United States Nuclear Regulatory Commission

Protecting People and the Environment

NUREG-1437, Volume 2
Revision 1

Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Public Comments

Final Report

Office of Nuclear Reactor Regulation

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Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Public Comments

Final Report

Manuscript Completed: May 2013
Date Published: June 2013

Office of Nuclear Reactor Regulation

Cover Sheet

Responsible Agency: U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation

Title: *Final Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (NUREG-1437) Volumes 1, 2, and 3, Revision 1

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Abstract

U.S. Nuclear Regulatory Commission (NRC) regulations allow for the renewal of commercial nuclear power plant operating licenses. To support the license renewal environmental review process, the NRC published the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS) in 1996. The proposed action considered in the GEIS is the renewal of nuclear power plant operating licenses.

Since publication of the GEIS, approximately 40 plant sites (70 reactor units) have applied for license renewal and undergone environmental reviews, the results of which were published as supplements to the 1996 GEIS. This GEIS revision reviews and reevaluates the issues and findings of the 1996 GEIS. Lessons learned and knowledge gained during previous license renewal reviews provide a significant source of new information for this assessment. In addition, new research, findings, public comments, and other information were considered in evaluating the significance of impacts associated with license renewal.

The intent of the GEIS is to determine which issues would result in the same impact at all nuclear power plants and which issues could result in different levels of impact at different plants and thus require a plant-specific analysis for impact determinations. The GEIS revision identifies 78 environmental impact issues for consideration in license renewal environmental reviews, 59 of which have been determined to be generic to all plant sites. The GEIS also evaluates a full range of alternatives to the proposed action. For most impact areas, the proposed action would have impacts that would be similar to or less than impacts of the alternatives, in large part because most alternatives would require new power plant construction, whereas the proposed action would not.

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Acronyms, Abbreviations, and Chemical Nomenclature

ABWR	advanced boiling water reactor
AC	alternating current
ACRS	Advisory Committee on Reactor Safeguards
ACS	American Cancer Society
ADAMS	Agencywide Documents Access and Management System
AEA	Atomic Energy Act
AEC	U.S. Atomic Energy Commission
AGNIR	Advisory Group on Non-ionizing Radiation
AIRFA	American Indian Religious Freedom Act of 1978
ALARA	as low as is reasonably achievable
ALI	annual limit on intake
APE	Area of Potential Effect
ALWR	advanced light water reactor
ASLB	Atomic Safety and Licensing Board
ASME	American Society of Mechanical Engineers
AWEA	American Wind Energy Association
BEIR	Biological Effects of Ionizing Radiation (National Research Council Committee)
BLM	U.S. Bureau of Land Management
BLS	U.S. Bureau of Labor Statistics
BMPs	best management practices
BPA	Bonneville Power Administration
BWR	boiling water reactor
BOEMRE	Bureau of Ocean Energy Management, Regulation, and Enforcement
CAA	Clean Air Act
CADHS	California Department of Health Services
CCS	carbon capture and storage
CCW	coal combustion waste
CDC	Centers for Disease Control and Prevention
CDF	core damage frequency
CdTe	cadmium telluride
CEC	California Energy Commission
CEDE	committed effective dose equivalent

CEG	Constellation Energy Group
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	capacity factor
CFR	*Code of Federal Regulations*
CGEC	California Geothermal Energy Collaborative
CH_4	methane
CHP	combined heat and power
CIGS	copper-indium-gallium-selenide
CLB	current licensing basis
CO	carbon monoxide
CO_2	carbon dioxide
COL	combined operating license
CSP	concentrating solar power
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DC	direct current
DDREF	dose and dose rate effectiveness factor
DNC	Dominion Nuclear Connecticut
DNI	direct normal insolation
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
DSM	demand-side management
EA	environmental assessment
EAB	exclusion area boundary
ECRR	European Committee on Radiation Risk
EEI	Edison Electric Institute
EERE	Energy Efficiency and Renewable Energy
EEZ	Exclusive Economic Zone
EF	enhanced Fujita (scale)
EFH	essential fish habitat
EGS	engineered geothermal systems
EI	exposure index
EIA	Energy Information Administration
EIML	Environmental Incorporated Midwest Laboratory
EIS	environmental impact statement
EJ	environmental justice
ELF-EMF	extremely low frequency-electromagnetic field

EMF	electromagnetic field
EMF-RAPID	Electric and Magnetic Fields Research and Public Information Dissemination (Program)
EP	emergency planning
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EPCRA	Emergency Planning and Community Right-to-Know Act
EPRI	Electric Power Research Institute
ER	environmental report
ERCOT	Electric Reliability Council of Texas
ERO	Electric Reliability Organization
ESA	Endangered Species Act
ESP	early site permit
Exelon	Exelon Generating Company LLC
F	Fujita (scale)
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDOH	Florida Department of Health
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FES	final environmental statement
FGD	flue gas desulfurization
FICN	Federal Interagency Committee on Noise
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FPL	Florida Power & Light Company
FR	*Federal Register*
FRCC	Florida Reliability Coordinating Council
FSAR	Final Safety Analysis Report
FS	U.S. Forest Service
GALL	Generic Aging Lessons Learned
GAO	U.S. General Accounting Office (now U.S. Government Accountability Office)
GCRP	U.S. Global Change Research Program
GDC	General Design Criterion
GEA	Geothermal Energy Association
GEIS	generic environmental impact statement
GHG	greenhouse gas
GIS	geographic information system
GNEP	Global Nuclear Energy Partnership

GSMFC	Gulf States Marine Fisheries Commission
GTCC	greater than Class C
HAP	hazardous air pollutant
HAPC	habitat area of particular concern
HAWT	horizontal axis wind turbine
HCCP	Harvard Center for Cancer Prevention
HDR	hot dry rock
HFC	hydrofluorocarbon
HCFC	hydrochlorofluorocarbon
HHV	higher heating value
HLW	high-level (radioactive) waste
HVAC	heating, ventilation, and air conditioning
IAEA	International Atomic Energy Agency
IARC	International Agency for Research on Cancer
ICM	Interim Compensatory Measure
ICRP	International Commission on Radiological Protection
IDPH	Illinois Department of Public Health
IDNR	Idaho Department of Natural Resources
IEEE	Institute of Electrical and Electronic Engineers
IGCC	integrated gasification combined cycle
IMP	Indiana Michigan Power
INIRC	International Non-Ionizing Radiation Commission
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
IRPA	International Radiation Protection Association
ISFSI	independent spent fuel storage installation
ISI	in-service inspection
IWSA	Integrated Waste Services Association
LERF	large early release frequency
LET	linear energy transfer
LFG	landfill gas
LLAP	*Legionella*-like amoebal pathogen
LLD	lower limit of detection
LLNL	Lawrence Livermore National Laboratory
LLW	low-level (radioactive) waste
LLRWPA	Low-Level Radioactive Waste Policy Act
LLTF	Lessons Learned Task Force
LLWPAA	Low-Level Radioactive Waste Policy Act Amendments

LOA	letter of authorization
LOEL	lowest observed effects level
LWR	light water reactor
MACCS	MELCOR Accident Consequence Code System
MACT	maximum achievable control technology
MCAQD	Maricopa County Air Quality Department
MCL	maximum contaminant level
MEI	maximally exposed individual
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSW	municipal solid waste
MTBE	methyl tertiary butyl ether
NAAQS	National Ambient Air Quality Standards
NaCl	sodium chloride (salt)
NAICS	North American Industry Classification System
NAGPRA	Native American Graves Protection and Repatriation Act
$NaNO_3$	sodium nitrate
NAS	National Academy of Sciences
National Register	*National Register of Historic Places*
NCDC	National Climatic Data Center
NCRP	National Council on Radiation Protection and Measurements
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act of 1969
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NETL	National Energy Technology Laboratory
NGCC	natural gas combined cycle
NGL	natural gas liquids
NHPA	National Historic Preservation Act of 1966
$(NH_4)SO_4$	ammonium sulfate
NIEHS	National Institute of Environmental Health Sciences
NIH	National Institutes of Health
NJDEP	New Jersey Department of Environmental Protection
NMC	Nuclear Management Company
NMFS	National Marine Fisheries Service
NO	nitrogen oxide
N_2O	nitrous oxide
NO_2	nitrogen dioxide

NOAA	National Oceanic and Atmospheric Administration
NORM	naturally occurring radioactive material
NOS	National Oceanic Service
NO_x	nitrogen oxides
NPCC	Northeast Power Coordinating Council
NPDES	National Pollutant Discharge Elimination System
NPP	nuclear power plant
NRC	U.S. Nuclear Regulatory Commission
NREL	National Renewable Energy Laboratory
NRPB	National Radiological Protection Board
NSPS	New Source Performance Standards
NWI	National Waste Initiative; National Wetland Inventory
NWPA	National Waste Policy Act
NYSDEC	New York State Department of Environmental Conservation
NYSDOL	New York State Department of Labor
O_3	ozone
OCS	Outer Continental Shelf
ODCM	Offsite Dose Calculation Manual
OPPD	Omaha Public Power District
OTA	Office of Technology Assessment
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PARS	Publicly Available Record System
Pb	lead
PC	pulverized coal
PCB	polychlorinated biphenyl
PDR	Public Document Room
PEIS	programmatic environmental impact statement
PFC	perfluorocarbon
PI	performance indicator
PILOT	payments in lieu of tax
PM	particulate matter
$PM_{2.5}$	particulate matter with a mean aerodynamic diameter of 2.5 μm or less
PM_{10}	particulate matter with a mean aerodynamic diameter of 10 μm or less
POTW	publicly owned treatment works
PPE	personal protective equipment
PRA	probabilistic risk assessment
PSD	prevention of significant deterioration
PTC	production tax credit

PURPA	Public Utility Regulatory Act of 1978
PV	photovoltaic
PVC	photovoltaic cell
PWR	pressurized water reactor
RCRA	Resource Conservation and Recovery Act of 1976
RD&D	research, development, and demonstration
RDF	refuse-derived fuel
REMP	Radiological Environmental Monitoring Program
RER	radiological effluent release
RERR	radiological effluent release report
RES	Renewable Energy Standard
RFC	Reliability First Corporation
ROP	Reactor Oversight Program
ROW	right-of-way
RPS	Renewable Portfolio Standards
RNA	ribonucleic acid
RRC	Regional Reliability Council
RRY	reference reactor year
SAAQS	State Ambient Air Quality Standards
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
SCE	Southern California Edison
SCR	selective catalytic reduction
SDWA	Safe Drinking Water Act
SEIS	supplemental environmental impact statement
SER	safety evaluation report
SFP	spent fuel pool
SHPO	State Historic Preservation Office or Officer
SIP	State implementation plan
SMITTR	surveillance, monitoring, inspection, testing, trending, and recordkeeping
SNYPSC	State of New York Public Service Commission
SO_2	sulfur dioxide
SOARCA	state-of-the-art reactor consequence analysis
SPAR	standardized plant analysis risk
SPDES	State Pollutant Discharge Elimination System
SPP	Southwest Power Pool
SRM	Staff Requirements Memorandum
SSCs	systems, structures, and components

Stat.	*Statutes at Large*
STG	steam turbine generator
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
TEDE	total effective dose equivalent
TESS	threatened and endangered species system
THPO	Tribal Historic Preservation Officer
TLD	thermoluminescence dosimeter
TSCA	Toxic Substances Control Act
TSS	total suspended solids
TTU	Texas Tech University
TVA	Tennessee Valley Authority
TXU	TXU Generation Company
UCB	upper confidence bound
UCS	Union of Concerned Scientists
UF_6	uranium hexafluoride
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
UO_2	uranium dioxide
U_3O_8	triuranium octaoxide
USACE	U.S. Army Corps of Engineers
USC	*United States Code*
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WCNOC	Wolf Creek Nuclear Operating Corporation
WCS	Waste Control Specialists LLC
WEC	wave energy capture
WGA	Western Governors' Association
WHO	World Health Organization

Shortened Nuclear Power Plant Names Used in This Report

Arkansas	Arkansas Nuclear One
Beaver Valley	Beaver Valley Power Station
Braidwood	Braidwood Station
Browns Ferry	Browns Ferry Nuclear Plant
Brunswick	Brunswick Steam Electric Plant
Byron	Byron Station
Callaway	Callaway Plant
Calvert Cliffs	Calvert Cliffs Nuclear Power Plant
Catawba	Catawba Nuclear Station
Clinton	Clinton Power Station
Columbia	Columbia Generating Station
Comanche Peak	Comanche Peak Steam Electric Station
Cooper	Cooper Nuclear Station
Crystal River	Crystal River Nuclear Power Plant
Cook	Donald C. Cook Nuclear Plant
Davis-Besse	Davis-Besse Nuclear Power Station
Diablo Canyon	Diablo Canyon Power Plant
Dresden	Dresden Nuclear Power Station
Arnold	Duane Arnold Energy Center
Farley	Joseph M. Farley Nuclear Plant
Fermi	Enrico Fermi Atomic Power Plant
FitzPatrick	James A. FitzPatrick Nuclear Power Plant
Fort Calhoun	Fort Calhoun Station
Ginna	R.E. Ginna Nuclear Power Plant
Grand Gulf	Grand Gulf Nuclear Station
Harris	Shearon Harris Nuclear Power Plant
Hatch	Edwin I. Hatch Nuclear Plant
Hope Creek	Hope Creek Generating Station
Indian Point	Indian Point Energy Center
Kewaunee	Kewaunee Power Station
LaSalle	LaSalle County Station
Limerick	Limerick Generating Station
McGuire	McGuire Nuclear Station
Millstone	Millstone Power Station
Monticello	Monticello Nuclear Generating Plant
Nine Mile Point	Nine Mile Point Nuclear Station
North Anna	North Anna Power Station
Oconee	Oconee Nuclear Station
Oyster Creek	Oyster Creek Nuclear Generating Station

Palisades	Palisades Nuclear Plant
Palo Verde	Palo Verde Nuclear Generating Station
Peach Bottom	Peach Bottom Atomic Power Station
Perry	Perry Nuclear Power Plant
Pilgrim	Pilgrim Nuclear Power Station
Point Beach	Point Beach Nuclear Plant
Prairie Island	Prairie Island Nuclear Generating Plant
Quad Cities	Quad Cities Nuclear Power Station
River Bend	River Bend Station
Robinson	H.B. Robinson Steam Electric Plant
St. Lucie	St. Lucie Nuclear Plant
Salem	Salem Nuclear Generating Station
San Onofre	San Onofre Nuclear Generating Station
Seabrook	Seabrook Station
Sequoyah	Sequoyah Nuclear Plant
South Texas	South Texas Project Electric Generating Station
Summer	Virgil C. Summer Nuclear Station
Surry	Surry Power Station
Susquehanna	Susquehanna Steam Electric Station
Three Mile Island	Three Mile Island, Unit 1
Turkey Point	Turkey Point Nuclear Plant
Vermont Yankee	Vermont Yankee Nuclear Power Station
Vogtle	Vogtle Electric Generating Plant
Waterford	Waterford Steam Electric Station
Watts Bar	Watts Bar Nuclear Plant
Wolf Creek	Wolf Creek Generating Station

Units of Measure

ac	acre(s)
bbl	barrel(s)
Btu	British thermal unit(s)
°C	degree(s) Celsius
cm	centimeter(s)
d	day(s)
dB	decibel(s)

°F	degree(s) Fahrenheit
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
gal	gallon(s)
gpd	gallon(s) per day
gpm	gallon(s) per minute
Gy	gray(s)
ha	hectare(s)
hr	hour(s)
Hz	hertz
in.	inch(es)
kg	kilogram(s)
km	kilometer(s)
kV	kilovolt(s)
kW	kilowatt(s)
kWh	kilowatt-hour(s)
L	liter(s)
lb	pound(s)
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mA	milliampere(s)
mg	milligram(s)
mG	milligauss
mGy	milligray(s)
MHz	megahertz
mi	mile(s)
min	minute(s)
mL	milliliter(s)
MMBtu	million Btu
MPa	megapascal(s)
mph	mile(s) per hour
mrad	milliard(s)
mrem	millirem(s)

Notation

mSv	millisievert(s)
mT	milliTesla(s)
MT	metric tonne(s)
MTHM	metric tonne(s) of heavy metal
MTU	metric tonne(s) of uranium
MW	megawatt(s)
MWe or MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt-hour(s)
pCi	picocurie(s)
ppm	part(s) per million
ppmv	parts per million by volume
ppt	part(s) per thousand
psi	pound(s) per square inch
rad	radian
rem	roentgen-equivalent-man
s	second(s)
scf	standard cubic foot (feet)
Sv	sievert(s)
T	tesla(s)
TPY	ton(s) per year
V	volt(s)
yr	year(s)
µCi	microcurie(s)
µGy	microgray(s)
µm	micrometer(s)
µT	microtesla(s)

Conversion Table

Multiply	By	To Obtain
To Convert English to Metric Equivalents		
acres	0.4047	hectares (ha)
cubic feet (ft^3)	0.02832	cubic meters (m^3)
cubic yards (yd^3)	0.7646	cubic meters (m^3)
curies (Ci)	3.7×10^{10}	becquerels (Bq)
degrees Fahrenheit (°F) -32	0.5555	degrees Celsius (°C)
feet (ft)	0.3048	meters (m)
gallons (gal)	3.785	liters (L)
gallons (gal)	0.003785	cubic meters (m^3)
inches (in.)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
pounds (lb)	0.4536	kilograms (kg)
rads	0.01	grays (Gy)
rems	0.01	sieverts (Sv)
short tons (tons)	907.2	kilograms (kg)
short tons (tons)	0.9072	metric tons (t)
square feet (ft^2)	0.09290	square meters (m^2)
square yards (yd^2)	0.8361	square meters (m^2)
square miles (mi^2)	2.590	square kilometers (km^2)
yards (yd)	0.9144	meters (m)
To Convert Metric to English Equivalents		
becquerels (Bq)	2.7×10^{-11}	curies (Ci)
centimeters (cm)	0.3937	inches (in.)
cubic meters (m^3)	35.31	cubic feet (ft^3)
cubic meters (m^3)	1.308	cubic yards (yd^3)
cubic meters (m^3)	264.2	gallons (gal)
degrees Celsius (°C) +17.78	1.8	degrees Fahrenheit (°F)
grays (Gy)	100	rads
hectares (ha)	2.471	acres
kilograms (kg)	2.205	pounds (lb)
kilograms (kg)	0.001102	short tons (tons)
kilometers (km)	0.6214	miles (mi)
liters (L)	0.2642	gallons (gal)
meters (m)	3.281	feet (ft)
meters (m)	1.094	yards (yd)
metric tons (t)	1.102	short tons (tons)
sieverts (Sv)	100	rems
square kilometers (km^2)	0.3861	square miles (mi^2)
square meters (m^2)	10.76	square feet (ft^2)
square meters (m^2)	1.196	square yards (yd^2)

Appendix A

Comments Received on the Environmental Review

Appendix A

Comments Received on the Environmental Review

A.1 Public Scoping

On June 3, 2003 (68 FR 33209), the U.S. Nuclear Regulatory Commission (NRC) issued, for public comment, a Notice of Intent to prepare an update of the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG–1437. In accordance with 10 CFR 51.26, the NRC conducted scoping meetings and collected comments from the public for the GEIS update.

The NRC conducted public scoping meetings in each of the four NRC regions for the License Renewal GEIS update. The public scoping meetings were held in Atlanta, Georgia; Chicago, Illinois; Anaheim, California; and Boston, Massachusetts. The NRC issued public scoping meeting summaries on August 12 and 13, 2003. The official transcripts from the public scoping meetings, written comments, and meeting summaries are available electronically for public inspection in the NRC Public Document Room (PDR) or from the NRC's Agencywide Documents Access and Management System (ADAMS) under package Accession Numbers ML032170942, ML032260339, ML032260715, and ML032170934. The scoping period for the GEIS update closed on September 17, 2003, but the Commission subsequently reopened it from October 3, 2005, to December 30, 2005 (70 FR 57628).

The NRC staff and its contractor reviewed the transcripts from the public meetings and all written materials received during the public comment periods. All comments were considered. The NRC staff prepared a scoping summary report for the GEIS update, which listed the comments received and the NRC responses thereto.

In accordance with 10 CFR 51.29(b), this report has been made publicly available at the PDR, located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852, or from ADAMS. The ADAMS Public Electronic Reading Room is accessible through the NRC's public website, www.nrc.gov. The Accession Number for the scoping summary report is ML082960910.

A.2 Public Comments Received on the Draft Revised GEIS

The NRC distributed the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Draft Report for Comment* (NUREG-1437, Revision 1, referred to as the draft revised Generic Environmental Impact Statement [GEIS]), along with the associated proposed rulemaking amending the NRC regulations at 10 CFR Part 51 (74 FR 38117), to Federal, State, and local government agencies; American Indian Tribes; environmental interest groups; and members of the public who requested copies of the draft. As part of the process to solicit public comments on the draft revised GEIS, the NRC:

- Placed a copy of the draft revised GEIS into the U.S. Nuclear Regulatory Commission's (NRC's) Public Electronic Reading Room and on its license renewal Web site;
- Sent requested copies of the draft revised GEIS to members of the public and environmental interest groups, representatives of American Indian Tribes, and Federal, State, and local government agencies;
- Published a notice of availability of the draft revised GEIS in the *Federal Register* on July 31, 2009 (74 FR 38239);
- Published a notice of an extension to the comment period from 75 to 165 days, which ended the comment period on January 12, 2010 (74 FR 51522);
- Issued public announcements, such as advertisements in local newspapers and postings in public places, of the availability of the draft revised GEIS;
- Announced and held public meetings in (1) Atlanta, Georgia, on September 15, 2009; (2) Newton, Massachusetts, on September 17, 2009; (3) Oak Brook, Illinois, on September 24, 2009; (4) Rockville, Maryland, on October 1, 2009; (5) Pismo Beach, California, on October 20, 2009; and (6) Dana Point, California, on October 22, 2009, to receive public comments on the draft revised GEIS;
- Issued public service announcements and press releases announcing the issuance of the draft revised GEIS, the public meetings, and instructions on how to comment on the draft revised GEIS; and
- Established several methods for the submittal of comments on the draft revised GEIS, including an email address to receive comments through the Internet.

During the public comment period on the draft revised GEIS, the NRC received a total of 24 comment letters, emails, and Web submissions in addition to comments received during the public meetings.[(a)] The NRC reviewed public meeting transcripts and comment letters, which have been incorporated by reference in this GEIS. The public meeting transcripts and comment letters have also been made available online in ADAMS as part of the NRC's Public Document Room.

Table A-2 identifies the individuals and representatives of environmental and public interest groups providing comments and the Commenter Identification Number associated with each person's set(s) of comments. Accession numbers indicate the location of the written comments in ADAMS.

The NRC categorized and consolidated specific comments according to issue topic. Comments expressing similar concerns were grouped to capture the common issues. Comments fall into one of the following general groups:

- Comments that were actually questions and introduced no new information.
- Comments that were related to support or opposition to renewing nuclear power plant operating licenses, opposed to nuclear power in general, or make general statements about the license renewal process. These comments may make only a general statement regarding environmental impact issues. In addition, they provide no new information and/or do not pertain to 10 CFR Part 51.
- Comments about an environmental impact issue in the GEIS that provide no new information that would require evaluation during the review.
- Comments about an environmental impact issue in the GEIS that provide new information that would require evaluation during the review.
- Comments that raise an environmental impact issue that was not addressed in the GEIS.
- Comments regarding alternatives to the proposed action or nuclear power.
- Comments outside the regulatory scope of license renewal (not related to 10 CFR Parts 51).

(a) The NRC received 32 comment submissions on the proposed rule and supporting documents. Twenty four contained comments on the draft revised GEIS. A comment submission contains one or more comments.

A.2.1 Comments and Responses

The following pages summarize the comments and suggestions received on the draft revised GEIS and discuss their disposition. Parenthetical numbers after each comment refer to the Commenter Identification and the comment number. Comments can be tracked to the commenter and the source document through the Commenter Identification listed in Table A-2.

Table A-1. Individuals Providing Comments on the Draft Revised GEIS[(a)]

Commenter Identification[(b)]	Commenter Name	Affiliation (if stated)	Comment Source and ADAMS Accession Number
AGA-NEI	Ralph Andersen	Nuclear Energy Institute	Atlanta, GA, Public Meeting ML092810007
NMA-NEI	John Snooks	Nuclear Energy Institute	Newton, MA, Public Meeting ML092931681
NMA-PW	Mary Lampert	Pilgrim Watch	Newton, MA, Public Meeting ML092931681
OBIL-Entergy	Rick Buckley	Entergy Nuclear	Oak Brook, IL, Public Meeting ML092931545
OBIL-NEI	Nancy Ranek	Nuclear Energy Institute Industry Task Force (Exelon Generation)	Oak Brook, IL, Public Meeting ML092931545
RMD-NEI1	Ralph Andersen	Nuclear Energy Institute	Rockville, MD, Public Meeting ML092931678
PBCA-Nelson	David Nelson	Private Citizen	Pismo Beach, CA, Public Meeting ML093070174
PBCA-SLOMFP1	Jane Swanson	San Luis Obispo Mothers for Peace	Pismo Beach, CA, Public Meeting ML093070174
PBCA-Cochran	June Cochran	Private Citizen	Pismo Beach, CA, Public Meeting ML093070174
PBCA-Schumann	Klaus Schumann	Private Citizen	Pismo Beach, CA, Public Meeting ML093070174
PBCA-SLOMFP2	June von Ruden	San Luis Obispo Mothers for Peace	Pismo Beach, CA, Public Meeting ML093070174
PBCA-Pinard	Peg Pinard	Private Citizen (Former County Supervisor and Mayor, San Luis Obispo, CA)	Pismo Beach, CA, Public Meeting ML093070174
PBCA-A4NR	David Weisman	Alliance for Nuclear Responsibility	Pismo Beach, CA, Public Meeting ML093070174
PBCA-Campbell	Bruce Campbell	Private Citizen	Pismo Beach, CA, Public Meeting ML093070174

Table A-2. (cont.)

Commenter Identification	Commenter Name	Affiliation (if stated)	Comment Source and ADAMS Accession Number
PBCA- Sierra	Andrew Christie	Sierra Club	Pismo Beach, CA, Public Meeting ML093070174
PBCA-Groot	Henrietta Groot	Private Citizen (Affiliated with Sierra Club, ECO, SLO, Mothers for Peace, Alliance for Nuclear Responsibility, and Committee for Unity with Nature of the Pacific)	Pismo Beach, CA, Public Meeting ML093070174
PBCA-Biesek	Jack Biesek	Private Citizen	Pismo Beach, CA, Public Meeting ML093070174
DPCA-PRWS	Dale Engelhardt	Permanent RAD Waste Solutions	Dana Point, CA, Public Meeting ML093100505
DPCA-UNASFV	Dorothy Boberg	United Nations Association of the San Fernando Valley	Dana Point, CA, Public Meeting ML093100505
DPCA-CREED1	Billie Pinnick Lovmark	Coalition for Responsible and Ethical Environmental Decisions	Dana Point, CA, Public Meeting ML093100505
DPCA-CREED2	Craig Beauchamp	68th AD, Coalition for Responsible and Ethical Environmental Decisions	Dana Point, CA, Public Meeting ML093100505
DPCA-Scott	Frank R. Scott	Private Citizen	Dana Point, CA, Public Meeting ML093100505
DPCA-A4NR	Nancy Casady	Alliance for Nuclear Responsibility	Dana Point, CA, Public Meeting ML093100505
DPCA-Costa	Byron Costa	Private Citizen	Dana Point, CA, Public Meeting ML093100505
DPCA-CREED3	Steve Netherby	Coalition for Responsible and Ethical Environmental Decisions	Dana Point, CA, Public Meeting ML093100505
DPCA-Nader	Tim Nader	Private Citizen (Former Mayor, Chula Vista, CA)	Dana Point, CA, Public Meeting ML093100505
DPCA-SHoffman	Sharon Hoffman	Private Citizen	Dana Point, CA, Public Meeting ML093100505
DPCA-AHoffman	Ace Hoffman	Private Citizen	Dana Point, CA, Public Meeting ML093100505
DPCA-SCG	Gary Headrick	San Clemente Green	Dana Point, CA, Public Meeting ML093100505

Table A-2. (cont.)

Commenter Identification	Commenter Name	Affiliation (if stated)	Comment Source and ADAMS Accession Number
DPCA-Exelby	Sandy Exelby	Private Citizen (Member of the League of Women Voters)	Dana Point, CA, Public Meeting ML093100505
DPCA-Collamer	Jerry Collamer	Private Citizen	Dana Point, CA, Public Meeting ML093100505
DPCA-A4NR1	Rochelle Becker	Alliance for Nuclear Responsibility	Dana Point, CA, Public Meeting ML093100505
DPCA-A4NR2	David Weisman	Alliance for Nuclear Responsibility	Dana Point, CA, Public Meeting ML093100505
DPCA-PHDCA	Ruth Hult Richter	Patrick Henry Democratic Club of America	Dana Point, CA, Public Meeting ML093100505
DPCA-Pack	Marion Pack	Private Citizen	Dana Point, CA, Public Meeting ML093100505
DPCA-CREED4	Lyn Harris	Coalition for Responsible and Ethical Environmental Decisions	Dana Point, CA, Public Meeting ML093100505
Mack-1	Eleanor T. Mack	Private Citizen	Email ML092170082
EPA-3 EPA-3(1)	Susan E. Bromm	U.S. Environmental Protection Agency	Letter with attachment ML092890603
Sierra-4	Andrew Christie	Sierra Club	Letter ML093430240
DWM-5	Kathryn Barnes	Don't Waste Michigan	Email ML100120408
PW-6 PW-6(1)	Mary Lampert	Pilgrim Watch	Web submission ML100130210
NEI1-7(4)	Ralph L. Andersen	Nuclear Energy Institute	Letter with attachment ML102110089
PIIC-8	Philip R. Mahowald	Prairie Island Indian Community	Email with attachment ML100150044
CEC-9 CEC-9(1)	James Boyd	California Energy Commission	Email with attachment ML100150045
CT AG-10	Richard Blumenthal	Connecticut Office of the Attorney General	Email with attachment ML100150046
A4NR-11	Rochelle Becker	Alliance for Nuclear Responsibility	Email with attachment ML100150047
NYS DEC-12	Joan Matthews	New York State	Email with attachment

Table A-2. (cont.)

Commenter Identification	Commenter Name	Affiliation (if stated)	Comment Source and ADAMS Accession Number
		Department of Environmental Conservation	ML100150083
SLOMFP-13	Jill ZamEk Jane Swanson	San Luis Obispo Mothers for Peace	Email with attachment ML100150145
NYS AG-14	Janice Dean	New York State Office of the Attorney General	Email with attachment ML100150111
Shaw-15	Sally Shaw	Private Citizen	Web submission ML100190372
Exelon-17	Michael P. Gallagher	Exelon Generation Company, LLC	Letter with attachment ML100250023
NY DOS-18	Jeffrey Zappieri	New York State Department of State	Letter ML100221838
BIA-19	Diane K. Rosen	U.S. Department of the Interior Bureau of Indian Affairs	Letter with attachment ML100261276
Riverkeeper-20	Phillip Musegaas Deborah Brancato	Riverkeeper, Inc	Letter with attachment ML100250236
Anon1-21	Anonymous–1		Hand delivered at Pismo Beach, CA, Public Meeting ML102240369
Denneen-22	Bill Denneen	Private Citizen	Hand delivered at Pismo Beach, CA, Public Meeting ML102240369
Schumann-27	Klaus Schumann	Private Citizen	Hand delivered at Pismo Beach, CA, Public Meeting ML102240658
Hoffman-30	Ace Hoffman	Private Citizen	Hand delivered at Dana Point, CA, Public Meeting ML102250150 ML102250153
Campbell-31	Bruce Campbell	Private Citizen	Email ML102280563
TVA-32	R.M. Krich	Tennessee Valley Authority	Letter ML100150043

(a) Specific comments pertaining to a comment document submission or public meeting are given NRC-assigned sequential comment numbers following the Commenter Identification (e.g., CEC-9-1, where “1” represents the first comment of the ninth comment submission from the California Energy Commission (CEC) and NMA-PW-4, where “4” represents the fourth verbal comment at the Newton, MA, public meeting, and it was made by Mary Lampert of Pilgrim Watch (PW). The NRC-assigned

Table A-2. (cont.)

Commenter Identification	Commenter Name	Affiliation (if stated)	Comment Source and ADAMS Accession Number
	sequential comment number is noted in the right margin of the annotated document submissions (ADAMS Accession No. ML12095A189) and public meeting transcripts (ADAMS Accession No. ML12095A179).		
(b)	Commenter Identifications beginning in "AGA," "NMA," "OBIL," "RMD," "PBCA," or "DPCA" indicate that comments were provided at the Atlanta, Newton, Oak Brook, Rockville, Pismo Beach, or Dana Point public meetings, respectively. For those Commenter Identifications ending in "- #," the # represents the document submission number. For those Commenter Identifications ending in "- #(#)," the first # represents the document submission number, and the second # represents the attachment number for that document.		

A single response may address several similar comments to avoid unnecessary duplication. Comments are grouped by category as follows:

A.2.1.1 Comments in Opposition to Renewing Nuclear Power Plant Operating Licenses and Opposed to Nuclear Power in General

A.2.1.2 Comments Concerning Land Use and Visual Impacts

A.2.1.3 Comments Concerning Air Quality, Meteorology, and Climatology

A.2.1.4 Comments Concerning Geology and Soils

A.2.1.5 Comments Concerning Water Quality, Hydrology, and Use

A.2.1.6 Comments Concerning Ecology: Aquatic Ecology, Terrestrial Ecology, Threatened and Endangered Species

A.2.1.7 Comments Concerning Historic and Cultural Resources

A.2.1.8 Comments Concerning Socioeconomics

A.2.1.9 Comments Concerning Human Health

A.2.1.10 Comments Concerning Uranium Fuel Cycle and Waste Management

A.2.1.11 Comments Concerning Cumulative Impacts

A.2.1.12 Comments Concerning Alternatives to Nuclear Power

A.2.1.13 Comments Concerning Postulated Accidents

A.2.1.14 Comments Concerning Decommissioning

A.2.1.15 Comments Concerning the License Renewal Process

A.2.1.16 Comments Concerning Issues Outside the Scope of License Renewal: Safeguards and Security; Emergency Preparedness; Need for Power; Aging Management; and Other Issues

A.2.1.17 Editorial Comments

A.2.1.18 Miscellaneous Comments

A.2.1.1 Comments in Opposition to Renewing Nuclear Power Plant Operating Licenses and Opposed to Nuclear Power in General

Comment: And I am asking tonight after these 24 or 25 years of working so hard with everybody on trying to visualize and actualize our state's Energy Action Plan and our state's law that says we won't have any more until they have a proven disposal, I think that I've come to the point where we have to say as Helen Caldicott told us when we said how can we protect ourselves? She said stop creating plutonium. So, that's mine, too. (DPCA-CREED4-48)

Comment: To give Southern California Edison permission to rebuild its San Onofre plant piecemeal starting with the steam generators probably is not against the law, but surely is against the will of the people who support the law about no nuclear power plants.

Please read my article on the table there. I noticed that many of you have looked at all of the materials over here and I gathered a lot of them, but also look at the table over here which represents citizen groups who have information to give you. (DPCA-UNASFV-4)

Comment: No license extensions -- especially for more unique facilities such as Diablo Canyon and San Onofre who have many unique features including seismic setting and various work related to seeking to have it withstand major quakes (though it is insufficient). (Campbell-31-23)

Comment: It is my belief that nuclear industry is dangerous and should be phased out and replaced with safe, renewable technologies///wind, water, solar. (DWM-5-2)

Response: *These comments express general opposition to nuclear power and renewing nuclear power plant operating licenses. No changes were made to the GEIS in response to these comments.*

A.2.1.2 Comments Concerning Land Use and Visual Impacts

Comment: I don't think too many people are annoyed about the architecture of the local nuclear plant, to be honest. And so those are just a few thoughts, there will be many thoughts in writing. (NMA-PW-16)

Response: *The comment apparently refers to a general lack of concern by the public with regard to the visual aesthetics of a nuclear power plant. Although this view may be held by many, visual aesthetics is typically evaluated in environmental impact statements, including those prepared by the NRC. No change to the GEIS was made in response to this comment.*

Comment: Page 4-6, lines 26 to 40: Text in lines 26 to 29 on page 4-6 reads as follows:

> Land use impact issues evaluated for the revised GEIS include: (1) the impacts of continued plant operations and refurbishment activities on onsite land use; (2) the impacts of continued plant operations and refurbishment activities on offsite land use; and (3) the impacts of transmission line ROWs on offsite land use.

Consistent with item (1) in the above-quoted statement from lines 26 through 29 on page 4-6 of the draft updated GEIS, the impacts of refurbishment activities should be, but is not, discussed in the subsection titled "Impacts on Onsite Land Use," which appears in lines 31 to 40 on page 4-6. (NEI1-7(4)-79)

Response: *Section 4.2.1.1 of the GEIS has been revised to clarify that refurbishment activities have not permanently changed onsite land use conditions.*

Comment: Page 4-7, lines 22 to 27: Text in lines 22 to 27 on page 4-7 reads as follows:

> For plants that have the potential to impact a coastal zone or coastal watershed, as defined by each State participating in the National Coastal Zone Management Program, licensees must certify that the proposed activity is consistent with the State Coastal Zone Management Program. Licensees must coordinate with the State agency that manages the State Coastal Zone Management Program with regard to the compatibility certification process for Federal projects within coastal zones.

Consider changing the paragraph in lines 22 through 27 on page 4-7 of the draft updated GEIS as follows to better explain how compliance with the Coastal Zone Management Act assures that impacts of license renewal will be small (~~strikethrough~~ font = deletion; *italics* font = addition):

For plants that have the potential to impact a coastal zone or coastal watershed, as defined by each State participating in the National Coastal Zone Management Program, ~~licensees~~ *applicants for license renewal* must ~~certify~~ *submit to the affected State a certification* that the proposed ~~activity~~*license renewal*, *which involves action by a Federal agency,* is consistent with the State'*s* Coastal Zone Management Program. ~~Licensees~~ *Applicants also* must coordinate with the State ~~agency~~*agencies* that manages the State Coastal Zone Management Program*s* ~~with regard to the compatibility certification process for Federal projects within coastal zones~~*to obtain determinations by the States that the proposed nuclear plant license renewal would be consistent with such programs. Consistency with State Coastal Zone Management Programs assures that land use impacts in State coastal zones will be small.* (NEI1-7(4)-80)

Response: *Section 4.2.1.1 of the GEIS has been revised, as suggested, to clarify the CZMA process.*

Comment: Page 4-7, lines 33 to 41: Text in lines 35 to 41 on page 4-7 is titled "Impacts of Transmission Line ROWs on Offsite Land Use" and reads as follows:

> Operational activities during the license renewal term would be similar to those occurring during the current license term and would not affect offsite land use in transmission line ROWs beyond what has already been affected. Certain land use activity in the ROW is usually restricted. Land cover is generally managed through a variety of maintenance procedures so that vegetation growth and building construction do not interfere with power line operation and access. Land use within ROWs is limited to activities that do not endanger power line operation; these include recreation, off-road vehicle use, grazing, agricultural cultivation, …

On page 3-3 in lines 38 and 39, the draft updated GEIS states that "only those transmission lines that connect the plant to the switchyard are considered within the scope of [the updated GEIS] review." On page 3-24 in lines 6 to 11, the draft updated GEIS states that "Power-transmission systems associated with nuclear power plants and considered within the scope of this review consist of switching stations (or substations) usually located on the plant site and the transmission lines that connect the plant to those substations. These systems are required to transfer power from the plant to the utility's network of power lines in its service area (the regional electrical distribution grid)." In addition, on page 3-24 the draft updated GEIS states that "in most cases, the transmission lines originating at the power plant substations are no longer owned or managed by the nuclear power plant licensees." Consider modifying the text in lines 35 through 41 on page 4-7 as follows for consistency with the above-quoted statements regarding the scope of the GEIS update with respect to transmission lines (~~strikethrough~~ font = deletion; *italics* font = addition):

As was previously discussed in section 3.1.6.5, in most cases, transmission lines originating at the power plant substations are no longer owned or managed by the nuclear power plant licensees. Accordingly, power-transmission systems associated with nuclear power plants and considered within the scope of this review consist of switching stations (or substations) usually located on the plant site and the transmission lines that connect the plant to those substations. These systems are required to transfer power from the plant to the utility's network of power lines in its service area (the regional electrical distribution grid). Operational activities *in offsite transmission line ROWs* during the license renewal term*, if any offsite ROWs fall within this scope of review,* would be similar to those occurring during the current license term and would not affect offsite land use in transmission line ROWs beyond what has already been affected. Certain land use activity in the ROW is usually restricted. Land cover is generally managed through a variety of maintenance procedures so that vegetation growth and building

construction do not interfere with power line operation and access. Land use within ROWs is limited to activities that do not endanger power line operation; these include recreation, off-road vehicle use, grazing, agricultural cultivation, … (NEI1-7(4)-81)

Response: *Section 4.2.1.1 of the GEIS has been revised to clarify what transmission lines are within the scope of the license renewal environmental review.*

Comment: The State of New York disputes the new characterization of offsite land use impacts in the Proposed GEIS as Category 1. *See* Proposed GEIS at 2-6 (Table 2.1-1), 4-7. The 1996 GEIS properly characterized impacts on offsite land use as a Category 2 issue that required a site-specific analysis by a license renewal applicant. However, relying on "license renewal reviews" subsequent to the 1996 GEIS, the Proposed GEIS concludes that "the impact of continued plant operations during the license renewal term and refurbishment on offsite use would be small at all plants," and therefore "is a Category 1 issue." *Id.* at 4-7.

Category 1 issues are those that meet *all* of the following criteria:

(1) The environmental impacts associated with the issue were determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics.

(2) A single significance level *(i.e.,* small, moderate, or large) was assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from the disposal of high-level waste and spent fuel).

(3) The mitigation of adverse impacts associated with the issue was considered in the analysis, and it was determined that additional plant-specific mitigation measures would probably not be. Sufficiently beneficial to warrant implementation.

Proposed GEIS at 4-2 – 4-3. Absent "new and significant" information, applicants need not analyze plant-specific impacts of Category 1 issues. *Id. at 4-3.* The Proposed GEIS thus would absolve individual license renewal applicants from having to analyze the impact of license renewal or non-renewal on offsite lands near their facilities.

In arriving at this determination, the Proposed GEIS identified only two categories of potential impacts on offsite land use: plant-related population changes and changes to tax revenues. *See* Proposed GEIS at 4-7. No other potential impacts were identified or analyzed. *See id.* Looking only at these two potential impacts, and looking only at data purportedly derived, but not identified, from post-1996 license renewal reviews, the Proposed GEIS concludes that "all plants" would experience the same impacts. *See id.*

But the Proposed GEIS fails to identify the impact of the no-action alternative on offsite land use as an issue. That is, the Proposed GEIS requires no analysis of the impact on land values in the vicinity of a nuclear facility if a license renewal application were denied. This analysis should be required. The impact of all types of power plants on property values has been established in peer-reviewed journals. *See, e.g., The Effect of Electric Utility Power Plant Location on Area Property Value,* Blomquist, G., *Land Economics,* Vol. 50, No. 1 (Feb. 1974) at 97-100. After adjusting for other factors, including property size and the demographic composition of the neighborhood, Blomquist found "a clear and statistically significant impact" of electric generating facilities on property values. *See Potential Impacts of Indian Point Relicensing on Property Values,* Stephen C. Sheppard, Ph.D. (Williams College, Economics) (2007) at 2 (attached as Ex. E) (ML073400193)("Sheppard Report").

A subsequent study determined that the impact on property values of nuclear power plants was, if anything, "larger" than the impact of fossil-fueled facilities *Id.* at 3 *(citing An Interregional Hedonic Analysis of Noxious Facility Impacts on Local Wages and Property Values,* Clark, D., and Nieves, L., *Journal of Environmental Economics and Management,* Vol. 27 (1994) at 235-253). Using data covering the entire country, and evaluating the impacts of 21 nuclear power plants, 39 coal-fired, and 53 gas- or oil-fired generating facilities, Clark and Nieves found impacts to offsite land uses "to a reasonable and professional accepted degree of scientific certainty from all types of power plant," and that the impact from nuclear generating facilities "is more than 3 times the impact of coal fired plants and more than 4 times the impact of gas and oil fired generating facilities." Sheppard Report at 3.6

The Proposed GEIS also improperly assumes that all impacts on offsite land use of an operating power plant are positive. *See generally* Proposed GEIS § 3.8 (socioeconomics) (nuclear facilities contribute to stable communities, provide jobs, employees occupy high cost housing, and facilities contribute to tax base). Conversely, the Proposed GEIS improperly assumes that virtually all impacts on offsite land use of the termination of operations would be negative. *See, e.g., id.* 4-204 - 4-205 (socioeconomic impacts of license termination would be bad with possible exception of impacts on traffic); *id.* at 4-192 (predicting that termination would result in loss of property tax revenue). As set forth in the Sheppard Report, and published literature, however, this is error. Indeed, the Proposed GEIS itself acknowledges that license termination would eliminate cooling tower drift, effluent discharges, and radionuclide emissions. Proposed GEIS at 4-199. Similarly, licensee termination would end cooling withdrawals and discharges, thus improving any nearby aquatic communities. *See id.* at 4-199 - 4-201. Inexplicably, however, the Proposed GEIS does not predict the potential impact on land use values of these important hedonic factors (nor does it require applicants to analyze them).

[[6] Unlike other studies, Clark and Nieves properly separated the impacts of the plants themselves from the employment or income-generating impacts of power plants. "This must be done to isolate the pure impact of the power plant that would be observed if the facility is completely replaced with an alternative use that is also capable of

generating employment and income." Sheppard Report at 3. By contrast, a subsequent study done by Clark and 3 others, including William Metz (see-GEIS at 3-28, 3-29, 3-164), inappropriately combined the discrete impacts of (1) job accessibility with (2) disamenity and nuisance associated with proximity to a nuclear power plants. "Combining these two impacts would be an appropriate technique for estimating the impact of the nuclear power plant ONLY in the case where the counter-factual being evaluated was complete removal and abandonment of the land." Sheppard Report at 3 (emphasis omitted).]

A license renewal applicant must analyze all potential impacts of the no-action alternative on offsite land use and must specifically address the impact of non-renewal on nearby property values. The kind of analysis necessary to determine the impact on surrounding real property of license renewal or non-renewal could not be done generically but would, instead, depend upon a site-specific analysis. Plainly, the impact of a facility in a rural area would be different than one in a semi-urban area, a fact the Proposed GEIS acknowledges. *See* Proposed GEIS at S-14 (changes in plant operations would have a greater impact in rural than semi-urban neighborhoods); *id. at* 4-204 - 4-205 (comparing socioeconomic consequences of license termination of plants in semi-urban areas to those in rural areas).

If the presence of the nuclear power generating plant has a significant impact on property values, then it logically follows that extending the license will have a significant impact on property which in turn will affect land use by affecting the decisions made by thousands of property owners and developers. Whether this significant impact exists is a scientifically testable question.

Sheppard Report at 2. Because the Proposed GEIS ignores the need to analyze the full panoply of impacts of license renewal or non-renewal on adjacent land values, it improperly categorizes offsite land use impacts as Category 1. Because Category 1 issues must share a single significance level offsite land use must be a Category 2 issue. *See* Proposed GEIS at 4-3 ("Category 2 issues are those that do not meet one or more of the criteria of Category 1 and for which, therefore, an additional plant specific review is required"); *see id.* (Category 1 issues must share a single significance level). (NYS AG-14-9)

Comment: Finally, the Proposed GEIS also improperly determines that offsite land use impacts would be uniformly "small." *See* Proposed GEIS at S-6, 2-6 (Table 2.1-1), 4-6.

The NRC's standard of significance for impacts uses the Council on Environmental Quality (CEQ) terminology for "significantly" (40 CFR 1508.27), which requires consideration of both "context" and "intensity." The NRC used the CEQ terminology to establish three significance levels: small, moderate, and large. The definitions of the three significance levels, which are presented in the footnotes to Table B-1 of 10 C.F.R. Part 51, Subpart A, Appendix B, follow:

- Small impact: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts do not exceed permissible level in the Commission's regulations are considered small.

- Moderate impact: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

- Large impact: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Proposed GEIS at S-4 – S-5.

Again, however, the Proposed GEIS focuses only on the impacts of plant-related population changes and tax revenue changes. *Id.* at 4-7. ("The NRC has not identified any information or situations, including low population areas or population and tax revenue changes resulting from license renewal that would alter the conclusion that impacts would be small for all nuclear power plants"). But "there is clear scientific evidence that the presence of nuclear generating plants can reduce the value of property in the area around the plant." *Potential Impacts of Indian Point Relicensing on Property Values,* Stephen C. Sheppard, Ph.D. (Williams College, Economics) (2007) at 4. And, although there are differences in properly done studies "about how far the impact might extend, and about the magnitude of the impact," all properly done studies, "indicate the potential for a significant, not a small, impact." *Id.* Indeed, the Proposed GEIS itself acknowledges the possibility of a significant offsite land use impact. Describing a land use study done and relied upon for the 1996 GEIS, the Proposed GEIS describes impacts that were "small at two sites, moderate at four sites, and significant at one site depending on the local jurisdiction's ability to provide the public services necessary to support substantial industrial development." *Id.* at 3-29. Offsite land use "impacts at the Wolf Creek plant in Kansas were determined to be potentially significant if the plant was shut down." *Id.* The looming property tax crisis was averted. *See* Proposed GEIS at 3-129. But the fact that the crisis was averted does not alter the fact that the Wolf Creek facility had a significant impact on offsite land use. And it does not matter that the "significant" impact was not ultimately adverse.

The Proposed GEIS's decision to characterize all potential impacts on offsite land use as "small" is unsupported by both the relevant scientific studies and the proposed GEIS itself. *See Impacts of Indian Point Relicensing on Property Values* at 2-4 (electric generating facilities have a clear and statistically significant impact on residential property values, particularly on properties within a 2 mile radius) Sheppard, S. C., 2007); *see also* Proposed GEIS at 3-29 (case study of land use changes in host communities indicated that potential impacts included moderate and significant impacts). As the ASLB in the Indian Point relicensing proceeding

properly found, a license renewal applicant must "consider the impact on real estate values that would be caused by license renewal or non-renewal." Order, *Matter of Entergy Nuclear Operations, Inc.* at 82-83 (Indian Point Nuclear Generating Units 2 and 3) (ASLBP No. 07-858-03-LR-BD01) (Jul. 31, 2008) at 83. (NYS AG-14-11)

Response: *The commenter makes the following main points: (1) The revised GEIS has improperly classified offsite land use as a Category 1 issue and, at the same time, has improperly assigned an impact level of SMALL. (2) By only focusing on plant-related population changes and changes to tax revenues in the offsite land use issue, the revised GEIS fails to include the impact to land and property values in the vicinity of a nuclear power plant if a license renewal application were denied (that is, the no-action alternative).*

In both the 1996 GEIS and the revised GEIS, the offsite land use issue(s)[(b)] consider the environmental impacts of license renewal on the use of offsite land (e.g., use for agricultural, residential, commercial, or industrial purposes), not on the value of such land. The issue is whether continued nuclear power plant operations and refurbishment activities during the license renewal term would cause offsite land use to change. For example, would nuclear power plant operations during the license renewal term or refurbishment cause agricultural land to be converted to residential use for housing or commercial use for retail services? Based on overly conservative estimates of the impacts from refurbishment, the 1996 GEIS assessed that offsite land use impacts could range from SMALL to LARGE. As explained in the revised GEIS, completed environmental reviews have subsequently shown that the impact of continued operations during the license renewal term and refurbishment has had little or no effect on offsite land use. The 1996 GEIS described the potential for population and tax revenue changes to alter offsite land use. As demonstrated in plant-specific license renewal environmental reviews conducted since the issuance of the 1996 GEIS, these population and tax revenue changes simply have not come to fruition.

Members of the public, environmental interest groups, industry representatives, and other Federal, state, and local governmental agencies assisted the NRC in identifying 92 license renewal environmental (NEPA) issues during the preparation of the 1996 GEIS (see Section 1.5 of the 1996 GEIS). Offsite land use impacts during the license renewal term and from refurbishment were identified from public comments and workshop discussions as two separate Category 2 issues needing to be addressed in plant-specific SEISs. Besides tax-revenue and population-driven impacts, no other issues associated with offsite land use impacts were identified during this vetting process.

(b) The 1996 GEIS had two offsite land use issues, one for refurbishment and the other for continuing operations. Both issues were classified as Category 2. The revised GEIS combined these two issues into one and reclassified the issue to Category 1.

Land and property values are not part of the offsite land use issue. Therefore, the NRC interprets the comment as a request to consider the impacts of license renewal on land and property values as a separate socioeconomic issue in the revised GEIS, which is the topic of discussion for the remainder of this response. The proposed federal action is renewal of a nuclear power plant's operating license. Accordingly, the question is whether the NRC's license renewal decision will affect offsite land and property values, and if so, will the impact be significant. In this regard, the commenter asserts that the revised GEIS analysis should consider the impact on land and property values resulting from the denial of a license renewal application. For the reasons set forth below, the NRC concludes that any impacts on land and property values resulting from a decision on a license renewal application will be negligible, for the approval of a license renewal decision, and remote and speculative, for the denial of a license renewal application. Therefore, the NRC disagrees with the comment for the reasons set forth below.

For this GEIS revision, the NRC re-evaluated the 92 environmental issues to determine if the findings from the 1996 GEIS remain valid. In doing so, the NRC considered the need to modify, add to, group, or delete any issue. During two public scoping periods in 2003 and 2005, the impact of continued nuclear plant operations and refurbishment on land and property values was not identified as an issue needing to be addressed either in site-specific license renewal environmental reviews or generically. Thus, the impacts of license renewal to offsite land and property values were never raised during the scoping processes for the 1996 GEIS and for the current GEIS revision, either as part of the offsite land use issue or as a separate socioeconomic issue. Additionally, the NRC has conducted over 40 license renewal environmental reviews since the issuance of the 1996 GEIS, and in only one matter thus far, the presently ongoing Indian Point proceeding, has the issue of offsite land and property value impacts been raised.[(c)] In that case, the issue was raised by the commenter, who is an intervenor in the Indian Point proceeding. Thus, the NRC has determined that the impact of license renewal on offsite land and property values is not controversial nor does it appear to be a matter of broad public concern.

Moreover, the scoping process is not just about discovering what issues should be included in the scope of an EIS; it is also intended to unearth issues that should not be included. As stated in 10 CFR 51.29(a)(3), scoping should "[i]dentify and eliminate from detailed study issues which are peripheral or are not significant…" In accordance with this provision, the NRC has determined that, for the reasons stated in the preceding paragraph, impacts on land and property values will not be evaluated as an issue in the GEIS.

(c) The Indian Point nuclear power plant is located in Buchanan, New York.

The commenter refers to three studies for the proposition that power plants, particularly nuclear power plants, have a negative impact on nearby property values. Two of the three studies cited by the commenter, the Blomquist study[(d)] and the Clark and Nieves study,[(e)] do not consider the impacts resulting from the approval or disapproval of a plant's license renewal application. The Blomquist study, which was published in 1974, "estimated the total impact on residential property values of one amenity factor, a power plant."[(f)] The study focused on one relatively small coal burning power plant, the Winnetka Power Plant in Winnetka, Illinois (a suburb of Chicago).[(g)] The data relied upon by the study was taken from the 1970 census.[(h)] The Blomquist study concluded, based upon this case study of the Winnetka Power Plant, that power plants have a negative impact on the values of surrounding properties.

The second study cited by the commenter, the Clark and Nieves study, which was published in 1994, concerned a variety of "noxious facilities" and the negative impact of such facilities on residential property values, specifically, a value the study defined as "housing rent."[(i)] In addition to nuclear power plants, the study considered several other classes of "noxious facilities" (e.g., coal-fired electric generating plants, gas- and oil-fired electric generating plants, military chemical weapons storage sites slated for decommissioning, chemical or radioactive hazardous waste sites, petrochemical refineries, and liquefied natural gas storage facilities).[(j)] Although published in 1994, the study selected specific sites using data from the 1980 census.[(k)] In addition, the study used other data to construct "a data set that provides details of wage and housing values, as well as the locational features of those markets. All of the data are for 1976-1980."[(l)] The study's authors found that nuclear plants "have a relatively strong negative influence on local economies," and that this finding was "inconsistent with results of authors who have applied an intracity modeling approach to data for relatively small local areas . . . and found little significant effect."[(m)]

(d) G. Blomquist, "The Effect of Electric Utility Power Plant Location on Area Property Value," Land Economics, Vol. 50, No. 1, 97-100 (February 1974).
(e) D. Clark and L. Nieves, "An Interregional Hedonic Analysis of Noxious Facility Impacts on Local Wages and Property Values," *Journal of Environmental Economics and Management,* Vol. 27, 235-253 (1994).
(f) Blomquist at 97.
(g) *Id*.
(h) *Id*.
(i) Clark and Nieves at 243 ("The annual housing rent . . . component of housing value is derived from the owner's estimate of the market value of the residence"). As part of its analysis, the study also looked at wages. Clark and Nieves at 240-244, and 248.
(j) *Id.* at 238.
(k) *Id.* at 239.
(l) *Id.* at 240.
(m) *Id.* at 250.

Both the Blomquist study and the Clark and Nieves study analyze the impact of an existing plant on residential property values; neither study considers the impacts on commercial or industrial property values. Both studies predate the NRC's first license renewal decision in March 2000 (extension of the operating license for the Calvert Cliffs plant, located in Lusby, MD, to 2034 (for Unit 1) and 2036 (for Unit 2)). In the case of the Clark and Nieves study, the data relied upon is at least 20 years earlier, and in the case of Blomquist, at least 30 years earlier, than this first license renewal decision. The Blomquist study does not analyze nuclear power plants at all, and the Clark and Nieves study only analyzes nuclear power plants amongst a series of other "noxious facilities." Neither study addresses the license renewal decision, which is the agency action being evaluated in the revised GEIS.

The third study cited by the commenter was prepared by Stephen C. Sheppard, Ph.D., one of the commenter's expert witnesses in the Indian Point license renewal proceeding ("Sheppard study").[(n)] *The Sheppard study focuses exclusively on the license renewal decision for the Indian Point plant and its analysis is limited to census block groups immediately surrounding that plant. Thus, the Sheppard study does not purport to analyze the impacts of license renewal on offsite land and property values for any other nuclear power plant or for nuclear power plants in general. The Sheppard study relies upon data from the 2000 census.*[(o)] *The Sheppard study, like the other two studies cited by the commenter, only analyzes residential property values.*[(p)] *After referring to the Blomquist and the Clark and Nieves studies, as well as brief references to a few other studies, the Sheppard study discusses the no-action alternative (i.e., the denial of the license renewal application). The Sheppard study states that following the decommissioning of Indian Point, "the highest and best alternative use of the site where the nuclear power plant is located would certainly NOT be abandonment, but rather a combination of attractive riverfront development that would be likely to include employment and other attractive locations."*[(q)] *Following a brief analysis, the Sheppard study concludes that residential property values would increase following removal of "the impacts of the Indian Point Nuclear plant."*[(r)]

The term of an initial operating license is 40 years, and a utility may not submit a license renewal application earlier than 20 years before the expiration of the operating license (10 CFR 54.17(c)). The decision will either extend the term of the operating license or not. The NRC license renewal decision does not authorize any major new construction, significant ground-disturbing activities or any other physical changes to the existing power plant; a license renewal decision will not result in the footprint of the plant either increasing or decreasing. And, as described further below, a denial of the license renewal application will, in all likelihood, result

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(n) S. Sheppard, "Potential Impacts of Indian Point Relicensing on Property Values," (2007).
(o) Sheppard at 4.
(p) Sheppard at 4, 6.
(q) Sheppard at 3 (emphasis in the original).
(r) Sheppard at 6.

in no discernible change to the physical plant and have little, if any, impact on land and property values.

In particular, the NRC disagrees with the commenter's logic, based upon the Sheppard study, that "[i]f the presence of the nuclear power generating plant has a significant impact on property values, then it logically follows that extending the license will have a significant impact on property which in turn will affect land use by affecting the decisions made by thousands of property owners and developers."[(s)] The NRC has concluded that any impact to offsite land and property values, either negative or positive, would have occurred when the nuclear power plant received its construction permit and operating license. The nuclear plant would have been in existence, and operating, for a minimum of twenty years prior to the submission of a license renewal application. If the NRC approves the request for license renewal, the incremental effect of an additional 20 years of reactor operations and related refurbishment activities on offsite land and property values would be negligible compared to any impacts that may have already occurred when the plant was first sited, built, and commenced operation. If the NRC denies the request for license renewal, any effect on property values would be remote and speculative—as described below, the effect will be so far removed in time from the license renewal decision as to render any attempt to measure the impact speculative.

The commenter asserts that if the NRC decides to not renew the operating license (the no-action alternative), the negative impacts to land and property values would come to an end. The NRC, however, does not consider this a likely or immediate occurrence. Following the expiration of the operating license, the nuclear power plant would then go into decommissioning. The decommissioning of nuclear facilities typically takes many years, so any nuclear power plant site would remain in existence for an extended period of time after ceasing operations. The impacts of terminating nuclear power plant operations and decommissioning are discussed in the revised GEIS in Section 4.12.2.1 (additional information related to the environmental impacts of decommissioning can be found in NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors.") Moreover, given that there is currently no long-term disposal site for the storage of spent nuclear fuel, it is probable that spent nuclear fuel and possibly other radioactive materials would remain at the nuclear power plant site for an extended period of time after cessation of operations.

Further, if the NRC does not renew the operating license, it is likely that the nuclear plant site would remain an industrial site. In this regard, the utility already owns, or holds by long-term lease, the land upon which the power plant is situated. The physical infrastructure already exists (including turbines, generators, electrical transfer stations, cooling towers, intake and discharge structures, and other industrial improvements or equipment) and is already connected

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(s) Sheppard at 2.

to the regional electrical grid. Moreover, the utility holds a host of Federal, State, and local permits allowing it to operate and has a trained workforce. The demand for electric power will also continue to exist. With this substantial investment in place, and the continuing demand for electricity, a power plant owner/operator may very well opt to continue to generate electricity at the site using another type of fuel (e.g., a coal or natural gas-fired power plant), unless the site is re-zoned.[t] *Thus, the NRC considers it likely that the site will remain a "brownfield" industrial site for many years following the termination of reactor operations, either as the site of a decommissioned nuclear power plant alone, or as a decommissioned nuclear power plant together with an operating non-nuclear power plant.*

Given the likelihood that the plant would remain a "brownfield" site for many years, the NRC concludes that any impacts on offsite land and property values as a result of a change from operating to decommissioning status or from a nuclear power plant to another type of power plant would be negligible compared to those impacts that may have occurred when the plant was constructed and commenced operation. Further, any attempt to estimate when the site would convert from a "brownfield" site to a site more acceptable to the commenter (again, the Sheppard study suggested, for the Indian Point plant, a "combination of attractive riverfront development that would be likely to include employment and other attractive locations") and the impacts on offsite land and property values as a result of such conversion would be both remote (in time) and speculative.

Also, as discussed above, the impacts of license renewal on offsite land and property values have only been raised by this commenter; the issue does not appear to be one of broad public concern or controversy (a possible criterion for inclusion of an issue in an EIS) and, under the NRC's scoping regulation (10 CFR 51.29), the issue can be excluded from the GEIS. The primary support relied upon by the commenter, the Sheppard study, focuses exclusively on one nuclear power plant, Indian Point. The focus of the GEIS is to identify and address the consequences of the proposed action (license renewal) that are common to all nuclear power plants and are thus dispositioned generically as Category 1 issues. If new and significant information concerning the impacts of license renewal on offsite land and property values arises during the scoping process for any site-specific license renewal environmental review or in a public comment made on a draft SEIS, the NRC will consider and evaluate such new and significant information. Any offsite land use impact issues under the no-action alternative (i.e., not renewing the operating license) would be addressed in an individual plant-specific SEIS. For the reasons set forth above, impacts on offsite land and property values do not warrant consideration in the GEIS.

(t) Any re-zoning action by the local zoning authority would only become effective after the plant was fully decommissioned. In addition, if the re-zoning action is opposed by the plant owner/operator, the re-zoning action may be considered a taking, thus requiring payment to the plant owner/operator of the fair market value of the property.

No changes were made to the revised GEIS in response to this comment.

Comment: The proposed GEIS also ignores the impact on offsite property values of increasing amounts of stored spent fuel generated by a facility as to which an extended license is sought. The impact on surrounding property values is ignored even though the proposed GEIS acknowledges that onsite storage will be necessary and will exceed original design capacity.

The Waste Confidence Findings and their related regulations at 10 C.F.R. § 51.23, "leave the onsite storage of spent nuclear fuel during the term of plant operation as the only option at the time of license renewal ....Until a permanent high-level waste repository is operational, the spent nuclear fuel will be safely stored either onsite or at offsite interim storage facilities (NRC 2006)." Proposed GEIS at 1-7. "Given the delays in the opening of the repository [for spent nuclear fuel], it is likely that power plants would have to expand their spent fuel storage capacity beyond their original design" capacity. Proposed GEIS at 4-226. Moreover, "[t]he most significant irreversible and irretrievable commitment of resources related to nuclear power plant operations during the license renewal term would be ... the land used to dispose of wastes, including the spent nuclear fuel generated during the license renewal term." Proposed GEIS at 4-231.

The Proposed GEIS itself thus acknowledges that some facilities will indefinitely continue to store spent nuclear fuel onsite during and after any license renewal term. *See also* Proposed GEIS at 4-165 - 4-168. Yet the Proposed GEIS does not require license renewal applicants to analyze the site-specific offsite land use impacts of this increased onsite storage. *See id.* This omission is inconsistent with the Proposed GEIS's concession that "[u]navoidable adverse impacts would vary among plants and would depend on the specific characteristics of each plant and its interaction with the environment. These unavoidable adverse impacts would need to be evaluated in plant-specific SEISs." Proposed GEIS at 4-288. Indeed, the Proposed GEIS acknowledges that the storage issues at each facility will differ, *see id.* at 4-166 ("interim storage needs vary among the plants, with older units likely to lose pool storage capacity sooner than new ones") yet nonetheless concludes that "the issue remains a Category 1 issue." *id.* at 4-168.

Minimally, license renewal applicants must analyze the impact on offsite land uses, including property values, of the increased and indefinite storage of spent nuclear fuel generated during the license renewal term. Applicants should address the impacts to property values in the areas surrounding the stored spent fuel, whether the spent fuel is stored in spent fuel pools or in onsite dry cask storage areas. This critical issue cannot be overlooked and cannot be analyzed generically. The Waste Confidence Rule does not relieve license renewal applicants of the need to analyze the impact on offsite land use of the undisputed increase in the indefinite storage of spent nuclear fuel at facilities located in a wide variety of settings (where impacts can be expected to differ greatly). (NYS AG-14-10)

Response: *The commenter expressed concern over possible impacts to offsite land use and land and property values as a result of the onsite storage of spent fuel. While this comment refers only to spent nuclear fuel, the commenter is essentially making the same argument presented in NYS AG-14-9 and NYS AG-14-11 with regard to the impacts on offsite land use and land and property values from a license renewal decision (see the NRC response to the NYS AG-14-9 and NYS AG-14-11 comments).*

The commenter also expressed concern about the "increased and indefinite storage of spent nuclear fuel generated during the license renewal term."

The NRC is committed to ensuring that both spent nuclear fuel and low-level radioactive wastes are managed to prevent health impacts to the public. Spent nuclear fuel is currently stored at reactor sites in the spent fuel pools and/or in independent spent fuel storage installations (ISFSIs). This practice is expected to continue until DOE is ready to take possession of the spent nuclear fuel. At this time, it is uncertain when this will happen.

Interim storage needs vary among plants, with older units having less available pool storage capacity than newer ones. However, given the uncertainty as to when a geologic repository will open and lack of other options, it is likely that some sort of expanded spent fuel storage capacity beyond the original design capacity will be needed at all nuclear power plants.

For spent nuclear fuel, the Waste Confidence Decision and Rule represented the Commission's generic determination that spent nuclear fuel can continue to be stored safely and without significant environmental impacts for a period of time after the end of the licensed life for operation of a nuclear power plant (after the permanent shutdown of the power reactor and expiration of the plant's operating license). This generic determination, codified in 10 CFR 51.23(a), meant that the NRC did not need to consider the storage of spent nuclear fuel after the end of a reactor's licensed life for operation in the National Environmental Policy Act (NEPA) documents that support its reactor and spent-fuel storage license application reviews.

On December 23, 2010, the Commission published a revision of the Waste Confidence Decision and Rule to reflect information gained based on experience in the storage of spent nuclear fuel and the increased uncertainty in the siting and construction of a permanent geologic repository for the disposal of spent nuclear fuel and high-level waste. In response to the 2010 Waste Confidence Decision and Rule, the states of New York, New Jersey, Connecticut, and Vermont, and several other parties challenged the Commission's NEPA analysis in the decision, which provided the regulatory basis for the rule. On June 8, 2012, the United States Court of Appeals, in New York v. NRC, 681 F.3d 471 (D.C. Cir. 2012), vacated the NRC's Waste Confidence Decision and Rule, after finding that it did not comply with NEPA.

In response to the court's ruling, the Commission issued CLI-12-16 on August 7, 2012, in which the Commission determined that it would not issue licenses that rely upon the Waste Confidence Decision and Rule until the issues identified in the court's decision are appropriately addressed by the Commission. CLI-12-16 provided, however, that the decision not to issue licenses only applied to final license issuance; all licensing reviews and proceedings should continue to move forward. In SRM-COMSECY-12-0016, dated September 6, 2012, the Commission directed the NRC staff to proceed with a rulemaking that includes the development of a generic EIS to support a revised Waste Confidence Decision and Rule and to publish both the EIS and the revised Waste Confidence Decision and Rule in the Federal Register within 24 months (by September 6, 2014). The Commission indicated that both the EIS and the revised Waste Confidence Decision and Rule should build on the information already documented in various NRC studies and reports, including the existing environmental assessment that the NRC developed as part of the 2010 Waste Confidence Decision and Rule. The Commission directed that any additional analyses should focus on the issues identified in the D.C. Circuit's decision. The Commission also directed that the NRC staff provide ample opportunity for public comment on both the draft EIS and the proposed Waste Confidence Decision and Rule.

In accordance with CLI-12-16, the NRC will not approve any site-specific license renewal applications until the deficiencies identified in the D.C. Circuit's decision have been resolved. Two license renewal issues that rely, wholly or in part, upon the Waste Confidence Decision and Rule are the "onsite storage of spent nuclear fuel" and "offsite radiological impacts of spent nuclear fuel and high-level waste disposal." Both of these issues were classified as Category 1 in the 1996 GEIS and the 10 CFR Part 51 final rule that was promulgated in 1996 (61 FR 28467, June 5, 1996), which codified the findings of the 1996 GEIS into 10 CFR Part 51, Subpart A, Appendix B, Table B-1. The draft revised GEIS that was published for public comment in 2009 (74 FR 38239, July 31, 2009) and the concomitant proposed rule (74 FR 38117, July 31, 2009) continued the Category 1 classification for both of these issues. As part of the NRC's response to the New York v. NRC decision, the NRC has revised these two issues accordingly.

Specifically, the NRC has revised the Category 1 issue, "Onsite storage of spent nuclear fuel," to narrow the period of onsite storage to the license renewal term. In both the 1996 GEIS and rule and the 2009 draft revised GEIS and proposed rule, the NRC relied upon the Waste Confidence Decision and Rule to make a generic finding that spent nuclear fuel could be stored safely onsite with no more than a small environmental impact for the term of the extended license (from approval of the license renewal application to the expiration of the operating license) plus a 30 year period following the permanent shutdown of the power reactor and expiration of the operating license.

The Waste Confidence Decision and Rule provided the basis for the 30 year period following the permanent shutdown of the reactor and expiration of the operating license. The 2010 Waste Confidence Decision and Rule extended this post-reactor shutdown onsite storage period from 30 years to 60 years. Given the New York v. NRC decision, and pending the issuance of a generic EIS and revised Waste Confidence Decision and Rule (as directed by SRM-COMSECY-12-0016), the period of onsite storage of spent nuclear fuel following the permanent shutdown of the power reactor and expiration of the operating license is now excluded from this GEIS issue. This issue now only covers the onsite storage of spent fuel during the license renewal term.

Similarly, the NRC has revised the Category 1 issue, "Offsite radiological impacts of spent nuclear fuel and high-level waste disposal." This issue pertains to the long-term disposal of spent nuclear fuel and high-level waste, including possible disposal in a deep geologic repository. Although the Waste Confidence Decision and Rule did not assess the impacts associated with disposal of spent nuclear fuel and high-level waste in a repository, it did reflect the Commission's confidence, at the time, in the technical feasibility of a repository and when that repository could have been expected to become available. Without the analysis in the Waste Confidence Decision, the NRC cannot assess how long the spent fuel will need to be stored onsite. Therefore, the NRC has reclassified this issue from a Category 1 issue with no assigned impact level to an uncategorized issue with an impact level of uncertain.

Upon issuance of the revised Waste Confidence Decision and Rule and its supporting generic EIS, the NRC will make any necessary conforming amendments to its regulations in 10 CFR Part 51 and supplement the GEIS as necessary. As referenced previously, the Commission will not approve any license renewal application for an operating nuclear power plant until the issues identified in the New York v. NRC court's decision are appropriately addressed by the Commission.

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Aesthetic impacts: Large scale alterations may occur as a result of nuclear power plant re-licensure. For facilities that are proposed to be significantly altered, aesthetic impacts should be considered in a SEIS. (NY DOS-18-2)

Response: *To date, there have been no significant alterations of nuclear power plant facilities associated with license renewal that would result in a MODERATE or LARGE impact to aesthetics. Such a modification would be considered new and significant information and would be evaluated in the plant-specific supplemental environmental impact statement (SEIS). No change was made to the GEIS in response to this comment.*

A.2.1.3 Comments Concerning Air Quality, Meteorology, and Climatology

Comment: Then I'm very interested in meteorology that is discussed, I thought in a positive way, starting at 330, 331, etcetera. Those are the pages, I didn't write down the names of the chapters. Affected environment.

In fact, I was talking to the meteorologist who was expert witness for Pilgrim Watch and for the New York and he was saying have you seen anything in there? It started to look good because they did mention the revision to Reg. Guide 1.23 that mentions complex environments, that sounded good, but then it didn't go anywhere, it wasn't hooked into anything. It wasn't hooked into SAMA, it wasn't hooked into plume models, it wasn't hooked into anything.

Then you start yapping about tornados. I went what? Where did this come from? There are three pages of where tornados have occurred, as opposed to discussing okay, what's this mean? Complex sites, what is a complex site? Therefore, what plume models should be being used, should only be allowed to be used at these sites in the environmental impact statement, as opposed to talking about tornados. You know, you could have been talking about the latest movie or something, you know? That made no sense to me and I think, quite clearly, what is important, when you are talking about the environment, is air dispersion and dispersion through water. (NMA-PW-15)

Response: *The section referred to in the comment discusses the affected environment of commercial nuclear power plant sites. It is not a discussion on how to choose models or which models to apply to various situations. Responses to comments on plume models appear in Section A.2.1.13 of the GEIS.*

Section 3.3.1 to which the comment refers lays out the requirements for characterizing the climate and meteorology including the monitoring requirements in NRC Regulatory Guide 1.23 (NRC 2007). Tornados are an important consideration at reactor sites due to their potential for damaging structures. Complex sites are defined in the text by example as coastal areas, hills of significant grade, or valleys. No changes were made to the GEIS in response to this comment.

Comment: Air quality impacts of continued operations and refurbishment activities:
Section 4.3 in the draft updated GEIS (p. 4-12 to 4-16) discusses the environmental consequences of both continued operations and refurbishment activities on air quality at nuclear power plants. Continued operations are addressed on pages 4-13 and 4-14, with the following conclusion [emphasis added]:

> Thus, although there is the potential for some air quality impacts to occur as a result of equipment and cooling tower operations, even in the worst-case situation

> (Hope Creek), the impacts would be considered small, at least in part because licensees would be required to operate within State permit requirements. On the basis of these considerations, *the NRC concludes that the impact of continued operations during the license renewal term on air quality would be small for all plants, and would be a Category 1 issue*.

Refurbishment activities are addressed on pages 4-14 through 4-16, with the following conclusion [emphasis added]:

In the 1996 GEIS, the NRC concluded that the impacts from plant refurbishment associated with license renewal on air quality could range from small to large, although these impacts were expected to be small for most plants. Air quality impacts resulting from construction vehicle, equipment, and fugitive dust emissions could be small or moderate depending on project and plant-specific details. On the basis of these considerations, *the NRC concludes that the impact of refurbishment activities on air quality during the license renewal term would be small for most plants, but could be MODERATE for plants located in or near air quality nonattainment or maintenance areas, depending on the nature of the planned activity. The impacts would be temporary and cease once projects were completed. Therefore, the impact on air quality from refurbishment activities remains a Category 2 issue.*

NRC summarized the above-quoted conclusions in the column labeled “Finding” for the entry in the row labeled “Air quality (non-attainment and maintenance areas)” in Table B-1 of Appendix B to the draft updated GEIS (pages B-3 and B-4) as follows:

Small, moderate, or large impact (Category 2). Air quality impacts of continued operations and refurbishment activities associated with the license renewal term are expected to be small. However, emissions during these activities could be a cause for concern at locations in or near air quality nonattainment or maintenance areas. The significance of the impact cannot be determined without considering the compliance status of each site and the activities that could occur. These impacts would be short-lived and cease after projects were completed.

Emissions from testing emergency diesel generators and fire pumps and from routine operations of boilers used for space heating would not be a concern, even for those plants located in or adjacent to nonattainment areas. Although particulate emissions from cooling towers may be a concern for a very limited number of plants located in States that regulate such emissions, the impacts in even these worst-case situations have been small.

Given the conclusions quoted above from Section 4.3 in the draft updated GEIS (Volume 1), industry believes that the “Finding” quoted above from Table B-1 of Appendix B to the draft updated GEIS (Volume 2) for the issue labeled “Air quality (non-attainment and maintenance areas)” is incorrect. Accordingly, the finding should be revised and the issue should be

categorized as “Category 1” instead of “Category 2” for the reasons discussed in the paragraphs below.

On pages 4-13 and 4-14 the draft updated GEIS explains that the impact of continued plant operations during the license renewal term on air quality was not identified as an issue in the 1996 GEIS. Accordingly, the draft updated GEIS provides an evaluation of this impact and concludes that, although there is the potential for some air quality impacts to occur as a result of equipment and cooling tower operations, even in an upper bound situation (Hope Creek), the impacts are small, in no small part because licensees are required to operate within State permit requirements. On the basis of these considerations, the draft updated GEIS concludes that the impact of continued operations during the license renewal term on air quality would be small for all plants.

The air emissions impact of refurbishment activities is discussed on pages 4-14 to 4-16 of the draft updated GEIS. This discussion mentions no example of refurbishment activities that could cause large impacts. According to the discussion, emissions from construction equipment and fugitive dust emissions from ground clearing and grading activities would cause small impacts in most cases, but in a few cases (e.g., building demolition, debris removal, and new construction) could cause moderate impacts that would be of concern in geographical areas with poor or marginal air quality. For this reason, the draft updated GEIS concludes that the impact of refurbishment activities on air quality would be a Category 2 issue, although such impacts would be temporary and would cease once a refurbishment project is completed.

Table B-1 of Appendix B to the draft updated GEIS (Volume 2) for the issue labeled “Air quality (non-attainment and maintenance areas)” reports the combined impact of continued plant operations and refurbishment activities as “small, moderate, or large,” which is not consistent with the conclusions of the analyses presented on pages 4-13 through 4-16, as the two paragraphs above clearly demonstrate. Furthermore, Table B-1 of Appendix B relies on the incorrect impact characterization to categorize the issue labeled “Air quality (nonattainment and maintenance areas)” as “Category 2”. The following paragraphs demonstrate that the updated GEIS should be changed to conclude that the combined impact on air quality in non-attainment and maintenance areas of continued plant operations and refurbishment activities is small and that the “Air quality (non-attainment and maintenance areas)” issue is “Category 1.”

Because the draft updated GEIS already concludes that the impact of continued operations during the license renewal term on air quality would be small for all plants, this discussion focuses on the analysis of air quality impact from refurbishment activities. According to the draft updated GEIS, potential sources of air quality impacts during refurbishment activities are (1) fugitive dust from site excavation and grading and (2) emissions from motorized equipment, construction vehicles, and workers’ vehicles. The draft updated GEIS also states that, with application of adequate controls or mitigation measures and best practices, the air quality

impacts from these air pollution sources would be small and of relatively short duration. Industry agrees with these statements, which are supported by lessons learned as stated in Section 1.10 of the draft updated GEIS and knowledge gained from refurbishment activities associated with license renewal applications filed since the 1996 GEIS was published. For example, air quality impacts from refurbishment activities at Beaver Valley (Supplement 36), Three Mile Island (Supplement 37) and Indian Point (Supplement 38) (all of which are located in nonattainment counties as shown in Appendix D, Table D.2-2, in the draft updated GEIS (Volume 2)) were determined to be small. These cases present evidence that use of appropriate best management practices (staggered work shifts, construction site and haul road wetting, and carpooling) would adequately mitigate the impact of refurbishment emissions.

Furthermore, nuclear power plant licensees must conduct reviews of applicable requirements for new or modified state and local emissions permits prior to initiating refurbishment activities. Construction permits would be obtained where required by applicable regulations and State Implementation Plans (SIPs), which ensure protection of human health and the environment. These permits include conditions and limits, as needed to further mitigate the impact from emissions of concern in geographical areas with poor or marginal air quality. These measures assure that the impact of refurbishment emissions at any nuclear power plant seeking license renewal from the NRC would be small.

Since the impact from continued plant operations and the impact from refurbishment activities would both be small for most nuclear power plants and (2) if needed, state and/or local permits would impose conditions to further mitigate the impact from emissions of concern during the short duration of refurbishment activities at particular plants, the NRC should modify the finding for the issue labeled “Air quality (non-attainment and maintenance areas)” in Table B-1 of Appendix B in the draft updated GEIS to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

> Small~~, moderate, or large~~ impact (Category ~~2~~1). Air quality impacts of refurbishment activities associated with the license renewal term *would be short-lived and cease after refurbishment projects have been completed. Such impacts* are expected to be small. ~~However, emissions during these activities could be a cause for concern at~~ At locations in or near air quality nonattainment or maintenance areas*, the implementation of best management practices and the issuance of new or modified conditions in state and local emissions permits that would further mitigate impacts from refurbishment emissions would assure conformance to the applicable State Implementation Plans*. ~~The significance of the impact cannot be determined without considering the compliance status of each site and the activities that could occur. These impacts would be short-lived and cease after projects were completed.~~

> Emissions from testing emergency diesel generators and fire pumps and from routine operations of boilers used for space heating would not be a concern, even for those plants located in or adjacent to nonattainment areas. Although particulate emissions from cooling towers may be a concern for a very limited number of plants located in States that regulate such emissions, the impacts in even these worst-case situations have been small**.**

The updated GEIS should be changed throughout (e.g., Volume 1: Summary, Chapter 2, and Chapter 4), to reflect this change in Volume 2: Appendix B, Table B-1. (NEI1-7(4)-1)

Response: *The NRC agrees with the commenter and has revised Section 4.3.1.1 of the draft revised GEIS to indicate that impacts on air quality would be SMALL for all plants and therefore a Category 1 issue. As presented in the revised GEIS, operating experience has shown that the potential impact from emergency generators and boilers on air quality would be expected to be SMALL for all plants and, given the infrequency and short duration of maintenance testing, would not be an air quality concern even at those plants located in or adjacent to nonattainment areas. Likewise, recent analysis has shown that the worst-case emissions related to cooling tower drift droplets and particulate emissions at operating plants were SMALL. Further, air quality impacts resulting from construction vehicle, equipment, and fugitive dust emissions associated with refurbishment would be SMALL for most plants, but they could be cause for concern for plants located in or near air quality nonattainment or maintenance areas. However, the impacts would be temporary and would cease once projects were completed, and operating experience has shown that refurbishment activities have not required the large numbers of workers and the months of time analyzed in the 1996 GEIS, nor have such activities resulted in exceedances in the* de minimis *thresholds for criteria pollutants in nonattainment and maintenance areas.*

Comment: Page 4-17, lines 7 to 17: Text in lines 7 to 17 on page 4-17 reads as follows:

Impacts on crop production that may have been caused by transmission line interference with aerial spraying have been reported by one field study of cotton, rice, and soybean fields crossed by a 500-kV line in eastern Arkansas (Parsch and Norman 1986). This study hypothesized that crop yields could be reduced either by electromagnetic fields (EMFs) or by inadequate aerial spraying directly under the power lines. Only cotton yields were found to be reduced; 15 percent less lint was produced under the lines than 150 ft from the lines. The resulting loss of income from cotton was estimated as $85.25 per year for an 1100-ft (335-m) span of the lines, based on a 15 percent yield reduction and an average lint yield of 480 lb/acre. The field sampling and statistical analyses were extensive; the observed yield reduction appeared to be real rather than a sampling error. However, the study could not determine whether the EMF or line interference with aerial spraying caused the yield reduction.

The above-quoted text, which appears in lines 7 to 17 on page 4-17 of the draft updated GEIS, is located within a subsection titled "Air Quality Effects on [sic] Transmission Lines." It is not clear how this text, which describes a study of the effects of aerial crop spraying and/or electromagnetic fields on crop yield under transmission lines, is related to the effects of transmission lines on air quality, which is the topic of the subsection. Consider deleting all text in lines 7 to 17 on page 4-17. (NEI1-7(4)-87)

Response: *Since this discussion concerns the impact of transmission line ROWs on offsite land use, this paragraph has been removed from the discussion of "Air Quality Effects of Transmission Lines" in Section 4.3.1.1, and added to the discussion of "Impacts of Transmission Line ROWs on Offsite Land Use" in Section 4.2.1.1.*

Comment: Page 7-23, lines 10 to 14: Text in lines 10 to 14 on page 7-23 reads as follows:

Greenhouse gases: Those gases, such as water vapor, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving the earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

Because the primary focus of discussions of greenhouse gases in the draft updated GEIS is on anthropogenic greenhouse gases and the need to control emissions of such gases to slow global climate change, consider deleting "water vapor," from the list of example greenhouse gases in the "Greenhouse gases" definition. Although water vapor is a naturally occurring greenhouse gas, emission of water vapor from electric power plants and other industrial facilities has not been identified as an environmental concern. (NEI1-7(4)-110)

Response: *The definition of greenhouse gases in Section 7 (Glossary) of the GEIS has been modified in response to this comment by deleting the words "water vapor" and adding the following statement for clarity: "While also a product of industrial activities, carbon dioxide, nitrous oxide, methane, ozone, and water vapor are naturally occurring greenhouse gases."*

Comment: A4NR [Alliance for Nuclear Responsibility] et al recommends that the GEIS should include scoping and analysis of the effects of climate change on reactor operations for the duration of the relicensed period. The past decade has provided ample evidence of reactors both domestically and internationally whose operations have been curtailed and whose reliability has been diminished by droughts, high ambient cooling water temperatures, unanticipated ice flows and other climate disturbances. Both NASA and NOAA predict an increase in these events during the coming decades and the Obama administration is considering adding the impacts of such exigencies to NEPA. The NRC would do well to follow the lead of the administration on this issue. (A4NR-11-38)

Response: *NRC follows closely the scientific debate regarding climate change, and has developed guidance related to the topic for its reviews of applications for combined licenses for new nuclear plants. Climate change and its possible effects on nuclear power plant operations are discussed in the GEIS under the issues "Surface Water Use Conflicts (Plants with Once-Through Cooling Systems)"* and *"Surface Water Use Conflicts (Plants with Cooling Ponds or Cooling Towers Using Makeup Water from a River)" in Section 4.5.1.1 of the GEIS. In addition, a new section specific to climate change has been added as Section 4.12.3.2 (Climate Change Impacts) and under Section 4.13 (Cumulative Impacts) of the GEIS.*

A.2.1.4 Comments Concerning Geology and Soils

Comment: Page S-6, lines 11 to 17: Text in lines 11 to 17 on page S-6 reads as follows:

> The NRC described the affected environment in terms of the following resource areas and activities: (1) land use and visual resources; (2) meteorology, air quality, and noise; (3) soils, geology, and seismology; (4) hydrology (surface water and groundwater); (5) ecology (terrestrial and aquatic resources; threatened, endangered, and protected species and essential fish habitat); (6) historic and cultural resources; (7) socioeconomics; (8) human health; (9) environmental justice; and (10) waste management and pollution prevention. The affected environments of the operating plant sites represent diverse environmental conditions.

The above-quoted paragraph, which appears in lines 11 to 17 on page S-6, indicates that one resource area described as part of the affected environment by the NRC in the draft updated GEIS (item (3)) consists of "soils, geology, and seismology." The NRC is encouraged to delete the reference to seismology in line 13 on page S-6, and in the following other locations throughout the draft updated GEIS:

- Page vii, Table of Contents, section 3.4 (delete "Seismology" for the section title)
- Page 1-17, line 22, section 1.11, 3rd paragraph, item (3) (delete the word "seismology")Page 3-1, lines 4 to 25, text box containing "Contents of Chapter 3", 2nd bullet, 3rd sub-bullet (delete the word "seismology")
- Page 3-49, line 14, section 3.4, title (delete "Seismology" for the section title)
- Page 3-50, lines 15 to 25 (delete the paragraph in lines 15 to 25)
- Page 4-28, lines 27 to 30 (delete the paragraph in lines 27 to 30)

These deletions are appropriate because seismology is not an environmental resource that could be affected by continued nuclear power plant operation and refurbishment activities, or for which environmental mitigation measures, such as avoidance, could be implemented. While the NRC correctly acknowledges that nuclear power plants are constructed according to the seismic

specifications in 10 CFR Part 50, Appendix S, the draft updated GEIS does not provide adequate justification for this issue to be considered under NEPA in the context of license renewal. If seismic conditions at a nuclear power plant site are found to have changed since its initial site selection and licensing, then the licensee may need to review the design basis of the plant to ensure that nuclear safety margins are maintained. This review would occur as part of routine plant operation programs under 10 CFR [Part] 50. However, this issue should not justify environmental review under NEPA during license renewal for an existing plant. Accordingly, if consideration of seismology is warranted during license renewal, the NRC is encouraged to address the issue as a plant nuclear safety issue, rather than as an environmental issue.

If the NRC is concerned about the environmental and human health effects of radioactive material releases that may occur as a result of seismic activity, such effects have already been evaluated, independent of cause, and determined to be SMALL for Category 1 issues related to aquatic organisms, low-level waste management storage, offsite impacts of spent fuel and high-level waste disposal, mixed waste storage and disposal, and the uranium fuel cycle. The NEPA review for all of these issues was documented in the 1996 GEIS. (NEI1-7(4)-7)

Comment: Page S-6: For purposes of the evaluation in this GEIS revision, the "affected environment" is the environment currently existing around operating commercial nuclear power plants. Current conditions in the affected environment are the result of past construction and operations at the plants. The NRC has considered the effects of these past and ongoing impacts and how they have shaped the environment. The NRC evaluated impacts of license renewal that are incremental to existing conditions. These existing conditions serve as the baseline for the evaluation and include the effects of past and present actions at the plants.

The NRC described the affected environment in terms of the following resource areas and activities: (1) land use and visual resources; (2) meteorology, air quality, and noise; (3) soils, geology, and seismology; (4) hydrology (surface water and groundwater); ...the affected environments of the operating plant sites represent diverse environmental conditions."

HOWEVER, on the following page of the GEIS, when listing this item specifically, it makes NO mention of seismic issues at all, while continuing to consider "Geology and Soils" as one topic. (A4NR-11-33)

Comment: Page 4-28, lines 27 to 30: Text in lines 27 to 30 on page 4-28 reads as follows:

As discussed in Section 3.4, nuclear power plants are constructed according to seismic specifications in 10 CFR Part 50, Appendix S. Spent fuel pools are designed with reinforced concrete, allowing them to remain operable through the largest earthquake that has occurred or is expected to occur in the vicinity of a nuclear power plant.

The NRC is encouraged to delete the paragraph in lines 27 to 30 on page 4-28 because it is more precisely an issue for current plant operation and is not directly related to plant refurbishment and operations during the extended term of operation resulting from license renewal. Furthermore, seismology is not a resource that is impacted by such activities. (NEI1-7(4)-13)

Comment: Page S-5: Category 1 issues are those that meet all of the following criteria:

(1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics;
(2) A single significance level (i.e., small, moderate, or large) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel);
(3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures would probably not be sufficiently beneficial to warrant implementation.

For issues that meet the three Category 1 criteria, no additional plant-specific analysis is required in future SEISs unless new and significant information is identified.

A4NR, et al, find the above descriptions for criteria constituting a Category 1 issue to be inconsistent and incomplete. For example, as cited below in S.4, the NRC lists item 3 as follows: (3) soils, geology, and seismology which seem inclusive of seismology. (A4NR-11-32)

Comment: Page S-7 & S–8: Impacts on geology and soils would be small at all plants if best management practices were employed to reduce erosion. This is a Category 1 issue. July 2009 S-7 NUREG-1437, Revision 1

And yet, on page 2-7 it mentions geology and soils without including "seismic" while making the blanket statement that "Geology and Soils" is a generic category 1 issue.

Geology and Soils − Impacts of nuclear plants on geology and soils Small impact (Category 1). Impacts on geology and soils would be small at all nuclear plants if best management practices were employed to reduce erosion associated with continued operations and refurbishment. July 2009 2-7 NUREG-1437, Rev 1

The NRC must clarify the subcategories of item (3) Geology and soils. It includes seismic issues, or it does not; seismic issues (standing alone as an issue) are deemed to be category 1, or as we maintain, must be deemed category 2 and therefore site specific. This confusing mix of usage of the terms "Geology and Soils" is either meant to obfuscate or minimize the impacts

of seismic issues on continued nuclear plant operations. This is certainly the case in California, where new USGS information has revealed a previously undisclosed and unstudied fault 1800 feet from the Diablo Canyon Power Plant. As previously indicated in these comments, the cautionary tale of the 2007 Japanese earthquake at the Kashiwazaka-Kariwa plant must be heeded by the NRC. In the case of the San Onofre plant, also singled out for special attention in the one paragraph dealing with seismic issues in detail (3-50) there have been no new or updated seismic studies since the plant was licensed. In the case of Diablo Canyon, the NRC has relied on the utility's own internal seismic study program, and not subjected their results to analysis from independent or outside consultants.

All seismic issues be moved to Category 2 and require consultation from the USGS as well as independent seismic studies apart from the utility at all facilities with seismic concerns. (A4NR-11-34)

Comment: I share the concern, and I guess I have to repeat this. When you put seismic issues under geology and soils, rather than try to look like it's simplifying anything, it really looks like you're burying it.

And if there's one item for every plant, that needs to be looked at individually, it has got to be seismic. I mean, you've got what was supposed to be, you know, built to the utmost of seismic capability, suffering from an earthquake.

We have that situation here. It needs to be called out, it needs to be looked at, and it needs to be updated by you, not just PG&E. We have a credibility issue here, when the party who's asking for the permit is the one who provides you with the information.

So we need to see that as a separate category and have you be updating it constantly as information becomes available. (PBCA-Pinard-14)

Comment: The Proposed GEIS contains a wholly inadequate discussion of seismic issues that could affect power reactors and associated systems, structures, and components, such as aging pipes, spent fuel pools, cooling structures, stacks, and concrete containment. Although the document spans 600 pages it contains only the most passing reference to seismic issues. Proposed GEIS at p. 3-50 (lines 15-25). This cursory reference contains no recognition that older plants and components were constructed before the advent of modern seismic building regulations nor does it recognize that seismic understanding and hazard analysis has expanded and improved over the last two decades.

The full extent of the Proposed GEIS's discussion of seismic issues follows:

Nuclear power plants are constructed according to seismic specifications in 10 CFR Part 50, Appendix S. Their spent fuel pools are designed with reinforced concrete, allowing them to remain operable through the largest earthquake that has occurred or is expected to occur in the area. The U.S. Geological Survey (Frankel et al. 2005) mapped seismic hazards across the United States. In terms of the peak horizontal acceleration with a 10 percent probability of exceedance in 50 years, most nuclear power plants are located in seismically low-hazard areas, with peak accelerations of 0 to 8 percent of gravity. However, the two California plants − Diablo Canyon and San Onofre − are in locations with peak acceleration of 25 to 30 percent of gravity. These plants have been designed to safely withstand the seismic effects associated with earthquakes with epicenters at various locations and at various depths, magnitudes, and ground accelerations (AEC 1973; Southern California Edison 2007).

Id. The first two sentences also appear later in the document. *Id.* at 4-28 (lines 27-30).[11]

[[11] The USGS reference is to Frankel, A.D., M.D. Petersen, C.S. Mueller, KM. Haller, R.L. Wheeler, E.V. Leyendecker, R.L. Wesson, S.C. Harmsen, C.H. Cramer, D.M. Perkins, and KS. Rukstales. 2005. Scientific Investigations Map 2883, Seismic-Hazard Maps for the Conterminous United States. Proposed GEIS at p. 3-161 (citing U.S. Geological Survey. Available URL: http://pubs. usgs.gov/sim/2005/2883/ (accessed October 3,2007)). According to USGS, the referenced seismic hazard maps were published four years ago in 2005 and were based on work dating back to 2002 and earlier Frankel, A, Petersen, M., Mueller, C., Haller, K., Wheeler, R, Leyendecker, E.V., Wesson, R., Harmsen, S., Cramer, C., M.,Perkins, D., and Rukstales, K., 2002, Documentation for the 2002 Update of the National Seismic-Hazard Maps: See U.S. Geological Survey Open-File Report 02-420, 39 p. (http://pubs.usgs.gov/of/2002/ofr-02-420D.]

Indian Point Unit 1 and its systems, structures, and components − such as pipes, building walls and roofs, and cooling water, ventilation, and electric systems − were built at a time when there were no meaningful AEC seismic regulations and the understanding of regional seismic conditions was quite rudimentary. Although NRC revoked the operating license for the Indian Point Unit 1 power reactor in 1980, many of Unit I's system, structures, and components were conjoined to Unit 2 and Unit 3 and are still in use today. These aging Unit 1 systems, structures, and components that were built to inferior seismic specifications, and Unit 2 and Unit 3's continued reliance on these systems today poses a significant safety question. Updated hazard assessments by the United States Geological Survey and a recent study published in the Bulletin Of The Seismological Society Of America that reports the discovery of a new and near-by seismic feature further underscore this safety concern.

The absence of any discussion or recognition that knowledge of intraplate and interplate seismicity has changed since the 1950s and 1960s when some the components and reactors were manufactures, installed, or constructed or that the most recent USGS seismic hazard analyses for existing reactor locations east of the Rocky Mountains reflects a higher hazard than that which was anticipated when those reactors were initially constructed and licensed constitutes a fundamental flaw in the environmental impact statement. This omission coupled with Staffs preference not to subject renewal applications to seismic reviews based on up-to-

date seismic information impedes any contribution or participation by the public in this important aspect of the inquiry of whether or not to permit the facility to operate beyond its 40-year license. The minimalist mention of the issue in the Proposed GEIS makes it likely that the License Renewal Application itself, the associated Environmental Report, and Staffs site-specific EIS will not analyze the issue in any meaningful manner. This omission and the exclusion of analysis can be seen in the response to the Indian Point license renewal applications.[12]

[[12] The probability of the occurrence of a severe seismic event is directly tied to the time period involved. Thus, by extending the license to operate a nuclear plant by an additional 20 years, the risk of a severe seismic event occurring during the operating life of the plant is increased by 50%, making the issue one that is appropriate for consideration in the license renewal proceeding.]

The commenter also requested that the GEIS expressly direct applicants to:

- provide a thorough discussion of the facility's current seismic profile in the Environmental Report; and
- examine the facility's current seismic hazard through the Significant Accident Mitigation Alternative (SAMA) program that came about as a result of the Third Circuit's Limerick Ecology v. NRC decision.

In short, given the Commission's commitment to "protecting people and the environment," the Commission should insist on and welcome a searching inquiry in to seismic risks posed by the extended operation of each power reactor facility.

The commenter further stated that it is imperative that the GEIS now under development acknowledge that older systems, structures and components should be subjected to close scrutiny with respect to seismic hazards and risks.

The commenter concluded by stating that: “On a broader level, as NRC is aware, USGS has informed the Commission that reactor sites located in the central and eastern United States have a higher seismic hazard than previously recognized. NRC should take this opportunity to modify the proposed GEIS and revamp its approach to such hazards to ensure that a thorough and transparent review takes place at this important juncture.” (NYS AG-14-14)

Comment: In past license renewal proceedings, the NRC has excluded an examination of seismic hazards, plant security, emergency preparedness, environmental review of spent fuel storage and analysis of spent fuel storage options from the scope of NRC's license renewal review. The NRC's Office of Inspector General completed an audit of the license renewal process in September 2007 and concluded that NRC staff should improve their analyses and audits (OIG-07-A~15). An important means for improving the NRC's license renewal process would be to revise the license renewal review to allow important site-specific issues to be reexamined during this review. For example, new and significant information that has arisen

since a plant originally received its operating license should be examined during license renewal reviews.

The discovery, announced to the public in 2008, of a new Shoreline Fault near Diablo Canyon is an example of new and significant seismic information that should be reviewed (Category 2 issues) during Diablo Canyon's license renewal review. The USGS and PG&E are conducting additional seismic research in the vicinity of Diablo Canyon and the Energy Commission has recommended additional tsunami and seismic research at both Diablo Canyon and SONGS. The NRC and the USGS are beginning in January 2010 an independent assessment of Diablo Canyon's seismic research program. New and significant seismic research information resulting from these studies must be considered in Diablo Canyon's license renewal review. Seismic issues, particularly when new and significant seismic research information is available, should be considered Category 2, site-specific issues to be examined during license renewal reviews for these plants. (CEC-9(1)-11)

Comment: I wish to make some comments regarding geology and soils. I note on page 2-7 that it is claimed that there is merely a "small impact" on geology and soils at all nuclear power facilities "if best management practices were employed to reduce erosion associated with continued operations and refurbishment" Excuse me, but seeing that "Geology and Soils" is the category, one must look at the effects not only of the nuclear power facility on Geology and Soils, but must also examine the effect of geology / soils / seismic setting on the nuclear power facility. Also, if one seriously examined potential effects on the nuclear power facility by shifting geology, soils, and seismic setting, then one would realize that this could result in a major accident which then would bring much larger than a "small" impact to the soils of such a facility due to serious radiological contamination from the nuclear power facility.

The NRC may well cling to their claim that there is just a small impact from geology and soils, but seeing that seismicity was ignored, and seeing that the effect of the geological setting on the nuclear facilities was ignored, clearly "Geology and Soils" (including seismic setting) need considerably more study and are site-specific, thus calling for a "Category 2" determination.

How can parts of the document consider and label "Geology and Soils" as a "Category 1" issue when the first three full sentences on page 3-50 of the GEIS says, "However, within each province, the local geology may differ significantly from the regional conditions. The geologic setting of each plant is therefore a site-specific function of the local geology rather than the physiographic province in which it is located. Plants are located in a wide variety of settings, including uplands along rivers, glaciated till plains, Great Lakes shorelines, and coastal sites."(?) The first sentence in the next paragraph says, "The geologic resources in the vicinity of each nuclear power plant vary with the location." (Campbell-31-7)

Comment: It can be noted, for example, that under the one seemingly innoxious category of soils and geology, seismic is also in soils and geology. How would one relegate seismic issues to a generic category when you have plants sitting on as diverse seismic backgrounds as Indian Point's fault on the Hudson River or the New Madrid fault that runs through the lower Midwest to the southeast. Not to mention, of course, our differing faults here on the Pacific Coast.

So, the idea that in one -- in fact, you notice this and Rochelle and I have been through most of the 600-page document enough to give you a word count. The seismic paragraph consists of 152 words out of the 600 pages.

And given that we now know at the Diablo Canyon and PG&E has announced that there is a new earthquake fault, it would seem that evolving science, and one who lives in California one always hears that seismology is constantly an evolving science, would require the inability to consider this a generic impact.

So, what I bring up is this. While there may be many questions and many considerations for failure or flaws in the Generic Environmental Impact Statement, the fact is the residents of California can make it a moot point. You needn't concern yourself in a sense beyond a certain point and here's why. As Ms. Becker alluded, in the current process, the Nuclear Regulatory Commission has not denied a single application for relicensing nor has any state that has brought particular contentions whether it was State of New Jersey's Department of Environmental Protection at Oyster Creek or those in New England or now the State of New York has filed. None of them have ever been -- have prevailed. No State has ever prevailed in an attempt to stop a license renewal at great cost to taxpayers whose money funds the attorney generals and those who must pursue these things. (DPCA-A4NR2-39)

Comment: Also the seismic setting of California nuclear facilities. So of course out here is basically the largest subsidiary of the San Andreas Fault, the Hosgri into the San Simeon, into the San Gorgonio, and then meeting the San Andreas Fault off the San Francisco area, San Francisco-Marin area. And then the Hosgri already had a 7.3 to 7.5 quake, November 24th, 1927, west of Lompoc.

And there's also splays from the Hosgri fault, even before this latest seismic information which I haven't researched yet. And then San Onofre has the Cristianitos Fault which runs beneath the reactor, a few miles offshore is the Newport-Inglewood Fault, the largest Southern California coastal area fault, which was responsible for the Long Beach quake of 1933, and in the last few months, there was a four point something quake in the Lenox area of Los Angeles County, along the Newport-Inglewood Fault.

I don't trust PG&E to do mapping of the seismic situation. I don't trust the NRC to do it. I actually didn't trust Sandia Labs, who is right next to Lawrence Livermore Labs. However, they

did a reactor accident consequence study, and it came out in late 1982, and for Diablo, as I recall, the statistic was that something like 10,300, or 400 deaths in the first year, in worst-case reactor accident consequences with the worst weather patterns, predicted about a little over 10,000 deaths in the first year, some eventual deaths from cancer, and I believe it was $158 million property damage.

Of course since then the -- what's the population grown? maybe by three times in the immediate area, especially the five cities into Santa Maria. And obviously property went way up in value, even though it's gone down some in the last couple years.

And so these are -- anyway, seismic is not generic. However, fine, let's have thorough seismic studies of all nuclear reactors. Remember the New Madrid Fault, sort of in the Mississippi River area, had a massive quake back in the mid 1800's, and the highest concentration of nuclear reactors in the country is in Illinois. So let's do study, not -- how can you study seismicity generically? Ah! If you want to study seismicity generically, at the dawn of winter solstice, 2012, it's the end of the Mayan calendar, and apparently there will be a total solar eclipse at dawn, with the sun, moon, Earth, and the galactic center, meaning the black hole, all in a line. Do you want to be San Luis Obispo county at that point? I sure won't be.

Let's see. So anyway, we need really independent researchers to do seismic studies at all nuclear facilities in the country, especially in California. (PBCA-Campbell-31)

Comment: Someone needs to point out that we are failing. We're failing on many levels. Let me give you your report card to the nuclear industry, the NRC, and nuclear technology, in general.

Earthquake geology. You get an F. You misjudged the Hosgri Fault, the other faults that are in the immediate area, as a threat to our lives. (PBCA-Biesek-41)

Comment: In the interest of protecting public safety and the environment, ensuring plant reliability, and lowering electricity costs to California consumers, we reiterate many of the concerns and recommendations that we expressed in our September 17, 2003, comments on the NRC's' revision of its GEIS for License Renewal of Nuclear Power Plants (NUREG-1437). In light of the well-documented seismic hazards at both the Diablo Canyon Nuclear Power Plant and the San Onofre Nuclear Generating Station (SONGS) in California, it is a major shortcoming that the Draft GEIS' discussion of seismic safety is limited to only one paragraph (See p. 3-5, GEIS). We strongly urge the NRC to consider seismic Issues as Category 2 site-specific Issues that should be addressed in plant license renewal reviews. The impacts from the 2007 earthquake on the Kashiwazaki-Kariwa Nuclear Power Plant in Japan highlight the importance of site-specific reviews of seismic safety.

The discovery in the late 1960's of the Hosgri Fault − an active major offshore fault near Diablo Canyon in California − while the plant was under construction led to years of investigations and hearings as well as revised plant design and seismic retrofits. This discovery was one of the main causes of construction delays that resulted in Diablo Canyon Unit 1 not becoming operational until 1984—15 years after work began at the site. The USGS' discovery of a new fault in 2008 near Diablo Canyon reinforces the need for updating seismic research information for the site and for a site-specific reexamination of seismic issues during license renewal reviews. (CEC-9-1)

Comment: Seismic Risks: The draft GEIS' discussion of seismic hazards at nuclear power plants is completely inadequate. The discussion is limited to only one short paragraph. It places seismic issues under the broader heading of "Geology and Soils" and considers it a generic, Category 1 issue (p. 3-50, GEIS). Seismic issues should be considered plant-specific Category 2 issues, particularly at seismically active reactor sites such as Diablo Canyon and SONGS. In addition, seismic issues must be considered plant-specific Category 2 issues at Diablo Canyon in light of the newly discovered active Shoreline Fault, which has raised questions about the seismic hazard at the reactor site. The NRC concluded that Diablo Canyon and SONGS "have been designed to safely withstand the seismic effects associated with earthquakes with epicenters at various locations and at various depths, magnitudes, and ground accelerations (p. 3-50). However, support for this conclusion is based upon an outdated report (1973) by the Atomic Energy Commission and a Southern California Edison report (2007).

Both of California's operating nuclear power plants are located in highly seismically active areas on the Pacific Coast. The discovery in the late 1960s of a major offshore fault − the Hosgri Fault − located 4.5 kilometers west of Diablo Canyon, resulted in years of investigations and hearings and the redesign and seismic retrofit of Diablo Canyon − an effort that resulted in Unit 1 not becoming operational until 1984, about 15 years after work at the site began. In 1984 the NRC made a condition of the operating license for Diablo Canyon that, "PG&E shall develop and implement a State-of-the-Art Program to revalidate the seismic design bases used for Diablo Canyon."[1] In November 2008, PG&E and USGS announced the discovery of a previously unidentified offshore fault – the Shoreline Fault − approximately one kilometer west of Diablo Canyon that has a capacity to generate a magnitude 6.5 earthquake. PG&E is working with the USGS to study earthquake hazards along the coastline in central and northern California, including near Diablo Canyon. The NRC and the USGS will conduct an independent review of PG&E's Long-Term Seismic Program (LTSP) program in 2010. Seismologic and geologic data that have become available since SONGS was built indicate that this plant site could experience larger and more frequent earthquakes than had been anticipated when the plant was designed.[2]

[[1] Safety Evaluation Report Related to the Operation of Diablo Canyon Nuclear Power Plant, Units I and 2, Dockets Nos. 50-275 and 50-323, NUREG-0675, Supplement No. 27, July 1984, p. 8.]

[[2] 2008 Integrated Energy Policy Report, p. 7, at http://www.energy.ca.gov/ab1632/documents/index.html]

In 2008, the Energy Commission, as directed by California Assembly Bill 1632 (Blakeslee, Chapter 722, Statutes of 2006), completed a comprehensive assessment of the vulnerability of Diablo Canyon and SONGS to a major disruption due to a seismic event and plant aging.[3] AB 1632 further directed the Energy Commission to assess the impacts of such a disruption on system reliability, public safety and the economy and assess the costs and impacts from nuclear waste accumulating at these plants. This assessment included a major consultant study by an interdisciplinary study team, public hearings, and review of academic, scientific and government reports and data provided by California's nuclear plant owners. To assist with this seismic vulnerability assessment, the Energy Commission formed a Seismic Vulnerability Advisory Team made up of seismic safety experts from California's Seismic Safety Commission, Geological Survey and Coastal Commission. This major study resulted in a number of recommendations by the Energy Commission including that PG&E and SCE should conduct advanced seismic hazard and vulnerability studies at Diablo Canyon and SONGS, including using three-dimensional geophysical seismic reflection mapping and other advanced techniques to explore fault zones near Diablo Canyon.

[[3] *An Assessment* of *California's Nuclear Power Plants: AB* 1632 *Report, November 200B (CEC-100-2008-2009-009-CMF)* and *AB* 1632 *Assessment of California's Operating Nuclear Plants which can be obtained from the Energy Commission's website at http://www.energy.ca.gov/ab1632/documents/index.html*.

Seismic events can cause major problems for nuclear power plants, as demonstrated by the July 2007 earthquake in Japan. The largest nuclear power plant in the world − the Kashiwazaka-Kariwa nuclear plant − remains in partial shutdown over 2.5 years following this earthquake. This earthquake magnitude exceeded values used for the plant design, and the resulting damage has necessitated costly plant repairs and large expenses to purchase replacement power during the plant's outage. (CEC-9(1)-1)

Comment: We have, tonight, I am just going to talk about three brief topics in general which we would like the staff to consider, the first is seismology. We feel that seismology should be removed from consideration in the GEIS. Seismology we feel is a condition of the site, it is unaffected by continued operation of the plant. Instead, seismology continues to be and is adequately covered by rule as a safety issue. (NMA-NEI-1)

Comment: Earthquake Risks Should be Category 2: It is contrary to current NRC regulations to license a nuclear facility next to an active, major earthquake fault. The NRC "grandfathered" the license for Diablo Canyon Nuclear Power Plant, buying into PG&E's excuse that it was unaware of the Hosgri Fault when it first invested billions of ratepayer dollars to building the plant, beginning in the late 1960's. The Hosgri Fault comes within 3.5 miles of the plant. The NRC is prohibited by its own regulations from taking into account corporate profits rather than public safety, but that is exactly what it did.

The Draft GEIS gives little attention given to seismology in the Draft GEIS except to reassure the public that the two California plants "have been designed to safely withstand the seismic effects associated with earthquakes..." (3-50, lines 23,24)

The newly-discovered Shoreline Fault, less than one mile offshore of the Diablo site, has not been thoroughly studied yet, but it clearly exacerbates an already precarious situation. Clearly, in the case of Diablo Canyon − and perhaps other plants − the impact of previously unknown seismological conditions has the potential to be quite large, and the issue should be placed in Category 2. The NRC implicitly acknowledges that it is not able to analyze earthquake risks generically in Appendix E, where it states that earthquake risks for the Diablo Canyon and San Onofre nuclear power plants were excluded from consideration of the risks of a spent fuel pool fire. Page E-33. (SLOMFP-13-15)

Comment: So safe accommodation as the NRC claims. At Songs and Diablo, the earthquake and tsunami dangers are completely different from any other plant, obviously. (PBCA-Schumann-9)

Comment: The NRC should not even consider renewing an operating license if new earthquake faults have been discovered during the current operating period of the license. Since quakes are often sudden and come with no warning, thus the seismic settings are not "gradual and predictable" and should clearly be deemed Category 2. (Campbell-31-21)

Comment: Page 3-50: Nuclear power plants are constructed according to seismic specifications in 10 CFR Part 50, Appendix S. Their spent fuel pools are designed with reinforced concrete, allowing them to remain operable through the largest earthquake that has occurred or is expected to occur in the area. The U.S. Geological Survey (Frankel et al. 2005) mapped seismic hazards across the United States. In terms of the peak horizontal acceleration with a 10 percent probability of exceedance in 50 years, most nuclear power plants are located in seismically low-hazard areas, with peak accelerations of 0 to 8 percent of gravity. However, the two California plants − Diablo Canyon and San Onofre − are in locations with peak acceleration of 25 to 30 percent of gravity. These plants have been designed to safely withstand the seismic effects associated with earthquakes with epicenters at various locations and at various depths, magnitudes, and ground accelerations (AEC 1973; Southern California Edison 2007).

We are amazed that seismic issues which could impact safety margins at reactor sites, not only in California, but ranging from Indian Point in New York to sites along the New Madrid Fault from Missouri through Tennessee to South Carolina, have been limited to one paragraph, only 153 words, in the NRC's 602 page draft GEIS.

The NRC has placed seismic issues under the broader heading of "Geology and Soils: Small Impact, Category 1". The NRC should not allow any seismic issues to be deemed Category 1. The NRC should not accept applications from utilities that have disclosed new active earthquake faults within the past decade. The NRC should not allow any applications from utilities until state mandated studies on the implications of new seismic studies are reviewed, adopted and implemented.

In Section 1.1 Purpose of GEIS (page 1-2) states "(3) Changes in the environment around nuclear power plants are gradual and predictable." This is clearly not the case with *seismic* events that are conversely both sudden and unpredictable. The most recent case in point is the July 2007 Kashiwazaka-Kariwa nuclear plant shutdown due to the earthquake in Niigata Prefecture. This devastating event exceeded all the predictions for ground motion that the Japanese nuclear safety agencies had predicted, as well as the design basis for the plant, and has resulted in a loss of generation for over two years from the world's largest nuclear power plant. (A4NR-11-22)

Comment: Aging reactors with colocated high-level, above-ground radioactive waste facilities, within two and a half miles from two major active faults, should be a clear indication that license renewal recommendations should be to deny an additional 20 years [see identifier PBCA-Cochran-6 for the comment on radioactive waste], and certainly seismic should come up to stage two, or Category 2 concern.

And where is the NRC's man -- and the NRC's mandate is the expertise to evaluate the environmental impacts of alternative sources, granted. PG&E always gives seismic data, and we don't hear it from other independent sources.

We hope that the NRC will put into effect some of their "go to" independent agencies to find out some of the seismic problems.

Right now, the PG&E is going to try to get ratepayers to pay for 3-D mapping, the newest technology, and seismic technology, and we're hoping that the NRC will make their own studies and get independent people to come up with those studies.

And I should have been organized. I apologize. And considering -- this is my last comment. Considering this long timeframe to relicense, PG&E should wait for seismic and safety reports, since if you, as the NRC, a public agency, knows that something may be dangerous, and we do have a new fault there, and several faults that might be underground that we don't about yet, that you know something might be dangerous, it would be a dereliction of duty not to fully investigate with independent sources. (PBCA-Cochran-7)

Comment: The tsunami hazards at Diablo Canyon and SONGS must also be reexamined during license renewal reviews. Currently available tsunami studies for both plants are at least 10 years old and do not take advantage of modern tools and recent studies that could improve the quality of the assessments such as new data from the National Oceanic and Atmospheric Administration, new probabilistic hazard assessments, and inundation modeling.[4] The December 26, 2004, Great Sumatran earthquake that resulted in widespread and catastrophic tsunami impacts and loss of life around the Indian Ocean caused the automatic shut-down of the Kalpakkam nuclear power plant on the east coast of India, which was restarted six days later.[5] In light of the new and significant seismic information that is available for plant sites since the original operating licenses were issued, the seismic and tsunami hazards for nuclear power plants should be examined as Category 2 site-specific issues during license renewal reviews.

[[4] Ed42008 IEPR, p. 9 (see above).]
[[5] Volcanic and Tectonic Hazard Assessment for Nuclear Facilities Edited by C. B. Connor, N. A. Chapman and L. J. Connor, Cambridge University Press, 978-0-521-88797, p. 4.] (CEC-9(1)-2)

Comment: But, I'm really more frightened about the safety factor because I don't think there's a way to make it safe and nobody's proven to me that there is a way to make it safe. I think we live under the law of accident and let's say we have an 8.5 shaker. At that plant, I think, according to what I heard last time, that plant really isn't equipped to even test the seismic responsibility to that place because of the nature of the way it's constructed. I heard that from an engineer. (DPCA-Collamer-33)

Comment: So, we haven't come up with the solutions to these problems [see identifier DPCA-Pack-43 for the comment on these problems] and we're adding new ones and the new one that I would particularly like to address today is the containment structure of San Onofre.

That particular containment structure was built specifically because we live in an area that is sensitive to earthquakes. It sits about three miles off the Newport/Inglewood fault and so, to try to make it safer, the structure containing the reactor was beefed up tremendously. It has about ten feet of concrete, steel and rebar and I just don 't understand how you could cut a 28 by 28 foot hole through a containment structure like that, take out the generator, put in a new generator and close it back up and have the same type of integrity that you had in the first place. It can't be done.

So, we've added to the issues of evacuation planning and safety and what do we do with the waste. Now, how do we make a containment structure the same level of integrity that it was before. (DPCA-Pack-44)

Comment: So, I was sitting in the chair here and the train went by over here and my chair was rumbling and I think that plant is closer to the railroad tracks than the train that's running by here

and then I keep remembering that they don't have really a way of testing the seismic responsibility of this mega-boiler sitting on sand. (DPCA-Collamer-35)

Response: *Seismology is the study of earthquakes and the earth's structure, and relevant information on seismology is appropriate for inclusion in a description of the geology of the affected environment. Seismicity relates to the likelihood and risk of earthquakes (i.e., the seismic hazard). Although impacts to geology and soils are considered a Category 1 issue, that issue does not include a consideration of seismic hazard and impacts on plant operation and safety. Seismic hazard is assessed in the site-specific safety review, where appropriate, that is performed for license renewals, rather than in the environmental review. Further, the NRC requires all licensees to take into account changes in seismic hazard in order to maintain safe operating conditions at all nuclear power plants. When new seismic hazard information becomes available, the NRC evaluates the new information to determine if any changes are needed at existing plants. This reactor oversight process, which includes seismic safety, is separate from license renewal. Thus, the topics of seismicity and seismic hazard are not included within the Category 1 issue of geology and soils, as inferred by the commenters, but is rather considered outside of the scope of the environmental review. Sections 3.4 and 4.4.1 of the GEIS have been revised to eliminate confusion related to the treatment of seismic issues in the GEIS. Section 3.4 has specifically been revised to include a discussion of the original design and site selection considerations with respect to geologic and seismic criteria for U.S. nuclear power plants. A brief description of the seismic setting is retained in Section 3.4 of the GEIS only as it relates to the geologic affected environment.*

With respect to report OIG-07-A-15 issued by the NRC's Office of Inspector General (OIG), the OIG completed this audit of the license renewal safety review process in 2007. As a result, the OIG made eight recommendations related to how the NRC conducts its safety reviews for license renewal. The NRC successfully closed all these recommendations in under three years, resulting in improvements to many areas of the license renewal program. No recommendations were made relative to license renewal environmental reviews as a result of the OIG's audit.

Where comment SLOMFP-13-15 references the exclusion of Diablo Canyon and San Onofre from an analysis of spent fuel pool fire risk, it is important to note that the report being discussed in Appendix E, NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," was based on updated seismic hazard information for plants east of the Rocky Mountains. Although data for plants west of the Rocky Mountains, including Diablo Canyon, San Onofre, and Columbia was not specifically analyzed, nothing in NUREG-1738 undermines the conclusion in the 1996 GEIS that the impacts of SFP severe accidents will be comparable to reactor severe accidents for all facilities. The text in Appendix E was updated to clarify that seismic hazard information for plants east of the Rocky Mountains were considered for NUREG-1738.

Comment: It is ironic that some portions of the documents acknowledge "diverse environmental conditions" (page S-6) and shifting biological communities, yet there are unsupported claims acting like all environments at and around nuclear power facilities are very stable, unchanging, and predictable. You can't have it both ways even if you have some lawyers instructing you what to say in some portions so that the document's conclusions may have a better chance of being validated in a courtroom.

For instance, page S-6 of the GEIS says, "The affected environments of the operating plant sites represent diverse environmental conditions." And on page S-7 (under the heading "S.5 Impacts from Continued Operations and Refurbishment Activities Associated with License Renewal"), it says under "Geology and Soils" that "Impacts on geology and soils would be small at all plants if best management practices were employed to reduce erosion." This is a Category 1 issue."

I note that it says on page 3-49, "Soils and subsoils at nuclear plant sites also vary in terms of their geotechnical properties relative to site construction projects and their hydraulic properties relative to the movement of infiltration, groundwater, and contaminants." It goes on to say that certain nuclear sites must be protected from erosion including along riverbanks and along coastlines. Thus, more reason to consider such issues a Category 2. (Campbell-31-8)

Response: *Section 3.4, Geologic Environment, of the revised GEIS describes the range of geologic and soil conditions at existing nuclear power plant sites, as well as the range of possible geologic hazards including erosional processes. Although geology and soils may vary greatly both locally and regionally, pertinent issues such as erosion potential and control, soil properties and geotechnical design, and hydraulic parameters were assessed and, if necessary, addressed during site design and construction. Moreover, the NRC evaluates new information that could affect the safety of operating nuclear power plants, such as severe erosion, on an ongoing basis to determine if any changes are needed at existing plants. This ongoing reactor oversight process is separate and distinct from the NRC's consideration of the license renewal application, which is a discrete event. If the license renewal application is approved, this ongoing reactor oversight process will continue throughout the period of extended operation.*

The impact of continued operations and refurbishment activities during the license renewal term on geologic and soil resources would consist of soil disturbance for various projects, as identified in Section 4.4.1 of the GEIS. To date, plant-specific license renewal environmental reviews conducted by the NRC have not identified any significant impact issues related to geology and soils from continued operations and refurbishment and, thus, the "geology and soils" issue is classified as Category 1. If, during future license renewal environmental reviews, new and significant information is identified, that information would be evaluated, and the results of the evaluation would be presented in the SEIS. No changes were made to the GEIS in response to this comment.

Comment: Page 3 – 49: Soils and subsoils at nuclear plant sites also vary in terms of their geotechnical properties relative to site construction projects and their hydraulic properties relative to the movement of infiltration, groundwater, and contaminants. Depending on the nuclear plant's location and design, riverbanks or coastlines may need to be protected to prevent erosion, especially at water intake or discharge structures.

Recent USGS and state studies have disclosed increasing erosion, especially at San Onofre Beach (SONGS site) at an average rate of close to 2 meters per year.[3]

[[3] (source: "Rates and trends of coastal change in California and the regional behavior of the beach and cliff system." Hapke, Reid and Richmond in THE JOURNAL OF COASTAL RESEARCH)]

All erosions studies (post 2000) must be included in SEIS and not decided in any way that would prevent erosion issues from being heard if SCE files for a license renewal for SONGS. (A4NR-11-21)

Comment: Besides some points regarding Geology and Soils being mentioned earlier, I also want to mention my concern in regard to the beach erosion at the San Onofre facility. Certainly, significant recent erosion at that site certainly makes not only that, but adds to the importance of examining many other components of the facility (including big demolition and construction jobs related to steam generator replacement). Since the plan is to replace steam generators at Diablo Canyon and at San Onofre in this general time frame under the older operating license, how many other steam generator replacements should we expect during the "life/half-life" of the facility operation at those facilities? (Campbell-31-19)

Response: *The impact of nuclear power plant operations and refurbishment on geologic and soil resources, including potential erosion, is considered a Category 1 issue, which does not require a site-specific analysis during an environmental review unless there is new and significant information that would indicate impacts could be greater than SMALL. To date, plant-specific license renewal environmental reviews conducted by the NRC have not identified any significant impacts related to geology and soils from continued operations and reburbishment activities, as described in Section 4.4.1 of the revised GEIS. However, as part of license renewal environmental reviews, changes in plant operating parameters or new and significant information pertinent to an evaluation of impacts are considered during preparation of plant-specific supplements to the GEIS. Data are reviewed in part for information that could change the conclusion in the GEIS with regard to an issue. In the case of coastal erosion, this might include a license renewal applicant proposing to undertake shoreline protection projects in support of license renewal. In a similar manner, if significant erosion at or near SONGS, or any other nuclear power plant, is attributable to the plant, it would be incorporated in a license renewal evaluation. Thus, even though this issue is considered Category 1, there are*

mechanisms in place to conduct a full site-specific review if new and significant information warrants such a review.

In addition, the impact of erosion on the power plant would be considered in the safety review for the license renewal, rather than in the environmental review. The NRC also evaluates new information that could affect the safety of operating nuclear power plants, such as erosion, on an ongoing basis to determine if any changes are needed at existing plants. This ongoing reactor oversight process is separate and distinct from the license renewal process. If the license renewal application is approved, this ongoing reactor oversight process will continue throughout the period of extended operation.

No changes have been made to the GEIS in response to these comments.

Comment: Page 4-28, lines 23 to 25: Text in lines 23 to 25 on page 4-28 reads as follows:

> In addition, the Farmland Protection Policy Act requires Federal Agencies to take into account agency actions affecting the preservation of farmland.

Although the above-quoted statement is accurate and the Farmland Protection Policy Act (FPPA) could apply in some circumstances to development of renewable energy resources (as an alternative to the proposed action), the FPPA does not generally apply to private construction, even if such construction is subject to federal permitting and licensing activities (e.g., license renewal of nuclear power plants) (see Farmland Protection Act Fact Sheet at http://www.farmlandinfo.org/documents/29480/FPPA_8-06.pdf and Section 2(c)(4) of the Act). Consider deleting the quoted text in lines 23 to 25 on page 4-28 of the draft updated GEIS. (NEI1-7(4)-88)

Response: *The Staff agrees that the FPPA does not generally apply to private construction. However, for clarity and completeness, Section 4.4.1 of the GEIS has been revised to note that while the FPPA could apply in some circumstances at nuclear power plant sites (e.g., development of renewable energy resources as an alternative to license renewal, other projects completed with Federal assistance including funding), it does not apply to the NRC issuing or renewing the operating license of nuclear power plants located on private or non-Federal lands. Nevertheless, consideration of the presence of important farmland soils in the GEIS is consistent with NRC's resource-based approach to NEPA compliance and helps to ensure that NRC has integrated its NEPA process with all other consultation and environmental review requirements.*

Comment: Page 4-28, lines 38 and 39 and Page 4-29, lines 1 to 29: Text in lines 38 and 39 on page 4-28 and lines 1 to 29 on page 4-29 contains sections 4.4.2 (Environmental

Consequences of Alternatives to the Proposed Action) and 4.4.2.1 (Renewable Alternatives), which address the impacts on geology and soils of alternatives to the proposed action.

Consider adding text in Section 4.4.2 on pages 4-28 and 4-29 explaining why impacts on geology and soils from construction and operation of the fossil-fueled alternative and the new nuclear alternative are not discussed. (NEI1-7(4)-89)

Response: *Section 4.4.2 of the GEIS has been revised to include an expanded summary discussion, which indicates that the impacts of construction for all alternatives (including fossil energy, new nuclear, and renewable alternatives) would be similar.*

A.2.1.5 Comments Concerning Water Quality, Hydrology, and Use

Comment: I notice that page S-9 mentions "unlined" cooling ponds. What percentage of nuclear power facilities in the USA have unlined cooling ponds? Would not unlined ponds leak and infiltrate more than lined ponds? I call for this issue to be a Category 2 issue since there obviously are different kinds of soil, varying infiltration rates, and differing groundwater situations at each nuclear power facility. What is involved with "groundwater protection programs" if at least some of them fail to even take the basic precaution of lining the cooling ponds for the hot spent nuclear fuel? Is the spent nuclear fuel too "hot" to allow a liner to last very long, so the industry figures why bother? (Campbell-31-6)

Response: *As described in Section 4.5.1.2 (Groundwater Quality Degradation for Plants Using Cooling Ponds in Salt Marches, and Groundwater Quality Degradation for Plants Using Cooling Ponds at Inland Sites), all of the large cooling ponds are unlined. However, they do not receive spent nuclear fuel as suggested by the commenter, but rather cooling water that does not come into contact with nuclear fuel. In the case of salt marshes, any infiltrated water is not expected to degrade groundwater quality; therefore, the issue is considered Category 1. In the case of inland sites, the issue is considered Category 2 because of the variation in site-specific factors such as pond water quality, hydrogeology, and water well locations. No changes were made to the GEIS in response to this comment.*

Comment: Also, in this age of depleting water supplies, the massive amount of water needed to cool reactors and cool cooling ponds, that needs to be considered, both generically and individually, for the nuclear power facilities around the nation. (PBCA-Campbell-33)

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Water use conflicts: Water use conflicts may be exacerbated by continual water withdrawals at a nuclear facility, especially given population increases in the vicinity of existing facilities. (NY DOS-18-5)

Response: *As described in revised Section 4.5.1.1, surface water use for cooling purposes is addressed in three issues. For two issues (Surface Water Use and Quality [Non-Cooling System Impacts] and Surface Water Use Conflicts [Plants with Once-Through Cooling Systems]), the Category 1 designation is considered appropriate because, as presented in the GEIS, the NRC review of available information determined that the impacts would be SMALL for all plants (the first issue) and for plants with once-through cooling systems (the second issue).*

For non-cooling system-related impacts, NRC's finding is predicated on the fact that licensees are expected to use best management practices during the license renewal term for both continuing operations and refurbishment activities including those to minimize soil erosion and implementation of spill prevention and control plans. For the second Category 1 issue, license renewal environmental reviews conducted since issuance of the 1996 GEIS have found that surface water use conflicts continue to be SMALL in association with plants with once-through cooling systems because they return most of their withdrawn water to the same surface water body. The third issue (Surface Water Use Conflicts [Plants with Cooling Ponds or Cooling Towers Using Makeup Water from a River]) was considered Category 2 because plants with these types of cooling systems return less water to the source water body, and, therefore, under certain circumstances, operations could result in MODERATE impacts. It should be noted that for these and all other impact issues, new and significant information can be used to reach a different conclusion than that presented in the GEIS. As noted in Section 4.5.1.1 of the GEIS, increased temperature and decreased rainfall resulting from climate change could adversely affect water availability. Such changes could be considered new and significant information and, if so, would be evaluated in plant-specific reviews. No changes were made to the GEIS in response to these comments.

Comment: Global Warming: The Draft defines global warming in the Glossary; but most important, NRC fails to consider its impact on nuclear reactor operations during an extended license. It properly should be considered on a site specific, Category 2, basis in license renewal.

Global phenomena can be anticipated to produce localized effects dependent on site specific conditions. For example, power plants that cool directly with seawater would be affected by increased severity of storms and increased salinity in sea water affecting corrosion. Erosion and/or submergence of shorelines could place some buried components underwater, impacting corrosion in buried components and thereby an increase in potential leaks of radioactivity offsite. Increased severity of flooding or storm surge would also have the potential flood at grade or below grade structures and components including, but not limited to pump houses,

reactor building basements, spent fuel pools, buried components associated with the following systems − service water, condensate storage, fuel oil, station blackout diesel generator, and fire protection systems.

Increased ocean, lake, [and] river water temperatures would magnify the effect of cooling water discharge on the biotic community. Warmer average temperatures would, varied by site-specific conditions, result in increased localized humidity and increased incidences of atmospheric temperature inversions. Changes in degree and incidence of these phenomena may result in increasing the dose from radiological releases radiation to the public and should be analyzed on a site specific basis.

Early warnings at the dawn of commercial nuclear development posited just such scenarios: "A gently seeping nuclear reactor can put its radioactive poison under a stable inversion layer and concentrate it onto a few hundred square miles in a truly deadly fashion...By being careful and also by good luck, we have so far avoided all serious nuclear accidents." Dr. Edward Teller, *Journal of Petroleum Technology: Issue* 2 May 1965. (PW-6-18)

Response: *The commenter expresses concerns related to the effects of climate change on operations and operational safety at nuclear power plants. The NRC's environmental review is confined to analyzing the effects on the environment of continued operation of nuclear power plants through the period of extended operation. It should be noted that the effects of climate change on the safe design and operation of a nuclear power plant would be evaluated as part of NRC's safety review of license renewals, rather than as part of the environmental review.*

As described in Section 4.5.1.1, climate change is considered in the discussion of two issues (Surface Water Use Conflicts [Plants with Once-Through Cooling Systems], and Surface Water Use Conflicts [Plants with Cooling Ponds or Cooling Towers Using Makeup Water from a River]). The former issue is considered Category 1, while the latter issue is considered Category 2, partly because of the potential for climate change to affect operations of cooling tower systems that have higher consumptive water use compared to once-through systems.

Regardless, a new section (GHG Emissions and Climate Change [Chapter 4, Section 4.12.3.2]), has been added to this revised final GEIS summarizing the potential cumulative environmental impacts of GHG emissions and global climate change. The NRC has and will also continue to include within each SEIS a plant-specific analysis of any impacts caused by GHG emissions over the course of the license renewal term as well as any impacts caused by potential climate change upon the affected resources during the license renewal term. No changes were made to the GEIS in response to this comment.

Comment: Groundwater and soil contamination: Finding in Table B-1 of Appendix B in the draft updated GEIS (Volume 2) for the issue labeled "Groundwater and soil contamination" reads as follows:

Small or moderate impact (Category 2). Industrial practices involving the use of solvents, hydrocarbons, heavy metals, or other chemicals and unlined wastewater lagoons have the potential to contaminate site groundwater, soil, and subsoil. Contamination is subject to State- and U.S. Environmental Protection Agency regulated cleanup and monitoring programs.

Section 4.5.1.2 in the draft updated GEIS (pages 4-45 and 4-46) discusses the environmental consequences of groundwater and soil chemical contamination during continued operations and refurbishment activities at nuclear power plants. This is an issue that was not evaluated in the 1996 GEIS.

For the reasons discussed in the following paragraphs, Industry suggests that the "Finding" quoted above from Table B-1 of Appendix B to the draft updated GEIS (Volume 2) for the issue labeled "Groundwater and soil contamination" should be revised and the categorization changed from "Category 2" to "Category 1."

Industry believes that the impacts from releases of contaminants to soil and groundwater can be adequately and appropriately considered through a generic analysis of contaminant releases from safety and non-safety related structures, systems, and components (SSCs) and chemical and waste storage systems. The Resource Conservation and Recovery Act (RCRA), Clean Water Act (CWA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Toxic Substances Control Act (TSCA), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) govern use, storage, disposal, release, and/or cleanup of solvents, hydrocarbons, and other potentially hazardous materials. The federal and State regulations implementing these laws protect groundwater, surface water, human health and the environment by imposing standards for hazardous materials management, including monitoring for spills and releases, reporting of monitoring results, and corrective action. The applicability of these regulatory protections to nuclear plants is independent of whether the nuclear plants are granted license renewals, and releases of hazardous materials will be addressed and remediated when they occur, regardless of whether the NRC grants a renewed operating license. Thus, this impact issue is similar to plant decommissioning, where the NRC has noted that the impacts of decommissioning would occur regardless of license renewal. Appropriate environmental and health and safety reviews would occur under NRC, EPA, and State regulations, as necessary. Furthermore, best management practices would be used to reduce the probability of events that could affect groundwater quality during the current and extended license terms.

On the basis of the considerations mentioned above, Industry encourages NRC to change its review conclusion about impacts from the issue of "Groundwater and Soil Contamination" from "small to moderate" to "small," and to reclassify this issue from Category 2 to Category 1 in the updated GEIS, Appendix B, Table B-1. Also, the draft updated GEIS should be changed throughout (i.e., Volumes 1 and 2) to reflect the changes. (NEI1-7(4)-2)

Response: *The presentation of groundwater impacts in Section 4.5.1.2 of the revised GEIS has been modified to better clarify the issues associated with license renewal. In making these revisions, the NRC has combined two issues, "groundwater use and quality" and "groundwater and soil contamination," into a single Category 1 issue named "groundwater contamination and use." The new consolidated Category 1 issue evaluates the impacts of the industrial use of solvents, hydrocarbons, heavy metals, or other chemicals on groundwater, soil, and subsoil at nuclear power plant sites during the license renewal term, including the use of wastewater disposal ponds or lagoons. Based on previous plant-specific reviews, groundwater and soil contamination problems have occurred at some operating plants. These situations have required regulatory involvement by State agencies during both monitoring and remediation phases. In some cases, remediation has taken place in the form of excavation and recovery wells. In these instances, all contamination was either remediated with no further action required by regulatory agencies or has been confined to the plant site with remediation continuing. Nevertheless, the number of occurrences of such problems can be minimized by means of proper material storage and handling, secondary containment, and leak detection equipment. In addition, nuclear plants have their own program for handling chemicals, waste, and other hazardous and toxic materials in accordance with Federal and State regulations and permits and are generally required to employ best management practices to prevent releases to the environment. Continued implementation of such programs and procedures such as Spill Prevention, Control, and Countermeasure Plans and spill and contingency plans including best management practices (e.g., good housekeeping of the plant site, preventive maintenance, routine inspections, etc.) would reduce the likelihood of any inadvertent releases to soils and/or groundwater.*

Comment: So that gets to the severe accident mitigation analysis, then I was particularly interested not only in the SAMA but I was interested in what you had to say about groundwater because one of the contentions I have that's still alive and well at Pilgrim has to do with the aging contention of the insufficiency of the aging management program for our buried pipes and tanks with radioactive contamination. [See identifier NMA-PW-13 for the comment on SAMA.] So I was very pleased to see that you are considering that as a contention [too] and pleased also to see that Chairman Yaczko [sic] is taking this issue seemingly seriously.

However, in reading the text that is in this draft, I found insulting and disconcerting because, again, the implication was relax and be happy, the focus being on tritium. Why just on tritium? You know there are other bad guys that are being released. Look at Indian Point, it's a good

example. To give the confidence, and then you listed only a few of the reactor sites that have experienced leaks, not certainly all that have, nor is there an honest caveat saying well these are the leaks we know about because, get the connection guys, we haven't required monitoring wells, except if the water on site is potable, potable, that you can drink it. I only know it in French.

And anyway, the point of it is that obviously we don't know how many leaks are out there because no one is testing for it. What, do you expect the licensee to be out there with tablespoons and sampling? Of course not. And so, and then you go on in your text about the NEI voluntary program, which was a total cave, as far as I'm concerned, by the NRC. You don't leave public safety up to industry's voluntary initiatives.

In the Pilgrim adjudication, my expert witness, Arnold Gutterson, spent considerable time going through Entergy's NEI voluntary program, pointing out all the holes and problems with it, that it gives absolutely no confidence. And so unless you go the step further and have what initially the NRC staff, before it was politically compromised out, had recommended a requirement for cathodic detection for buried components and then go further with monitoring wells, go further with a more regular inspection program and a required baseline before, you know, right at the time of license application, you haven't got any assurance for the public.

But if you don't know anything and you just read what's in the draft, it's don't worry about it, it's all taken care of. There is going to be a voluntary program, just worry about tritium and it's fine, there's never been a problem, and I don't think that should be the role of our public safeguard. NRC is supposedly working for the public. I hate to be harsh about it, but I think it's true. (NMA-PW-14)

Response: *As described in Section 4.5.1.1, "Radionuclides Released to Groundwater" is discussed in the GEIS as a new Category 2 issue. The emphasis in the text is on tritium because tritium, in the form of tritiated water, is as mobile as the groundwater in an aquifer. In contrast, other radionuclides are generally immobile because of sorption to aquifer materials. However, the issue relates to all radionuclides released to groundwater, and is not restricted to tritium only.*

Tritium has become an important issue at operating power plants. As described in Section 4.5.1.2, the NRC has evaluated the tritium issue and determined that tritiated groundwater has generally remained onsite. The only example of offsite tritium had an activity concentration above background but well below the EPA's drinking water standard.

As a Category 2 issue, a site-specific analysis of groundwater monitoring data is required in the environmental reviews of license renewal. No changes were made to the GEIS in response to this comment.

Comment: Inadequate Assessment of Inadvertent Radioactive Releases to the Environment: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

A History of Inadvertent Radioactive Releases to the Environment: Unplanned releases of radionuclides to the environment have become ubiquitous at nuclear power plants across the United States. To date, leaks from varying plant systems have occurred at 29 plants in the United States, nearly a third of the United States' operating fleet. Riverkeeper has compiled documentation related to these leaks, attached hereto as Exhibit A, for your consideration in this rulemaking proceeding.

It is imperative that the update to the 1996 GEIS fully address any and all relevant concerns. Unfortunately, as discussed below, the Revised GEIS as proposed would not ensure a comprehensive review of this issue. (Riverkeeper-20-3)

Comment: Inadequate Assessment of Inadvertent Radioactive Releases to the Environment: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

Revised Assessment of Groundwater Resources: The NRC proposes to add a new Category 2 issue to address radionuclides released to groundwater.[7] It is in this portion of the Revised GEIS that the NRC recognizes the reality of inadvertent releases of radionuclides: "There is a growing concern about radionuclides detected in groundwater at nuclear power plants. These releases have occurred as leaks in at least 14 plants."[8] However, as discussed in more detail below, it is apparent that the Revised GEIS would not require consideration of the environmental impacts of such releases in relation to other "resources areas," i.e. aquatic ecology, terrestrial resources, and threatened/endangered species. Providing for such a narrow assessment related only to impacts to groundwater would lead to a narrow and incomplete analysis of the impacts of such releases to the environment. As discussed below, the NRC must require a comprehensive site-specific analysis of the impacts of accidental releases on all relevant environmental media. This is the only way to ensure a thorough assessment and accurate conclusions as to significance of such inadvertent contamination.

[[7] *See* Revised GEIS at 4-46 to 4-47; Revised GEIS Appendices at B-12.]
[[8] *See* Revised GEIS at 4-46; see also Proposed Rule, 74 Fed. Reg. at 38122.]

The newly proposed Category 2 issue to address radionuclide releases to groundwater is problematic for other reasons as well. While the Proposed Rule implies a focus on an assessment of public health impacts, the Revised GEIS and associated guidance documents notably fail to provide concrete direction to ensure adequate analysis related to such impacts. Instead, the Draft Revised SRP and Draft Reg. Guide 4015 provide vague directives, mostly emphasizing assessment of groundwater monitoring systems.[9] The Revised GEIS even appears to largely dismiss public health concerns, stating that "[t]he NRC does not consider these tritium releases to be a health risk to the public or onsite workers in any of these [previously reported] cases because the tritiated groundwater is expected to remain onsite."[10] The NRC should provide more specific guidance to ensure that licensees and the NRC accurately assess all reasonably foreseeable impacts to public health at particular plants.

[[9] *See* Draft Revised SRP at 4.4.6-1 to 4.4.6-3; Draft Reg. Guide 4015 at 31-32.]
[[10] Revised GEIS at 4-47.]

For example, at Indian Point, licensee/license renewal applicant, Entergy Nuclear Operations, Inc., (hereinafter "Entergy") acknowledges groundwater contamination that is slowly leaching through the underlying bedrock to the Hudson River,[11] contrary to the NRC's blanket conclusion stating that groundwater contamination has remained onsite. Currently, there is [a] proposed project that would site a desalination plant in Rockland County, New York, across and slightly downstream from Indian Point, which would withdraw Hudson River water for drinking water.[12] Far from speculative, this proposal is currently in the planning, environmental review, and permitting stages.[13] Accordingly, an appropriate assessment of the impacts of radionuclide releases from the Indian Point facility should include impacts to the public from use of contaminated drinking water. Unfortunately, in the Indian Point relicensing proceeding, the NRC Staff's site-specific Draft Supplemental Environmental Impact Statement[14] was completely devoid of assessment of the impacts of license renewal on drinking water quality in regard to the use of the Hudson River as a source of drinking water via the desalination plant.[15] Thus, in the instant rulemaking, the NRC must provide clear direction so that any reasonably foreseeable radionuclide exposure to the public, such as through anticipated drinking water sources, will be assessed.

[[11] *See* Groundwater Investigation Executive Summary (Indian Point Energy Center, Buchanan, N.Y., Jan. 2008), at *2-4, available at* http://jic.semo.state.ny.us/Resources/ExecutiveSummary%20GW%20final.pdf.]
[[12] *See generally* Riverkeeper's IP DSEIS Comments at 22-25.]
[[13] *See generally id.*]
[[14] Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3, Draft Report for Comment, Main Report (U.S. Nuclear Regulatory Commission December 2008) ("Indian Point Draft Supplemental EIS"), *available at,* http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement38/ (last visited Jan. 12, 2010).]

[[15] *See* Indian Point Draft Supplemental EIS at §§ 2.2.7, 4.3. (Riverkeeper-20-4)

Comment: Inadequate Assessment of Inadvertent Radioactive Releases to the Environment: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

Revised Assessment of Threatened/Endangered Species: The Revised GEIS would expand the scope of an existing Category 2 issue related to threatened or endangered species to include "essential fish habitats."[27] Riverkeeper believes this addition is an improvement to this assessment. Riverkeeper further commends the NRC for recognizing that releases of radionuclides to the environment have the potential to impact threatened, endangered, and protected aquatic species, and essential fish habitats. In particular, the Revised GEIS acknowledges that terrestrial and aquatic threatened, endangered, and protected species, and essential fish habitats could be affected by, *inter alia,* "exposure to radionuclides."[28]

[[27] *See* Revised GEIS at 4-71 to 4-77; Revised GEIS Appendices at B-24.]
[[28] Revised GEIS at 3-73, 4-111, 4-112.]

While this explicit recognition is a departure from the 1996 GEIS, Riverkeeper remains apprehensive that licensees and the NRC Staff would continue to fail to fully address the impacts of inadvertent radioactive releases to the environment on threatened, endangered, and protected species, and essential fish habitats, since there is no explicit requirement that such impacts be evaluated. For example, the Draft Revised SRP simply requires that site-specific supplemental environmental impact statements present a "list of adverse impacts to listed and proposed threatened or endangered species or critical habitats from continued operations during the renewal term and refurbishment."[29] Given the discussion in the Revised GEIS recognizing potential impacts from radionuclides, license renewal applicants and NRC Staff assessments of this issue should ostensibly include adverse impacts caused by radionuclide contamination, both from normal operations as well as inadvertent releases. However, with the noted history of accidental radioactive contamination at nuclear power plants, and the tendency to evade full review of this issue, as evidenced from the discussion above, a more explicit requirement is preferable.[30]

[[29] Draft Revised SRP at 4.5.5-5.]
[[30] In the newly required essential fish habitat assessment under the Magnuson-Stevens Fishery Conservation and Management Act, "adverse impact" is defined as including "direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH." Draft Revised SRP at

4.5.5-2. This would ostensibly cover accidental radionuclide contamination, but once again, an overt requirement in light of the ongoing problem is preferable.]

Failure to specifically require this analysis will lead to inadequate environmental reviews of this issue. For example, in the Indian Point license renewal proceeding, Entergy's Environmental Report and the NRC Staff's Indian Point Draft Supplemental EIS lack any assessment of the potential effects on threatened or endangered species caused by groundwater contamination at the facility. Despite leakage of extensive amounts of highly toxic radionuclides from the IP1 and IP2 spent fuel pools, including strontium-90 and tritium, into the groundwater around the plant, the environmental review documents completed by the license renewal applicant and the NRC Staff at no point assesses the effects of such contamination on the Hudson River's federally listed shortnose sturgeon, or candidate species, Atlantic sturgeon.[31] This is particularly concerning due to the known dangers of exposure to these radioactive substances: strontium-90 imitates calcium by concentrating in fish bones and shells of clams and blue crab; clams are a major part of the diet of sturgeon found in the Hudson River. Therefore, concern that Hudson River sturgeon are being exposed to elevated levels of such dangerous substances, is wholly warranted. It is, therefore clear that the environmental review in the Indian Point relicensing case was lacking in this regard. The NRC must, therefore, explicitly require consideration of radionuclide contamination to avoid such deficient assessments in the future.

[[31] *See* Indian Point Draft Supplemental EIS at 4-49 to 4-53] (Riverkeeper-20-7)

Comment: Inadequate Assessment of Inadvertent Radioactive Releases to the Environment: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

Need for a Comprehensive Framework to Assess Inadvertent Radionuclide Releases: As discerned from the discussion above, it is evident that the Revised GEIS will not ensure a complete evaluation of the environmental impacts of inadvertent radionuclide releases from nuclear power plant facilities. NRC must implement a comprehensive framework to ensure that all aspects of such contamination are properly assessed. At a minimum, NRC must ensure that the impacts of unintended radionuclide releases on groundwater, aquatic ecology, terrestrial resources, and threatened, endangered, and protected species, and essential fish habitats, are all Category 2 issues, with specific requirements for appropriate assessment, as indicated above.

However, preferably, the NRC should put all of these issues under one umbrella issue, to ensure that an all-inclusive review occurs. Indeed, separating all of the individual environmental effects of accidental radioactive contamination does a disservice to the environmental review process by disallowing a look at the overall, collective impacts of this issue.

Notably, the NRC's proposed method of analyzing radionuclide contamination as articulated throughout the Revised GEIS would lead to inconsistencies in the review process. For example, the NRC would apparently require a Category 2 site-specific assessment of radionuclide impact to threatened, endangered, and protected species, and essential fish habitats, however, makes a generic Category 1 determination with respect to the impacts of radionuclides on aquatic organisms. Thus, for example, while the impacts of radioactive contamination to certain federally listed fish species would require extra analysis, the impacts to the majority of fish species would be categorically dismissed as small. This makes no sense, and, in fact, only serves to prove that Category 2 analysis is warranted in relation to effects on aquatic resources from inadvertent radioactive contamination.

Furthermore, instead of a comprehensive review, the NRC's Revised GEIS envisions a narrow assessment of inadvertent releases that would essentially focus on impacts to groundwater and associated public exposure pathways. To the contrary, NEPA requires a broader evaluation of environmental impacts beyond mere public health concerns.[33] The significance of any radiological release is governed by the CEQ regulation defining "significantly"; this definition, requires consideration of the context of the action and intensity or severity of the impacts.[34] Accordingly, in order to accurately evaluate the significance of inadvertent radiological release, license renewal applicants and the NRC Staff must fully assess all of the impacts to the surrounding natural environment. Thus, the need for a comprehensive site-specific review of impacts to all relevant environmental media is apparent.

[[33] *See Marsh v. Oregon Natural Resources Counsel,* 490 U.S. 360, 374 (1989).]
[[34] *See* 40 C.F.R. § 1508.27 (requiring analysis often different factors).]

For example, in the Indian Point license renewal proceeding, Entergy and the NRC Staff's environmental analysis of the leaks from the Indian Point spent fuel pools was seriously deficient. In that proceeding, the relevant environmental analyses focused solely on radiological doses to humans from the proclaimed "only" exposure pathway, i.e., consumption of aquatic foods.[35] By determining that the leaks did not exceed public radiation dose limits via consumption of aquatic foods, the NRC Staff concluded that the leaks did not have a significant impact on "plant workers, the public, *or the environment*."[36] In their reviews, Entergy and the NRC Staff did not perform *any* analysis of the impacts of the contamination to the Hudson River ecosystem. In particular, Entergy's Environmental Report and the NRC Staff's Indian Point Draft Supplemental EIS failed to determine if toxic radionuclides including strontium-90 and cesium-137 are bioaccumulating in the environment; there was no analysis of the contamination

to Hudson River fish or shellfish despite sampling showing elevated levels of such radionuclides in fish; there was no assessment of the effects of the contamination to the nearby essential fish habitat and ecologically critical area of Haverstraw Bay; and, as discussed above, there was no assessment of the potential effects of the leaking on the Hudson River's federally listed endangered species, including the short-nosed sturgeon.[37]

[[35] Indian Point Draft Supplemental EIS § 2.2.7, at 2-107 to 2-108; § 4.3, § 4.5, § 4.7. In addition to incorrectly relying on dose limits as a sole measurement of the impacts from the leaks, the NRC Staff's assessment of dose limits was also fundamentally flawed since it did not take into consideration the proposed desalination plant, discussed above, that is likely to result in a direct drinking water pathway.]

[[36] Indian Point Draft Supplemental EIS §§ 4.3, 4.5, 4.7 (emphasis added).]
[[37] *See generally id.*]

If the Revised GEIS is implemented as proposed, such an inadequate review would continue to be acceptable, since no site-specific review of impacts of radionuclides on terrestrial/aquatic/ endangered, etc resources would be required. It is, thus, clear that the Revised GEIS must be adjusted to provide for a comprehensive review of impacts of radionuclide releases on all relevant resources. (Riverkeeper-20-9)

Comment: 5. Radionuclides Released to Groundwater: NRC incorrectly assigns "small to moderate impact" from radionuclides released to groundwater. We are pleased that NRC properly designated it as a Category 2 issue.

a. Impacts - Mischaracterized To Be or Small to Moderate Impact: NRC bases this determination on inadequate information; blind faith in the sufficiency of industry's proposed voluntary initiatives; and a wrong assessment of the adequacy of NRC's aging management program.

(1) Impact Based Inadequate Information: Neither NRC, the licensee, state/local governments nor the public knows exactly what has leaked to groundwater or unmonitored offsite into adjacent water bodies. This is because, for example: NRC does not require monitoring wells onsite unless the ground water is used for drinking. Radiation detection capabilities used by industry are based on 1970's technology. NRC does not define the magnitude of spills that must be reported nor do they define "significant contamination" that needs to be recorded after the cleanup process. There is no requirement that this information must be submitted to the NRC. Although 10CFR50.75 (g) discusses the requirement for records of any remaining residual contamination, there are no regulatory requirements which require remediation while the power plant is operating.

This was made clear by NRC in a report The NRC's Groundwater Contamination (Tritium) at Nuclear Plants-Task Force − Final Report, Sept 1, 2006.

In the Executive Summary they say:

> Leakage that enters the ground below the plant may be undetected because there are generally no NRC requirements to monitor the groundwater onsite for radioactive contamination.
>
> Contamination in groundwater onsite may migrate offsite undetected.

And further in the report that,

> ...many of the release events reviewed occurred over an extended period of time and the use of current source term data may not reflect actual conditions at the time of release. p.13
>
> "the NRC should develop guidance to the industry for detecting, evaluating, and monitoring releases from operating facilities via unmonitored pathways." P. 15
>
> [The Branch Technical Division]...does not require ground water monitoring within the licensee's site for general detection and monitoring purposes. Ground water monitoring within the licensee's site is only required if the ground water is tapped for drinking or irrigation purposes. P. 18
>
> The radiation detection capabilities specified in the BTP are the 1970's state-of-the-art for routine environmental measurements in Laboratories. More sensitive radiation detection capability exists today, but there is no regulatory requirement for the plants to have this equipment. The guidance primarily focuses on gamma isotopic analysis of environmental material and on tritium in water samples. There are minimal requirements for analyzing environmental samples for beta- and alpha-emitting radionuclides. P.18
>
> The regulatory guidance provides built in flexibility in the scope of the REMP. It...allows licensees to reduce the scope of and frequency of the sampling program, without the NRC approval, on historical data. ..if a licensee's environmental samples have not detected licensed radioactive material in several years, then the licensee typically reduces the scope and sample frequency of the associated environmental pathway. NRC inspections have observed reductions in the scope and frequency of licensee programs... P.19
>
> No specific regulatory requirements for licensees to conduct routine onsite environmental surveys and monitoring for potential abnormal spills and leaks of radioactive liquids. However, 10CFR 50.72(g) [sic] requires that licensees keep

> records of information important to the safe and effective decommissioning of the facility. These records include information about known spills [key word "known"].
>
> The rule does not define the magnitude of the spills and the leaks that need to be documented by the licensee. Also the rule does not define "significant contamination" that needs to be recorded after the cleanup process. There is no requirement that this information must be submitted to the NRC. However, the records are available for review by NRC inspectors.
>
> Although 10CFR50.75(g) discusses the requirement for records of any remaining residual contamination, there are no regulatory requirements which require remediation while the power plant is operating. A licensee's decision to remediate contamination before the plant is decommissioned is typically based on several factors, including ALARA considerations for potential worker and public dose, cost, feasibility, disposal options, and external stakeholder considerations. P.19 (PW-6-14)

Comment: Inadequate Assessment of Inadvertent Radioactive Releases to the Environment: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

Need for a Comprehensive Framework to Assess Inadvertent Radionuclide Releases: Moreover, any complete assessment of inadvertent radioactive releases to the environment must specifically include an analysis of the *cumulative impact* of such contamination. For example, in the Indian Point relicensing proceeding, neither Entergy nor the NRC Staff performed any evaluation of the cumulative long-term effects of the contaminated groundwater plumes at Indian Point. The NRC Staff cited Entergy's removal of spent fuel from the IP1 pool as evidence that impacts from the contamination would be minimized.[38] Entergy made further claims that leaking is no longer active at the facility, a claim that is dubious at best, as explained in Riverkeeper's Petition for Hearing. However, the extensive leakage that has emanated from the Indian Point spent fuel pools to date is still in the groundwater and will continue to slowly leach into the Hudson River.[39] Whether leaking is active or not, it is undisputed that there has never been an assessment of the environmental impacts of this contamination. Current and future accidental radioactive releases from the plant will only add to the existing plumes. For example, an underground pipe leak at the facility in February 2009 resulted in over 100,000 gallons of tritiated water being released directly into the waterway.[40] It is, therefore,

imperative that the NRC specifically require an evaluation of the cumulative environmental impacts of inadvertent radioactive releases at nuclear power plant sites.

[[38] *Id.* § 4.3, at 4-36.]
[[39] For example, in the months leading up to the completion of draining of the pool at Indian Point Unit 1, Entergy reported it was leaking around 70 gallons per day, contributing thousands and thousands of additional gallons of polluted water into the groundwater and eventually the Hudson River.]
[[40] *See* Annie Correal, *Indian Pt. Broken Pipe Spurs Safety Worries,* THE NEW YORK TIMES (Feb. 27, 2009).]

In contrast, the Revised GEIS's new Category 2 issue requiring analysis of cumulative impacts[41] would not necessarily require such an assessment. The Revised GEIS explains that an "analysis of cumulative impacts focuses on the resources that could be affected by the incremental impacts from continued operations of the nuclear plant" and that "[p]ast and present actions include all actions up to and including the time of the license renewal application."[42] And yet, despite the fact that repeated inadvertent releases of radionuclides can have an incremental impact on the surrounding environment, this new Category 2 issue does not explicitly require consideration of this issue. Other than stating that the cumulative impacts on terrestrial and aquatic resources would include habitat degradation,[43] the Revised GEIS does not provide any specific guidance that would ensure consideration of the cumulative impact of radioactive contamination. This failure precisely highlights the problem with breaking down this issue into various sections of the Revised GEIS.

[[41] *See* Revised GEIS at 4-220 to 4-227.]
[[42] *See id.* at 4-220, 4-221.]
[[43] *See id.* at 4-223, 4-224.]

Only with an all-inclusive review of the environmental impacts of unplanned radioactive contamination will the NRC ever be able to come to an accurate conclusion as to the degree of the overall impact. Accordingly, the NRC must require site-specific assessment of accidental releases on all pertinent environmental media, including terrestrial animals and plants, soils, river sediments, aquatic biota, and endangered/threatened/protected resources, as well as the cumulative impacts thereto.

In light of the foregoing, it is also clear that the range of impacts, when taking into account all of the potential environmental consequences of inadvertent radiological release, could be anywhere from SMALL to *LARGE*.[44] Given the long history of widespread contamination at nuclear power plant sites across the country, along with the fact that license renewal proceedings involve continually aging facilities, it is reasonably foreseeable that additional tritium leakage will occur at aging, relicensed plants during their twenty year term of extended operation, and that such leakage could result in "LARGE" impacts to the environment. Indeed, the NRC has offered no support for its assertion that current and future impacts will only be SMALL or MODERATE, beyond simply relying on its belief that the incidences of tritium leakage that have occurred thus far have had no health impacts and minimal environmental impacts, at

least according to the NRC's assessment. Riverkeeper strongly disagrees with this assertion, as evidenced by the arguments put forth in our intervention petition, environmental scoping comments, and comments to the Draft Supplemental EIS in the Indian Point relicensing proceeding.[45] Therefore, the NRC should find that impacts on all media, as explained above, from inadvertent radiological releases to groundwater could be "SMALL, MODERATE OR LARGE."

[[44] Thus, the NRC's proposed range of impacts in relation to the new Category 2 issue related to radionuclide release to groundwater, of "small to moderate," is unfounded, *(see* Revised GEIS at 2-9; Revised GEIS Appendices at B-12), and the conclusion of "small" impact in relation to the two Category 1 issues related to radionuclide impact on terrestrial and aquatic resources, is also unsupported *(see* Revised GEIS at 2-9, 2-11; Revised GEIS Appendices at B-12, B-22).]
[[45] *See* Riverkeeper Exhibits B, C, D.] (Riverkeeper-20-10)

Response: *The NRC agrees that inadvertent releases of radionuclides to groundwater are a concern and as such, the NRC has included as a new Category 2 (site-specific) issue, "Radionuclides released to groundwater," in the GEIS (see Section 4.1.5.2). The issue is discussed in detail, including the conclusions of the NRC task force report mentioned by one of the commenters, in Section 3.9.1.3 of the GEIS. Additionally, the GEIS contains discussions on two new Category 1 radiological issues, "Exposure of terrestrial organisms to radionuclides" (discussed in Section 4.6.1.1) and "Exposure of aquatic organisms to radionuclides" (discussed in Section 4.6.1.2), as well as a discussion of radiological impacts to human health (Section 4.9.1.1.1).*

However, the staff does not agree that it performed a narrowly focused and segmented review of radiological issues associated with the operations of nuclear power reactors. The NRC has an ongoing, comprehensive regulatory framework for the protection of plant workers, the public, and the environment from radioactive material that is not limited to the environmental review performed as part of the license renewal process. NRC's review and enforcement of radiological monitoring and reporting requirements apply at all times and are independent of the license renewal environmental review aspects that are the subject of this final rule. Radioactive gaseous and liquid effluent releases, routine and inadvertent, from nuclear power plant operations and refurbishment associated with license renewal are addressed under the issue "Radiation Exposures to the Public" (see the GEIS, Sections 3.9.1.3, 3.9.1.4, and 4.9.1.1.1). Radiation doses to members of the public from the current operations of nuclear power plants have been examined in the 1996 GEIS and the revised GEIS from a variety of perspectives (i.e., releases of radioactive gaseous and liquid effluents, radiation from radioactive waste storage buildings, radiological impacts from refueling and maintenance activities, and inadvertent leaks of radioactive liquids), and the impacts were found to be within dose standards specified in NRC regulations at 10 CFR Part 20 and Appendix I to 10 CFR Part 50, as well as the EPA regulations at 40 CFR Part 190. No aspect of future operation or refurbishment associated with license renewal has been identified that would substantially alter this situation.

The NRC expects its licensees to continue to comply with its radiation protection standards at all times, including any extended period of operation resulting from license renewal. Therefore, NRC concludes that the impact from radioactive effluents during continued operations and refurbishment activities to plant workers, the public, and aquatic and terrestrial biota would be appropriately monitored and controlled.

In addition to NRC's requirements to monitor radioactive effluents (routine and inadvertent) discharged into the environment, each nuclear power plant is required to have a radiological environmental monitoring program (REMP). The REMP quantifies the environmental impacts associated with radioactive effluent releases from the plant. The REMP monitors the environment over time, starting before the plant operates to establish background radiation levels and throughout its operating lifetime to monitor radioactivity in the local environment. The REMP provides a mechanism for determining the levels of radioactivity in the environment to ensure that any accumulation of radionuclides released into the environment will not become significant as a result of plant operations. The REMP also measures radioactivity from other nuclear facilities that may be in the area (i.e., other nuclear power plants, hospitals using radioactive material, research facilities or any other facility licensed to use radioactive material). Thus, the REMP monitors the cumulative impacts from all sources of radioactivity in the vicinity of the power plant.

To obtain information on radioactivity around the plant, samples of environmental media (e.g., surface water, groundwater, drinking water, air, milk, locally grown crops, locally produced food products, river, ocean, or lake sediment, and fish and other aquatic biota) are collected from areas surrounding the plant for analysis to measure the amount of radioactivity, if any, in the samples. The media samples reflect the radiation exposure pathways (i.e., inhalation, ingestion, and physical location near the plant) to the public from radioactive effluents released by the nuclear power plant and from background radiation (i.e., cosmic sources, naturally occurring radioactive material, including radon and global fallout). The NRC has standards for the amount of radioactivity in the sample media, which, if exceeded, must be reported to the NRC and the licensee must conduct an investigation. The REMP supplements the radioactive effluent monitoring program by verifying that measurable concentrations of radioactive materials and levels of radiation in the environment are not higher than expected when compared against data on the amount of radioactive effluent discharged. As part of its license renewal environmental review, the staff reviews several years of REMP reports to look for adverse data or evidence of a buildup of radioactivity in the environment. The results of the staff's review are discussed in each plant-specific SEIS.

The new Category 2 issue "Radionuclides released to groundwater" was added to evaluate the potential impact of inadvertent discharges of radioactive liquids from plant systems into groundwater. The issue is relevant to license renewal because all commercial nuclear power plants have spent fuel pools, liquid storage tanks, and piping that contain and transport radioactive liquids. Over time, these systems and piping have a potential to degrade and release radioactive liquids that could migrate into the groundwater. The NRC has investigated cases where radioactive liquids have been inadvertently released into the groundwater in an

uncontrolled manner. Regarding the magnitude of impact, the NRC based its determination of SMALL to MODERATE impact on its review of radiological data from nuclear power plants that had inadvertent releases of radioactive liquids. Even though the NRC expects impacts for all plants to be within this range, a conclusion of MODERATE impact would not be precluded for a future license renewal review if it is based on new and significant information that supports such a conclusion.

For this new Category 2 issue, the license renewal applicant is required to provide information and an evaluation of the potential impacts from radioactive liquids released to groundwater. In each SEIS for license renewal, the staff will perform an independent review of this issue and include a discussion of the potential impacts as well as the cumulative impacts associated with the issue. Additionally, as discussed above, NRC regulations in 10 CFR Part 20 require the residual radioactivity from these inadvertent releases to be evaluated by the licensee for any potential hazard.

For all Category 2 issues, the NRC provides appropriate guidance to an applicant for license renewal regarding what information, data, and analysis should be submitted in their Environmental Report in the revised Regulatory Guide 4.2, Supplement 1, "Preparation of Environmental Reports for Nuclear Power Plant License Renewal Applications."

For the Category 1 issue, "Exposure of aquatic organisms to radionuclides," the GEIS evaluated the potential impacts to aquatic organisms from routine radioactive effluents and concluded that the impacts were SMALL for all nuclear power plants. As a Category 1 issue, an applicant does not have to evaluate the potential impacts to aquatic organisms from radionuclides except if it identifies new and significant information that would result in impacts beyond those discussed in the GEIS. Therefore, unless the applicant's site-specific assessment of threatened, endangered, or protected fish species finds information that radioactive effluents are significantly impacting a protected species; no site-specific radiological assessment is required to be submitted by the applicant in its Environmental Report. However, as part of the license renewal process, the staff will perform an independent evaluation of all Category 1 issues to look for new and significant information that would require a more detailed evaluation of a particular issue. Regardless of whether or not new and significant information is found, the staff will include a discussion of Category 1 issues in the SEIS.

No changes have been made to the GEIS in response to these comments.

Comment: Radionuclides released to groundwater; Finding in Table B-1 of Appendix B in the draft updated GEIS (Volume 2) for the issue labeled "Radionuclides released to groundwater" reads as follows:

Small or moderate impact (Category 2). Underground system leaks of process water have been discovered in recent years at several plants. Groundwater protection programs have been established at all operating nuclear power plants.

The issue of "Radionuclides released to groundwater" was not addressed in the 1996 GEIS, but was added to the draft updated GEIS based on industry events in which an unplanned or unmonitored release of radioactive liquids to the environment has resulted in low but detectable levels of radionuclides in groundwater. In all but one instance, the contamination remained on-site, and all of the events were well below regulatory limits. None of the inadvertent releases presented an impact on public health, safety, or the environment. Industry submits that sufficient data are available to classify the issue of radionuclides released to groundwater as Category 1. This is supported by the following statement from the NRC's Liquid Release Lessons Learned Task Force Final Report issued on Sept. 1. 2006: "*Although there have been a number of industry events where radioactive liquid was released to the environment in an unplanned and unmonitored fashion, based on the data available, the task force did not identify any instances where the health of the public was impacted*."

Industry suggests that the issue labeled "Radionuclides released to groundwater" in Table B-1 of Appendix B in the draft updated GEIS (Volume 2) be re-categorized from "Category 2" to "Category 1"and that the above-quoted issue description be changed in Table B-1 of Appendix B in the updated GEIS to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Small ~~or moderate~~ impact (Category ~~2~~*1*). Underground system leaks of process water have been discovered in recent years at several plants. Groundwater protection programs have been established at all operating nuclear power plants.

Information supporting this suggested change is provided in the paragraphs below.

As a result of the industry events, the nuclear industry voluntarily implemented the industry-wide Ground Water Protection Initiative (*Industry Ground Water Protection Initiative – Final Guidance Document: NEI 07-07 [Final],* 2007 to ensure timely detection and effective response to situations involving inadvertent radiological releases to groundwater and to enhance licensee communications with their stakeholders about these situations. The early detection of contamination, typically through on-site monitoring wells, allows licensees to take actions as necessary to prevent the off-site migration of licensed radioactive material. This voluntary initiative assists the industry in implementing programs for early detection and allows the industry to effectively mitigate releases once they occur to be protective of drinking water supplies and associated human health. The NRC is in the process of reviewing licensees' implementation of the Industry Ground Water Protection Initiative as part of their radiation protection program oversight (refer to NRC Inspection Manual – Temporary Instruction

2515/173). On-site groundwater monitoring data are reported to the NRC in either the Annual Radioactive Effluent Release or Annual Radiological Environmental Operating Reports.

Considering the information presented above, it is recommended that the revised GEIS develop a generic impact analysis based on the following:

- Impacts of radioactive material releases to groundwater can be adequately and appropriately addressed for all nuclear power plants in the updated GEIS by describing the process by which an inadvertent release of radiological material to groundwater is already being dealt with at all nuclear plants through the licensee's implementation of the Industry Ground Water Protection Initiative and ongoing Offsite Dose Calculation Manual updates, Annual Radioactive Effluent Release Reports, Annual Radiological Environmental Operating Reports, and NRC oversight. Licensee implementation programs include periodic reviews of the site's potential vulnerability for an inadvertent leak to occur due to equipment failure or human error, an understanding of the site's hydrology and geology, early detection through ground water monitoring, and reporting of the data to the NRC
- For those instances when a release of radioactive material to groundwater does occur at a nuclear power plant, a site-specific assessment is performed in accordance with the plant's groundwater protection program. Such assessments address site-specific conditions, including site-specific contaminants and potential receptors, and necessary actions to prevent off-site migration. Accordingly, the generic impact analysis should acknowledge that, regardless of whether the NRC renews licenses for nuclear power plants, existing regulations and performance standards already ensure that the environmental impacts are assessed in the event of a radioactive material spill or leak to groundwater or soil. Examples of such existing regulations and standards are listed below:

  1. NEI 07-07 (Industry Groundwater Protection Initiative) guidance document.
  2. Revisions to Regulatory Guide 4.1 (Radiological Environmental Monitoring Programs)
  3. NRC Inspection Manual – Temporary Instruction 2515/173
  4. Revisions to Regulatory Guide 4.21 (Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning
  5. Revisions to Regulatory Guide 1.21 (Measuring, Evaluating and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste
  6. EPRI Report 1016099 "Groundwater Protection Guidelines for Nuclear Power Plants" 2008

The above-described level of controls now imposed on an unplanned or unmonitored release of radionuclides to the environment from nuclear power plants and the NRC's regulatory oversight justifies a conclusion that impacts from the issue "Radionuclides released to groundwater" would be SMALL, and that the issue designation should be changed from "Category 2" to "Category 1." These changes would be consistent with the NRC's approach of designating

other issues that are generically evaluated in the updated GEIS and found to have small impacts as a result of monitoring and regulatory controls as “Category 1”. Examples include storage and disposal of low-level radiological waste, spent fuel, high-level waste, and mixed waste. For these issues, the GEIS relies on regulatory controls and permissible levels, which are outlined in regulations and implemented by the nuclear industry through operational monitoring programs, to conclude that impacts associated with each issue would be SMALL for all plants, and hence, that the issues are classified as “Category 1.”

The updated GEIS should be changed throughout (i.e., Volumes 1 and 2) to reflect the above-suggested modification in Table B-1 of Appendix B. (NEI1-7(4)-3)

Response: *This new Category 2 issue has been added to the GEIS and the rule to evaluate the potential contamination and degradation of groundwater resources resulting from inadvertent discharges of radionuclides into groundwater from nuclear power plants. Within the past several years, there have been numerous events at power reactor sites that involved unknown, uncontrolled, and unmonitored releases of radionuclides into the groundwater. The number of these events and the high level of public controversy have made this issue one that the NRC believes needs a “hard look” as required by NEPA.*

The issue is relevant to license renewal because all commercial nuclear power plants routinely release radioactive gaseous and liquid effluents into the environment under controlled conditions in accordance with NRC radiation protection standards. These radioactive releases are planned, monitored, documented, and released into the environment at designated discharge points. However, within the past several years there have been numerous events at power reactor sites that involved unknown, uncontrolled, and unmonitored release of radioactive liquids into the groundwater. NRC regulations in 10 CFR Part 20 and in 10 CFR Part 50 limit the amount of radioactive material, from all sources at a nuclear power plant, released into the environment to levels that are as low as is reasonably achievable (ALARA). The regulations are designed to protect the public and the environment.

The majority of the inadvertent liquid release events involved tritium, which is a radioactive isotope of hydrogen. However, other radioactive isotopes, such as cesium and strontium, have also been identified. The types of events include; leakage from spent fuel pools, buried piping, and failure of pressure relief valves on a liquid effluent discharge line.

Another aspect encountered by the NRC due to the inadvertent releases was the high level of concern from the public, even at the very low radiation levels caused by the events. There has also been significant media coverage and demands by State and local government officials and members of Congress for the NRC to take action to stop these events.

NEI comments that this new issue is not needed because the nuclear power industry has committed to follow NEI 07-07, Industry Ground Water Protection Initiative – Final Guidance Document. The industry's groundwater protection initiative, as stated in NEI 07-07, is an industry-initiated program designed to help each plant improve management of situations involving inadvertent radiological releases that migrate into groundwater and to improve communication with external stakeholders to enhance trust and confidence with local communities, States, the NRC, and the public. The program is not an NRC-required program and the guidance in the document is not subject to regulatory enforcement. The NRC reviews each plant's groundwater protection program for consistency with the guidance in NEI 07-07. The Temporary Instruction 2515/173 was a "one time" review of each plant's implementation of the guidance in NEI 07-07. The temporary instruction does not constitute a continuing, periodic inspection of the program that verifies compliance with NRC regulations on radioactive effluents.

For example, an NRC Inspection Report (Vermont Yankee Nuclear Power Station Preliminary Results of Inspection Related To Vermont Yankee Ground Water Program And Recent Onsite Ground Water Contamination, dated April 16, 2010. ADAMS Accession No. ML101060419) stated that the plant had not fully implemented the guidance in NEI 07-07. Since adherence to NEI 07-07 is not a regulatory requirement, no enforcement action was taken against Vermont Yankee.

The monitoring data collected by each plant for the groundwater protection program is not required by regulation to be included in the annual reports cited in the comment. The exception to this is if a radioactive release was evaluated as a radioactive effluent that had the potential to cause a radiation dose to a plant worker or a member of the public.

NRC Regulatory Guides provide guidance to licensees on an acceptable method that complies with NRC regulations. However, a Regulatory Guide is not a regulation that requires compliance.

The referenced EPRI document is a good example of industry working to craft its own guidance and programs to solve a problem, but as with NEI 07-07 it is not a regulatory requirement.

The NRC cannot rely on a voluntary initiative or industry guidance as a basis to ensure that the nuclear power industry will monitor and have adequate information available for the NRC to determine whether the issue does or does not have an adverse impact on ground water resources.

On the basis of the information and experience with these leaks, the NRC concludes that the impact on ground water quality from the release of radionuclides could be small or moderate, depending on the magnitude of the leak, radionuclides involved, and the response time of plant personnel to identify and stop the leak in a timely fashion. Since the leaks are not planned and

there are currently no NRC regulations that would require the timely identification and termination of a leak, there is no information available to the NRC that would enable it to make a generic assessment. Therefore, a site-specific evaluation in the Environmental Report is needed for each application for license renewal. Thus, the issue remains a Category 2 issue. No changes were made to the GEIS as a result of this comment.

Comment: 5. Radionuclides Released to Groundwater: NRC incorrectly assigns "small to moderate impact" from radionuclides released to groundwater. We are pleased that NRC properly designated it as a Category 2 issue.

a. Impacts - Mischaracterized To Be or Small to Moderate Impact: NRC bases this determination on inadequate information; blind faith in the sufficiency of industry's proposed voluntary initiatives; and a wrong assessment of the adequacy of NRC's aging management program.

(2) Draft's Misguided Faith − Adequacy Industry's Voluntary Groundwater Protection Initiatives: NRC in response to the recent proliferation of leaks from reactors decided to allow industry to self regulate instead of imposing enforceable requirements − regulations. Voluntary programs are not enforceable and do not provide the protection the public deserves; neither do they assure that NRC's rules that prohibit unmonitored radioactive releases offsite will be followed.

The weaknesses identified by Pilgrim Watch in Entergy's *Buried Piping and Tanks Inspection Program and Monitoring Program* provide an example.[12]

[[12] Docket 50-293: Evidentiary Hearing Transcript, April 2008 − Adams Accession Number ML081070329; Pilgrim Watch Findings of Fact and Conclusions of Law, June 2009 − Adams Accession Number ML081650345; Pilgrim Watch Petition for Review of LBP-06-848 − Adams Accession Number ML083240599]

- Section 5.0, subsection [I] at page 7 acknowledges right at the beginning that "The risk of a failure caused by corrosion, directly or indirectly, is probably the most common hazard associated with buried piping and tanks."

- Steps required in building a risk assessment tool are discussed in Section 5.0, subsection [2] on page 7. However the program fails in that it does not require a complete baseline review. There is no indication that the entire component is supposed to be examined; instead escape batches are provided to the licensee − such as [at 2a] "the size of each section shall reflect practical considerations of operation, maintenance, and cost of data gathering with respect to the benefit of increased accuracy." Any program worth its salt would require a thorough baseline inspection along the entire length of the pipe.

- Subsection [4] categorizes the piping into high, medium and low impact. High impact components require prompt attention. The Board agrees that they should require prompt attention however Entergy's definition of "prompt" allows considerable delay − high impact buried sections shall be examined within 9 months of issuance of the procedure; and no date is given when the procedure shall be initiated.

- Buried piping and tanks having high risk are specified as having an initial inspection period of 5 years with a re-inspection interval of 8 years. The time interval is too long

- The Table does not tell how much of the component will be inspected.

- There is no requirement to shorten a subsequent inspection based upon the degree of corrosion discovered at the time of the prior inspection.

- Absent from this procedure is the prudent and practical guidance to conduct the inspection provisions of this procedure when opportunities present themselves, regardless of the inspection intervals in Table 4. For example, if a section of buried piping categorized as having "Low" inspection priority is excavated for other reasons, this excavation procedure should direct/require workers to take advantage of the opportunity and perform inspections – corrosion is neither linear nor constant across the component's length.

- In subsection [5], the determination of inspection locations may also consider the "ease of access to inspection point." However, ease of location and lack of corrosion do not necessarily go together. A component that is difficult to access may never been inspected – all the more reason that it should be inspected now.

- Section 5.6, *Parameters to be Inspected,* page 13, lists: external coatings and wrapping condition; pipe wall thickness degradation; tank plate thickness degradation; and cathodic protection system performance, if applicable. The attributes that must be considered in tabulating risk are too narrow. They include: (a) soil resistivity measurement; (b) drainage risk weight; (c) material risk weight; (d) cathodic protection/coating risk weight.

- The list in Section 5.6 should be expanded to include, for example, the age of the component's parts; the number of high risk corrosion areas in component such as welds, dead spots etc; counterfeit or substandard part not replaced. The list is silent on internal corrosion even though corrosion from the inside can bring about a failure.

- Section 5.6 also is silent on the size of the sample required, its location, and the rational for the sampling protocol − if, in fact, a sample is taken and not an inspection of the entire component. Section 5.7, on page 13, provides vague remarks about acceptance criteria for any degradation of external coating, wrapping and pipe wall or tank plate thickness. It says

that they should be based on current plant procedures; and if not covered by plant procedures then new procedures need to be developed before the inspections. The pass/fail grade should be clearly defined. For example what precisely constitutes an "unacceptable" from an "acceptable" degraded external wrapping? The NRC's Lessons Learned Task Force was very specific that "significant" and other such descriptions need definition.

• Section 5.8, Corrective Actions, page 14, says that "a condition report (CR) shall be written if acceptance criteria are not met. Any and all inspections should generate a written condition report regardless of what is or is not found to maintain a permanent paper trail of all inspections. The Section also says that corrective actions *may* include engineering valuations, scheduled inspections, and change of coating or replacement of corrosion susceptible components, and those components that do not meet acceptance criteria shall be *dispositioned* by engineering. [Emphasis added]. This provides no assurance to public safety for the following reasons.

a. The corrective actions *may* include engineering valuations, scheduled inspections, and change of coating or replacement of corrosion susceptible components; but they also "may not." These should be required.

b. The licensee's own engineering department will deal with it; but there is no clear definition of how they will deal with it. There should be layers of supervision and that the NRC should have an oversight role in this program?

c. Who sees the Condition Reports − or to put it another way, where are the reports kept, who has access to those reports, do they have to be sent to the NRC and if so under what conditions and time schedule? A more basic issue is that Condition Reports are unlikely to be written or, if they are written, to actually say anything as explained directly below.

• Section 5.12 Inspection Methods and Technologies/Techniques, subsection [1] on page 15 specifies steps to be taken for Visual Inspections of buried piping and tanks. Step (g) directs the workers: "A CR [condition report] shall be initiated if the acceptance criteria are not met." A review of steps (a) through (f) reveal a lack of objective, or even subjective, acceptance criteria that could trigger a condition report.

a. When opportunities arise, buried sections of piping and tanks "should be examined to quantify deposit accumulation...and those results documented." As long as exposed piping is examined and damage chronicled, the acceptance criteria are met – no condition report.

b. "Look for signs of damaged coatings or wrapping defects" − as long as workers look the acceptance criteria are met. Only not looking would fail to meet the acceptance criterion and trigger a condition report.

c. "The interior of piping may be examined by divers, remote cameras, robots or moles, when appropriate:" The combination of "may" and "when appropriate" means the acceptance criterion is met when examinations are performed or not.

d. "Use holiday tester to check excavated areas of piping for coating defects:" When coating defects are found for exposed area of piping using a holiday tester, the acceptance criteria is met and no condition report is written.

e. If visual inspection reveals coatings or wrappings are not intact, further inspection of piping for signs of pitting, MIC, etc. is required; and if the additional inspection is performed and the acceptance criterion is satisfied then no condition report is warranted whether damage is found or not.

f. Inspect below grade concrete for indication of cracking and loss of material. As long as the inspection is performed, the acceptance criterion is satisfied whether damage is found or not.

- Section 5.12 subsection [2] on page 16 specifies the steps to be. taken for Non-Destructive Testing of buried piping and tanks. No steps direct workers to initiate condition report(s) regardless of how extensive the piping and/or tank damage is identified.

- Section 5.9 Preventive Measures, at 14, "…the existing cathodic protection system *may* be updated or a new Cathodic Protection system *may* be installed. Pilgrim Watch has explained that cathodic protection *should* be installed. The emphasis should be on prevention not waiting to discover failures before acting.

In summary, reasonable assurance is not provided by this new program. Ground Water Programs need real commitments. (PW-6-15)

Comment: 5. Radionuclides Released to Groundwater: NRC incorrectly assigns "small to moderate impact" from radionuclides released to groundwater. We are pleased that NRC properly designated it as a Category 2 issue.

a. Impacts - Mischaracterized To Be or Small to Moderate Impact: NRC bases this determination on inadequate information; blind faith in the sufficiency of industry's proposed voluntary initiatives; and a wrong assessment of the adequacy of NRC's aging management program.

(3) Draft's Misguided Assessment − Adequacy Aging Management Program in License Renewal: The Draft incorrectly assumes that the aging management program for buried pipes and tanks and the day-today maintenance programs provide reasonable assurance that the

impact will be small to moderate. This is misguided and fully explained in Pilgrim Watch's filings on Contention I in Entergy's License Renewal Application adjudication. Please refer to those documents in NRC's Adams collection.[13]

[[13] Ibid.]

The Aging Management Program: The Buried Piping and Tanks Inspection Program include (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel, stainless steel, and titanium components. Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components are inspected when excavated during maintenance. If trending within the corrective action program identifies susceptible locations, the areas with a history of corrosion problems are evaluated for the need for additional inspection, alternate coating, or replacement. A focused inspection will be performed within the first 10 years of the period of extended operation, unless an opportunistic inspection (or an inspection via a method that allows assessment of pipe condition without excavation) occurs within this ten-year period.

Neither the Aging Management Program for buried pipes and tanks, nor the inspections and tests performed as part of routine maintenance, and operation, provide reasonable assurance that the effects of aging will be managed such that the buried pipes within scope and under consideration will perform their intended functions consistent with the current licensing basis for the period of extended operation. They are not sufficient. Therefore in order to protect public safety, the aging management program must be enhanced or supplemented with a more robust inspection system, cathodic protection, a base line inspection prior to license extension, and an effective monitoring well program or any licensee's Application denied.

Day-to-Day maintenance procedures quite obviously are ineffective; if they were effective the proliferation of leaks known to have occurred would not have happened. For example, the water chemistry program is a mitigation program and does not provide detection for aging effects. More frequent complete inspections as part of the overall program are the only effective assurance that defects created by aging components will be uncovered. Tritium leaks at reactors across the country belie the effectiveness of water chemistry alone to prevent leaks. (PW-6-16)

Response: *The emphases of these comments are on impacts related to leaking or corroding components, which are aging management issues. Aging management is considered outside of the regulatory scope of license renewal environmental reviews because it concerns safety and thus is considered in license renewal safety reviews. Current operational inspections ensure proper maintenance of leaks, corrosion, or embrittlement concerns. The license renewal inspection program, which is a separate programmatic action from current operational*

inspections and the license renewal environmental review, ensures that the applicant has demonstrated that adequate aging management practices are in place for those components that will be in operation during the period of extended operation resulting from license renewal. The impact of radionuclides released to groundwater, as presented in Section 4.1.5.2 of the GEIS, is a new Category 2 issue, requiring plant-specific reviews of sampling data and monitoring programs as part of a license renewal environmental review. No change has been made to the GEIS as a result of these comments.

Comment: Groundwater: We are pleased that the NRC has elevated radionuclides released to groundwater to Category 2. The revised GEIS recognizes that "there is a growing concern about radionuclides detected in groundwater at nuclear power plants" (page 4-46, line 27) and that "tritium is the most mobile radionuclide in soil and water." In finalizing its justification for elevating this issue to Category 2, the revised GEIS states, "On the basis of occurrence at several nuclear plants, the impact of radionuclide releases to groundwater quality could be small to moderate, depending on the occurrence and frequency of leaks and the ability to respond to leaks in a timely fashion" (page 4-47, line 33). The Federal Register notice states "this issue is relevant to license renewal because virtually all commercial nuclear power plants routinely release radioactive gaseous and liquid materials into the environment" (page 38122).

Moving forward, this is wonderful news for those communities whose groundwater is impacted by nuclear power plants whose licenses are yet to be renewed. But what does this say for power plants whose renewal applications are either pending or already approved? Will the NRC take a retrospective look at this issue to assure communities that this issue was not overlooked because of bad timing?

In the case of PINGP, there have been documented levels of tritium in the groundwater (equal to the levels cited in the revised GEIS for the Byron plant) that are due to operational problems or leaks. For instance, tritium was detected in the Community's drinking water in the late 1980s/1990s and in wells around the PINGP at above normal background levels. Although the detected levels were below the EPA standard of 20,000 pico curies per liter (pCi/L), the range detected (1,300 − 1500 pCi/L) was above what was detected in other wells (300 − 400 pCi/L). Tritium is still detected in observation wells. Community members are concerned with the history of leakage of tritium from PINGP for which no adequate explanation has yet been given. Even though the Radiological Environmental Monitoring ("REMP") Reports state that the tritium results are far below the EPA drinking water standard, the Community is concerned about how the tritium is getting into the groundwater, why the concentration of detected tritium fluctuates so dramatically, and what is the best way to monitor the leakage to ascertain the source of the leakage, determine precisely whether, how and to what extent the tritium migrates adjacent lands, and to ensure that the levels of tritium do not exceed the EPA standards over time. According to the 2006, 2007, and 2008 REMP, tritium results for PINGP onsite well P-10 have been relatively high (3773 pCi/L (2006), 2258 pCi/L (2007), and 2060 pCi/L (2008)) compared

with the two off-site indicator locations 2 miles away (ranging between <19 pCi/L and 59 pCi/L) and 13 miles away (ranging between <19 and 46 pCi/L). Although dramatic fluctuations in the tritium results were also observed each year, as of yet no explanation has been given for these fluctuations.

We recommend that this issue be evaluated, retrospectively, for all the plants that have either been relicensed or have pending applications. (PIIC-8-6)

Response: *As described in Section 4.1.5.2 of the GEIS, there have been numerous inadvertent releases of radioactive liquids to the environment. The NRC agrees that inadvertent liquid radioactive releases to groundwater are a concern; therefore, they are included as a new Category 2 (site-specific) issue in the GEIS.*

The information cited by the commenter about the Prairie Island Nuclear Generating Plant was reviewed by the staff during the preparation of a supplemental environmental impact statement (SEIS) for the plant's license renewal. Based on its review, the staff concluded, in the final SEIS, that the radiation dose to man from radioactive effluents was within NRC regulations and therefore, the impact to human health was SMALL.

The NRC will not conduct a retrospective review of nuclear power plants whose licenses were renewed. Such a review is not necessary because the NRC conducts individual plant inspections as part of the Reactor Oversight Process to ensure each nuclear power plant complies with NRC regulations on radioactive discharges (routine and inadvertent) and is appropriately monitoring the environment for radioactivity. The inspection looks at the potential impacts from radioactive effluent releases to ensure they are within the dose limits to members of the public and that radioactive material from the plant is not building up in the environment beyond what was evaluated at the time the plant was originally licensed. The inspection also reviews each plant's groundwater protection program to ensure it is effectively monitoring the groundwater that would most likely receive any radioactive liquid from a leaking pipe or component. It is through the inspection process that the NRC ensures continuous protection of the public from radioactive effluents. No change was made to the GEIS in response to this comment.

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Surface-water use and quality: Re-licensure of a nuclear facility may perpetuate surface-water use and quality impacts that were not considered during, or new data may have become available since the original licensing of the facility. Re-licensure may also result in altered operating parameters that may affect water use or quality. (NY DOS-18-3)

Response: *The cited Category 1 issue has been renamed, "Surface water use and quality (non-cooling system impacts)," for clarity in this revised final GEIS. As described in Section 4.5.1.1 of the GEIS, this issue encompasses non-cooling system-related impacts associated with continued operations and reburbishment activities, including associated construction, on surface water use and quality. As discussed in the revised GEIS, the NRC's conclusion that this issue is generic to all plants (Category 1) and has a SMALL level of impact is based upon licensees' use of best management practices and adherence to spill control and prevention plans. Many of the best management practices employed by licensees and the spill prevention and control plans are required by EPA-issued or CWA-delegated State-issued permits or by applicable regulation. In addition, previous license renewal environmental reviews have shown that both refurbishment associated with license renewal and continued operations during the license renewal term have had negligible effects on surface water use and quality.*

As with all Category 1 conclusions, the site-specific license renewal environmental review determines whether there is new and significant information that would change the conclusion in the GEIS. New and significant information of in-scope environmental impacts would be considered in plant-specific SEISs. The details of how the NRC addresses new and significant information are discussed in response to comment CEC-9(1)-10.

Comment: I note on page 3-50 of the GEIS under the headings "3.5 Hydrology 3.5.1 Surface Water" that is admitted that, "An exception is the Palo Verde plant in Arizona, which relies on treated municipal wastewater for cooling." I call for the Palo Verde nuclear power facility to be considered non-generic due to this admitted uniqueness in the kind of water used for cooling the reactors. Seeing that the City of Phoenix adds hydrofluosilicic acid to its water supplies, and there are associated damages to metal pipes from years of being exposed to this corrosive substance, such impacts need to be seriously assessed even during this operating license period, and certainly must be considered carefully before any consideration of an operating license extension for that large facility. (Campbell-31-18)

Response: *The adequacy of aging management programs, including the evaluation of water chemistry, is considered in the safety review of license renewal applications and is, therefore, outside of the regulatory scope of the license renewal environmental review. Current operational inspections ensure proper maintenance of leaks, corrosion, or embrittlement concerns. The license renewal safety review (which includes an inspection program), ensures that the applicant has adequate aging management practices in place for components that will be in operation under the proposed renewed license. No change was made to the GEIS in response to this comment.*

Comment: The following discussions on EPA's area of expertise would benefit from further elaboration or correction in the final GEIS:

Page 3-53, Lines 4-6: States − "High surface water temperature at the intake does not represent an impact on the environment but rather an effect of the natural conditions on operations." High surface water temperature at the intake means that the discharge at the facility will also be higher and therefore may cause increased environmental impacts on aquatic organisms and terrestrial organisms that depend on those aquatic resources. (EPA-3(1)-3)

Response: *The section referenced in the comment (Section 3.5.1.1) discusses impacts on surface water use during plant operations. The suggested change relates to impacts to the environment from releasing heated cooling system water during periods of the year when the receiving water body was at higher temperatures. As described in Section 3.5.1.2, thermal discharges are regulated by a power plant's National Pollutant Discharge Elimination System* (*NPDES*) *permit, which typically specifies limits on discharge temperature and/or the difference in temperature between intake and discharge. Seasonal limits may be included that would limit discharges of heated effluent at certain temperatures. No change was made to the GEIS as a result of this comment.*

Comment: The following discussions on EPA's area of expertise would benefit from further elaboration or correction in the final GEIS:

Page 3-53, the Clean Water Act text box should read as follows:

"Section 402 authorizes the National Pollutant Discharge Elimination System (NPDES) permit program that controls water pollution by regulating point sources that discharge pollutants into waters of the United States."

"Section 316(a) allows for a variance from thermal discharge standards in an NPDES permit if the variance is more stringent than necessary to assure the propagation of a balanced, indigenous population. The alternate thermal effluent limitation is only good for the term of the NPDES permit (5 years), and the facility must reapply each permit term for the permitting authorities review and approval"

"Section 316(b) requires that the location, design, construction, and. capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact," **(**EPA-3(1)-2)

Comment: The following discussions on EPA's area of expertise would benefit from further elaboration or correction in the final GEIS:

Page 3-53, Line 10: States − "Discharges from the circulating cooling water system account for the largest volumes of water and usually the greatest potential impacts on water quality and aquatic systems, although other systems may contribute heat and chemical contaminants to the

effluent." We recommend striking "circulating" because this paragraph discusses cooling systems in general and use of the term "circulating" implies a closed-cycle system. (EPA-3(1)-4)

Comment: D. The Draft Generic EIS Fails to Adequately Assess Aquatic Impacts in Specific Key Areas: Numerous specific statements in the draft revised Generic EIS need to be addressed by the NRC. These include the NRC's portrayal of the Clean Water Act section 316(b) Phase III rules, the viability of acoustic deterrent systems at plants in Belgium and New York, the role of the consultation process under the federal Endangered Species Act, and the environmental consequences, of alternatives to license renewal.

1. Clean Water Act Section 316(b) − Phase III Rules

The NRC's Statement: Phase III applies to existing manufacturing facilities with a design intake flow of at least 50 million gpd (189 million L/d) and new offshore and coastal oil and gas extraction facilities designed for withdrawing at least 2 million gpd (7.6 million L/d). Draft Generic EIS, p. 3-54, lines 13-16.

The NYSDEC's Response: This statement is incorrect or at least misleading. The Final Phase III rule applies only to new oil and gas extraction facilities. Existing manufacturing facilities using 50 MGD or more are still decided on a case-by-case, best professional judgment basis:

This rule establishes categorical section 316(b) requirements for intake structures *at new offshore* oil *and gas extraction facilities* that have a design intake flow threshold of greater than 2 million gallons per day and that withdraw at least 25 percent of the water exclusively for cooling purposes. For existing Phase III facilities, EPA determined that uniform national standards are not the most effective way at this time to address cooling water intake structures at these facilities. Instead, EPA believes that it is better to continue to rely upon the existing National Pollutant Discharge Elimination System (NPDES) program, which implements section 316(b) for existing facilities not covered under the Phase II rule on a case-by-case, best professional judgment basis. 71 Fed. Reg. 35006 (June 16, 2006) (emphasis added).

This NRC statement is also irrelevant to the license renewal of nuclear power plants since no EPA rule covers existing nuclear power facilities. (NYS DEC-12-6)

Response: *For accuracy, Section 3.1.5.2 of the GEIS was modified in response to these comments to more accurately represent the EPA's authority to regulate discharges under the CWA.*

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Altered current patterns at intake and discharge structures: Re-licensure may result in altered operating parameters or perpetuate effects that were not considered during the original licensing of a nuclear facility. (NY DOS-18-4)

Response: *On the basis of the evaluation presented in Section 4.5.1.1 of the GEIS, the issue of altered current patterns at intake and discharge structures is identified as a Category 1 issue because impacts are considered to be SMALL for all plants. No new information has been identified in plant-specific SEISs prepared since the 1996 GEIS or associated studies that would change this conclusion. However, if new and significant information is identified during plant-specific environmental reviews of license renewals that would call into question this conclusion, a full evaluation would be performed and presented in the plant-specific supplement to the GEIS. The details of how the NRC addresses new and significant information are discussed in response to comment CEC 9(1)-10. No change was made to the GEIS in response to this comment.*

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Groundwater use and quality: Aging facility infrastructure may contribute to groundwater quality impacts that may not have been present during the original licensing of the facility. (NY DOS-18-6)

Comment: Non-Radiological Contamination the Environment: The Revised GEIS would create a new Category 2 issue requiring assessment of non-radiological groundwater and soil contamination resulting from general industrial practices.[46] Riverkeeper supports inclusion of this new issue, however, urges the NRC to specifically require that in the course of the assessment of this issue, licensees provide detailed, publicly available inventories of any and all spills, leaks, and other releases that contributed to any such soil and groundwater contamination. Such a requirement would ensure a more complete evaluation of such contamination. [[46] *See* Revised GEIS at 4-45 to 4-46.] (Riverkeeper-20-11)

Response: *The revised GEIS consolidates the issues of "Groundwater Use and Quality" and "Groundwater and Soil Contamination" into the single issue of "Groundwater Contamination and Use (non-cooling system impacts)." The consolidated issue is classified as Category 1 with an impact level of SMALL. The focus of this issue is the potential impacts to groundwater, as well as to soil and subsoil, caused by nuclear power plant licensees employing industrial practices common to all industrial sites. Specifically, the consolidated issue is concerned with impacts from spills and other non-radioactive contaminant releases. This issue does not concern impacts to groundwater caused by systems unique to a nuclear power plant (e.g., the plant's cooling system).*

As described in the revised GEIS, the new consolidated Category 1 issue evaluates the impacts of the industrial use of solvents, hydrocarbons, heavy metals, or other chemicals on groundwater, soil, and subsoil at nuclear power plant sites during the license renewal term, including the use of wastewater disposal ponds or lagoons. In consideration of public comments and further evaluation by the NRC, the NRC determined that potential effects on groundwater and soil quality from common industrial practices can be addressed generically (i.e., Category 1) as such industrial practices are common to industrial facilities and not unique to nuclear power plants. The NRC expects that each licensee will comply with all applicable Federal, State, and local permits that the licensee must obtain to operate its plant, including those that are required by the Clean Water Act and its implementing regulations. For example, licensees must obtain and comply with National Pollutant Discharge Elimination System permits and prepare associated pollution and spill prevention response plans. As described in the revised GEIS, operational experience has shown that non-radioactive contamination of groundwater at or near nuclear power plant sites, caused by spills and other releases originating from the site, has been remediated to the point where no further action was required by the applicable regulatory agency, or that the contamination has been confined to the plant site with continuing remediation in place. However, as discussed in Sections 1.8.4 and 1.8.6 of the GEIS, if new and significant information is identified during plant-specific environmental reviews of license renewals that would call into question this conclusion, a full evaluation would be performed and presented in the plant-specific supplement to the GEIS. No change was made to the GEIS in response to these comments.

A.2.1.6 Comments Concerning Ecology: Aquatic Ecology, Terrestrial Ecology, Threatened and Endangered Species

Aquatic Ecology

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Effects of cooling water discharge, gas super-saturation, and eutrophication: Altered operating parameters or new information not available during the original licensing of a nuclear facility warrant further consideration of the effects of cooling water discharge in a SEIS. (NY DOS-18-7)

Response: *The NRC classified impacts from cooling water discharge on dissolved oxygen levels, gas supersaturation, and eutrophication as Category 1 issues in the GEIS on the basis of a review of past studies, operating experience, and the findings of license renewal environmental reviews that have been conducted to date. The NRC would consider any changes in plant operating parameters or other new and significant information pertinent to an evaluation of these impacts during preparation of plant-specific supplements to the GEIS. Thus,*

even though this issue is classified as Category 1, mechanisms are in place to conduct a full site-specific review if new and significant information warrants such a review.

Finally, the NRC notes that the commenter stated that "new information not available during the original licensing . . . warrant[s] further consideration of the effects of cooling water discharge in a SEIS." Under NRC regulation 10 CFR Part 51.53(c)(3)(iv), information must also be significant, in addition to being new, to warrant being addressed in the plant-specific SEIS.[(u)]

The NRC made no changes to the GEIS in response to this comment.

Comment: B. The Draft Generic EIS Fails to Provide Key Guidance for Addressing Impacts to Aquatic Resources in the Development of Supplemental EISs for Individual Nuclear Power Plants that Are or Will Undergo License Renewal: One of the NRC's stated purposes of the draft revised Generic EIS is to "defin[e] the number and scope of impacts that need to be addressed in plant-specific EISs." Draft GEIS, p. iii (emphasis added). In the Summary of the draft revised Generic EIS, the NRC states the following:

> The GEIS is intended to improve the efficiency of the license renewal process by (1) providing an evaluation of the types of environmental impacts that may occur from renewing commercial nuclear power plant operating licenses, (2) identifying and assessing impacts that are expected to be generic (the same or similar) at all nuclear plants (or plants with specified plant or site characteristics), and (3) defining the number and scope of environmental impact issues that need to be addressed in plant specific EISs. Draft Generic EIS, p. S-1 (emphasis added).

In our view, the draft revised Generic EIS does not adequately define the scope of environmental impacts to aquatic resources that should be addressed in the plant-specific EISs.

Although the NRC has correctly determined that aquatic impacts caused by the operation of cooling water intake systems using a "once-through" system will need to be addressed in plant-specific EISs (a Category 2 issue), it has included little about the scope or breadth of the analyses that will be required. The conclusion of Section 4.6.1.2 is simply that the NRC will perform facility specific impact assessments for nuclear power facilities that use a once-through cooling water system. Thus, the NRC does not provide much-needed details in the draft revised Generic EIS to indicate:

(u) 10 CFR 51.53(c)(3)(iv) ("The environmental report must contain any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware"); see also NRC Reg. Guide 4.2, Supp. 1 (NRC 2000) ("New and significant information may also be identified by other parties and the NRC in the scoping and public comment process").

- how it will make this assessment;
- the data that it will require from the licensee;
- the type of analysis that it will conduct; and
- what it will require if an impact is determined to be moderate or large.

The lack of these details makes this section of the draft useless as a· guidance document for NRC staff to use in making these very important and complex impact assessments. Additionally, the draft makes little, if any, changes to required assessments and mitigation of impacts caused by the cooling water intake systems at nuclear power facilities.

The NRC briefly discusses "[v]arious methods that have been used to reduce impingement" (Draft Generic EIS, p. 4-83). This discussion is extremely brief and misleading given that there has been over three decades of technology development and application. Many mitigative technologies are not mentioned, while the stated effectiveness of others is overemphasized. For example, as discussed in more detail below, the NRC makes statements on the effectiveness of sound deterrent systems that exaggerate the actual effectiveness of that technology.

The draft revised Generic EIS also contains no discussion of the impact reductions associated with a number of other mitigative technologies: wedgewire screens, barrier nets, and most importantly, closed cycle cooling. The NRC then states in Section 4.6.2 that the few mitigative alternatives that are discussed will cause the following impacts: "fugitive dust; impingement and entrainment of fish and other aquatic organisms; heated effluent from cooling water discharge and blowdown; ... boiler blowdowns; ... cooling tower drift (fogging and ice); salt deposition; maintenance of transmission line ROWs; bird collisions; and wildlife avoidance behavior due to operational activities and noise" Draft Generic EIS, p. 4-114. Therefore, the NRC has effectively developed an excuse for doing nothing if aquatic impacts are determined to be moderate to large. According to the draft Generic EIS, mitigating these impacts would only result in additional moderate to large impacts. However, the Generic EIS must provide a context for the impact and identify appropriate ways to minimize or mitigate impacts that are moderate to large. (NYS DEC-12-4)

Comment: <u>C. In the Draft Generic EIS; the NRC Perpetuates and Compounds the Flaws in Its Assessment of Impacts on Aquatic Resources in the License Renewal for Indian Point</u>: Having participated in the license renewal process for Indian Point Units 2 & 3, the NYSDEC is concerned with (1) the environmental impacts from the extended operation of those plants, (2) the NRC's failure to adequately assess the environmental impacts at those plants, and (3) whether future license renewal proceedings conducted under the revised Generic EIS would follow what is being done for the license renewal of Indian Point Units 2 & 3. In the Indian Point license renewal proceeding, the NRC released a draft Supplemental EIS (specific to Indian Point). The NYSDEC identified flaws in the NRC s approach for the aquatic impact assessment

for Indian Point Units 2 & 3, and the State conveyed its concerns in its comments to the draft Supplemental EIS. Those comments are attached to this document as *Attachment A.*

The impacts to aquatic resources from the once-through cooling systems at Indian Point are well known. In the license renewal proceeding, NYSDEC submitted expert declarations in support of its contentions detailing the impacts to aquatic resources with New York State's Notice of Intention to Participate and Petition to Intervene (November 30, 2007). New York's submission included the declarations of Roy A. Jacobson, Jr. (dated November 29, 2007) and David W. Dilks, Ph.D. (dated November 28, 2007). These declarations are attached to this document as *Attachments B and* C, respectively. The issues raised in these declarations are very relevant to the Generic EIS. Although they detail the significant and persistent adverse impacts from once-through cooling at Indian Point, they tell the unfortunate story for once through cooling water intake systems nationwide. This unfortunate story is summarized below:

Summary of Impingement and Entrainment Contention - Indian Point License Renewal: The operation of Indian Point consumes and returns approximately 2.5 billion gallons of Hudson River water each day. The River is an important estuarine ecosystem, and this operation has significant adverse impacts to the fish that call the Hudson home. Large fish are "impinged" on screens at the water intake where they are severely stressed and then suffocated. Smaller fish are "entrained" in the water intake − pulled through the operating plant and killed. This relentless process has continued relatively unabated for almost 40 years, and the applicant now seeks 20 more years. This must not continue because the environmental costs are too high. The NRC must fully consider the alternative of closed cycle cooling to mitigate these significant adverse impacts in this license renewal proceeding.

Summary of Heat Shock/Thermal Contention − Indian Point License Renewal: Indian Point's 40-year-old design uses massive quantities of Hudson River water when operating, and this system returns significantly heated water back to the river. The Hudson River would be a far more productive estuarine ecosystem if the heat shock/thermal impacts from Indian Point could be mitigated. Tens of millions of fish are impacted − from behavioral and growth impacts to fatalities. These impacts cannot be mitigated and they violate the requirements of the Clean Water Act. The State of New York contends that these impacts must be fully analyzed and addressed in this license renewal proceeding.

Summary of Endangered Species Contention − Indian Point License Renewal: The Endangered Species Act became the law of the United States to stop the disappearance of species in jeopardy of extinction. The NRC must implement and follow this important legal obligation in the license renewal application process. Operation of Indian Point impinges shortnose sturgeon − an endangered species − and impinges and entrains the Atlantic sturgeon, a candidate threatened species under the Act. The applicant argues that Indian Point does not jeopardize these fish. The State of New York contends that there are serious

questions about the applicant's views. The Endangered Species Act and common sense dictate that a full and thorough analysis is needed before the NRC makes a decision that could determine the fate of the sturgeon in the Hudson.

Despite the extensive analysis submitted into the NRC record regarding the Indian Point license renewal, NYSDEC is dismayed and concerned that the NRC perpetuates and compounds its prior flaws in the draft revised Generic EIS here. Specifically, the draft revised Generic EIS does not account for the flaws identified by the NYSDEC in the Indian Point plant specific draft Supplemental EIS, which can be replicated for any number of plants throughout the country. Included among the flaws in the NRC's environmental review for Indian Point in the draft Supplemental EIS that the NYSDEC identified are the following:

- The impingement data that Entergy provided to the NRC for Indian Point were erroneous. Nevertheless, the NRC conducted analyses and based its impact assessment on these erroneous data. This error was discovered by New York State and the National Marine Fisheries Service after the draft Supplemental EIS for the re-licensing of Indian Point Units 2 & 3 was released for public comment. The NRC will now need to reevaluate these impacts with the corrected data, which may lead to a delay in completing the Supplemental EIS for Indian Point Units 2 & 3.

- Some of the results of the impact assessment made by the NRC are contrary to the conclusions made by New York State biologists and many fisheries biologists familiar with the Hudson River estuary. For example, the NRC concluded that the re-licensing of Indian Point Units 2 & 3 will result in a *large* impact on bluefish populations. However, very few adult bluefish are impinged, and few, if any, bluefish eggs and larvae have been entrained by Indian Point Units 2 & 3. If adult bluefish are impinged, survival off the Ristroph-type traveling screens is high, on the order of 85 percent. In addition, bluefish stocks have been increasing in recent years.

- The NRC recommended *illegal* restoration activities to offset the Clean Water Act Section 316(b) impacts. This is contrary to what the NRC states in the draft revised Generic EIS that all Clean Water Act Section 316(b) issues will be handled by the EPA and not the NRC. See Draft Generic EIS, p. 4-86, fn "a".

- The NRC could not make final adverse impact assessments on several of the fish species it considered due to the lack of adequate information. Specifically, the adverse impacts to Atlantic sturgeon, shortnose sturgeon, Atlantic menhaden, gizzard shad, and blue crab could not be determined. Therefore, the NRC has no idea what the impact to these species will be if the licenses for Indian Point Units 2 & 3 are renewed for another 20 years because it did not obtain adequate data and information from the licensee.

- One of the species that the NRC did not have enough information on was the shortnose sturgeon − a federally listed endangered species. The NRC was aware that the licensee would be required to address Endangered Species Act issues, and the NRC appears to have known that Entergy had no recent data to ensure that an adequate assessment of the impacts on this species was made. The NRC never took the initiative to require the licensee to collect adequate data even though both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service requested this information early on.

Recommendations: In the context of the NRC's draft Supplemental EIS on the license renewal of Indian Point Units 2 & 3, additional information is required for the Generic EIS to meet the requirements of NEPA. Specifically, the NRC must incorporate the following information into the final Generic EIS:

- The NRC should specify the information on aquatic resources that it will require the licensees to provide.

- The NRC should list the specific aquatic species data required for both listed and non-listed aquatic species.

- Data need to be collected during appropriate times of the year and be recent enough to account for biological changes that have occurred over time in many aquatic systems throughout the country.

- The NRC should also address quality assurance and quality control to avoid repeating the errors that occurred with the impact assessment at Indian Point Units 2 & 3.

- The NRC must provide details about the types of analyses that NRC staff will undertake to make impact assessments and what the NRC will require of a licensee if any impacts are determined to be “moderate” or "large."

- To address potential thermal impacts caused by the thermal discharge of nuclear plants operating once-though cooling water systems, licensees should be required to undertake a thermal study to accurately estimate the potential species-specific thermal impacts. Many of these nuclear facilities have received power uprates since they were originally licensed, and some water bodies have warmed. Thermal studies conducted 10, 20, or more years ago obviously could not have accounted for these changes.

Lastly, given our experience with the NRC’s handling of the Indian Point license renewal proceeding, we question why the NRC goes through the trouble to make any facility-specific assessment of impingement and entrainment impacts on non-listed species given the statement in footnote "a” on page 4-86. NRC staff is spending a significant amount of time and resources

conducting fish population impact analyses to determine impacts that the NRC has a history of not addressing during the license renewal process. This is particularly egregious in the case of Indian Point Units 2 & 3 where erroneous data were used. The NRC then shirks its duty under NEPA and other relevant law when it determines that its action will likely lead to a moderate or large impact on an aquatic resource and then proceeds to renew the license without requiring the mitigation or minimization of the impact that the NRC identified.

For example, with Indian Point Units 2&3, the NRC has identified several moderate to large impacts but then indicated that these impacts will be minimized or avoided through the New York State Pollutant Discharge Elimination System (SPDES) permit program. However, the licensee has challenged the draft SPDES permit requiring the minimization of these impacts claiming that no such impact exists. Therefore, by challenging New York State, the licensee is in fact disagreeing with the NRC findings and is delaying or avoiding any mitigation for the aquatic impacts identified by the NRC. This delay provides the necessary cover for the NRC − enabling it to continue with a license renewal proceeding without ever having to confront the necessary issues on impacts to aquatic resources. In the end, however, simply deferring to the agencies responsible for the issuance of permits and approvals does not satisfy the NRC's legal obligations mandated under NEPA. (NYS DEC-12-5)

Response: *Guidance regarding how to prepare site-specific supplements to the GEIS, including how to perform and document the assessment, is provided in NUREG-1555, Supplement 1 (NRC 2013a). Guidance for the Preparation of Environmental Reports to support license renewal, including what type of data are required, is identified in Regulatory Guide 4.2, Supplement 1 (NRC 2013b). Revisions to these two documents were prepared concurrently with the GEIS and were made available for public review. Although examples of some potential mitigation measures are presented in the GEIS, identification and discussion of the many mitigation measures that could be applied to address potential impacts to aquatic resources is beyond the scope of the GEIS. The National Environmental Policy Act (NEPA) is a procedural law and does not grant the NRC the authority to take action, but rather, directs Federal agencies to assess the impact of an action on the environment, consider alternatives to the proposed action, and propose mitigation of impacts. Prevention and elimination of environmental impact are the responsibilities of regulatory agencies charged with management and protection of specific resources. The EPA or the delegated State, not the NRC, regulates thermal discharges through NPDES permits and Clean Water Act regulations. Power plants cannot operate without valid NPDES permits. The NRC made no changes to the GEIS in response to these comments.*

Comment: I'm a little concerned about some of these Category 1 designations. The one, in particular, that jumps out at me off of -- I'm looking at Appendix B here -- you have the thermal plume as a Category 1 issue, and that, to me, is a big mistake. To put all the plants together and make it a generic issue is wrong. Diablo Canyon is a great example of thermal plume "gone mad." I mean, thermal plume out there hasn't really been looked at the degree that it

should be looked at, and now you're going to put it in a Category 1. That makes it generic, so that we can just write it off as if everything's okay. Everything's not okay and it should be a Category 2 item. (PBCA-Nelson-1)

Response: *Thermal impacts on aquatic organisms is considered a Category 2 issue for plants with once-through cooling or cooling ponds and is considered a Category 1 issue for plants with cooling towers. The reason for the difference is that cooling towers transfer much of the heat produced by the power plant to the atmosphere rather than to surface water bodies, which greatly reduces thermal impacts on aquatic resources. Also, the designation of an issue as a Category 1 issue does not mean that potential impacts are not considered. The NRC considers changes in plant operating parameters or new and significant information pertinent to an evaluation of impacts during preparation of site-specific supplements to the GEIS. The NRC made no changes to the GEIS in response to this comment.*

Comment: The draft GEIS states - "Thermal impacts on aquatic organisms are expected to be small at nuclear plants with cooling towers. Thermal effects associated with plants that use cooling towers are small because of the reduced amount of heated discharge from these types of systems." This has been designated as a Category 1 issue. EPA's Region 7 has identified periods where the ambient water temperatures have exceeded water quality standards without any added discharge of thermal effluent from power plants. For example in August 2002, the temperature of the Missouri River exceeded its water quality standard for six days in a row. In ambient conditions like this, any discharge of heat could have large impacts, whether a facility is using closed-cycle or once-through cooling. A single significance level is not representative of the impacts here, as the impacts may be small, moderate, or large. (EPA-3-2)

Response: *As described in the comment, under extreme ambient conditions a plant would likely have to either decrease its operating capacity or cease operations altogether in order not to exceed NPDES operating limits. Section 1.5.2 of the GEIS lists the three criteria under which an issue would be considered as Category 1. For issues that do not meet all three Category 1 criteria, then NRC considers the issue a Category 2 issue, and a plant-specific analysis is required for that issue. On the basis of a review of the past studies, recent operating experience, and license renewal environmental assessments conducted to date, the NRC determined that these three criteria apply to the issue of thermal impacts on aquatic organisms at nuclear plants with cooling towers.*

In the commenter's example, ambient water temperatures that exceed water quality criteria relevant to plant operations would be new information. The NRC would also consider such information significant because it can affect NRC's level of impact. The NRC considers such new and significant information reason for additional plant-specific analysis. In addition, releases of cooling water require an NPDES permit issued by the EPA or the State that sets

limits for thermal discharges, and power plants cannot operate without valid NPDES permits. NRC made no changes to the GEIS in response to this comment.

Comment: [Regarding questions by the public about the NRC's definition and disposition of "new and significant information" in generic, Category 1 issues and the conditions under which the NRC would address a Category 1 issue in a SEIS.] Now since I started, you know, not believing in this, I've been really involved in the "once through cooling" issue, which is another huge issue, and again, as I go through this document, these are Category 1 problems. These aren't Category 1. These are Category 2, especially here, in California. They use the cooling water source of the Pacific Ocean for Diablo. That's generic.

They're using my water from Morro Bay estuary, that goes through a water pyramid, that leaves the bay and goes right into their reactors, along with Morro Bay reactor, doing huge cumulative impacts, that have never been studied, and these impacts -- because it's so expensive. (PBCA—Nelson-26)

Response: *As indicated in Table 4.6.1.2-3 of the GEIS, thermal impacts and impingement and entrainment of organisms are identified as Category 2 issues for plants with once-through cooling systems, such as the Diablo Canyon plant. The NRC assesses both the direct and indirect impacts of power plant operation as well as the cumulative effects caused by an aggregate of past, present, and reasonably foreseeable future actions as part of its assessment of site-specific, Category 2 issues. The GEIS provides an overview of cumulative impacts on aquatic resources in Section 4.1.3.8, and SEISs provide more specific cumulative impacts assessments on a plant-by-plant basis. The NRC made no changes to the GEIS in response to this comment.*

Comment: You should look at all the data that they put in, and I'm specifically talking about the thermal impact of Diablo Canyon on the ground that it's pouring out on.

They originally said it was going to destroy three-quarters of a mile. Now, years ago, the Water Board brought a cease and desist order up against Diablo, but of course it was just a big bluff, and never went past a draft. But the draft was made, it was presented to the board. They were going to make a big land deal, but then, all of a sudden, they were going to change a generator, so they made a land deal with the Coastal Commission instead, so the Water Board was "left out to hang."

And they never did anything, even though they know the problems, and this document's not taking these problems into consideration. They made promises when they built the plant, they broke so many promises along the way, and as it was pointed out, all you guys do is just keep changing the rules, and you're not taking into consideration the long-term effects that this plant's having on this county. (PBCA-Nelson-28)

Response: *NEPA directs Federal agencies to assess the impact of an action on the environment, consider alternatives to the action, and propose mitigation of impacts. Prevention and elimination of environmental impacts are the responsibilities of regulatory agencies charged with management and protection of specific resources. The EPA or the delegated State, not the NRC, regulates thermal discharges through NPDES permits and Clean Water Act regulations. Power plants cannot operate without valid NPDES permits. The NRC is currently preparing a supplement to the GEIS for renewal of the Diablo Canyon plant license. If NRC staff identifies new and significant information that demonstrates an increased impact on the aquatic environment as a result of continued station operation, the California Energy Commission will likely take that information under consideration as part of the NPDES permitting process when determining if any modifications to the cooling system are necessary to protect the affected resources. The NRC made no changes to the GEIS in response to this comment.*

Comment: Thermal impacts on aquatic organisms (plants with once-through cooling systems or cooling ponds): Finding in Table B-1 of Appendix B in the draft updated GEIS (Volume 2) for the issue labeled "Thermal impacts on aquatic organisms (plants with once-through cooling systems or cooling ponds" reads as follows:

Small, moderate, or large impact (Category 2). Most of the effects associated with thermal discharges are localized and are not expected to affect overall stability of populations or resources. The magnitude of impacts, however, would depend on site-specific thermal plume characteristics and the nature of aquatic resources in the area.

This issue is a consolidation of five issues that were previously analyzed in the 1996 GEIS. The 1996 GEIS concluded that four of the five issues would have small impacts and be Category 1. The fifth issue, "Heat shock (plants with once-through and cooling-pond heat dissipation systems)," was said to have small, moderate, or large impact, depending on sites-specific conditions, and was classified as a Category 2 issue.

For the reasons more fully discussed in the paragraphs below, Industry requests that the issue labeled "Thermal impacts on aquatic organisms (plants with once-through cooling systems or cooling ponds)" in Table B-1 of Appendix B in the draft updated GEIS (Volume 2) be re-categorized from "Category 2" to "Category 1"and that the above-quoted issue description be changed in Table B-1 of Appendix B in the draft updated GEIS to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Small~~, moderate, or large~~ impact (Category ~~2~~1). Most of the effects associated with thermal discharges are localized and are not expected to affect overall stability of populations or resources. ~~The magnitude of impacts, however, would depend on site specific thermal plume characteristics and the nature of aquatic resources in the area.~~ *Heat shock effects would be*

mitigated to assure small impact at all sites through permits issued by state regulators under the Clean Water Act and state laws.

Section 4.6.1.2 provides analysis of various factors of potential impacts related to thermal discharges from different cooling systems (pages 4-88 through 4-96). The draft updated GEIS provides analyses on cold shock (for all plants), thermal plume barrier to migrating fish (for all plants), distribution of aquatic organisms (for all plants), premature emergence of aquatic insects (for all plants). The draft updated GEIS concludes in Section 4.6.1.2 on page 4-91 (lines 26 - 30) that the impacts of thermal discharges are a Category 2 issue because the magnitude of the impact would depend on plant-specific characteristics of the cooling system and characteristics of the aquatic resource. Yet, the draft updated GEIS states the lessons learned from more than 30 Environmental Reports, and NRC's Supplemental Environmental Impact Statements for license renewal, show small impacts related to heat shock in all cases. As discussed below and in the draft updated GEIS, these plant-specific characteristics have been evaluated and are managed to assure that thermal impacts from nuclear plants are SMALL.

The draft updated GEIS (page 4-88, lines 36-38) cites York et al. (2005)[1] as the basis to assert that the thermal discharges from the San Onofre and Diablo Canyon plants in California have had significant impacts on aquatic habitats. The draft updated GEIS concludes without any plant-specific data or further analysis, that since neither of these plants has requested renewal of their operating licenses as of this date[2], "…thermal discharges could be a concern ..." (emphasis added) and, ultimately, that there may be plants with specific characteristics that require this issue to be classified as Category 2. In fact, the York et al. study specifically states on page 66 of Appendix A of the report that Southern California Edison (SCE) meets the thermal requirements of its NPDES permits for environmental limits. Consistent with the NRC's conclusion that the impacts attributable to radioactive releases below regulatory limits are small, the fact that SCE is complying with the thermal limits in its NPDES permits impacts supports the draft updated GEIS statement (page 4-88, lines 25-26) that the impacts are SMALL and that thermal discharge on aquatic organisms should be classified as a Category 1 issue.

[[1] Editorial note: the reference in the draft updated GEIS is incorrect. The reference should be http://www.energy.ca.gov/2005 publications/CEC-700-2005-013/]
[[2] PG&E submitted its license renewal application on November 23, 2009 for Diablo Canyon Power Plant.]

SCE owns and operates the San Onofre Nuclear Generating Station (SONGS) power plant located on the Pacific Coast in northern San Diego County. SONGS consists of two active units, each discharging approximately 1,200 million gallons per day of slightly heated seawater to the Pacific Ocean. The two active units employ once-through cooling water systems, withdrawing cooling water from the Pacific Ocean through each unit's approximately 3200 feet long intake conduit and discharging it to the ocean through separate (unit-specific) discharge conduits that are just beneath the ocean substrate. The Unit 2 discharge conduit is approximately 8400 feet

(2500 meters) long in approximately 45 feet (15 meters) depth and the Unit 3 discharge conduit is approximately 6100 feet (1800 meters) long in about 35 feet (12 meters) depth. The last (farthest offshore) 2500 feet (762 meters) of each discharge conduit, is equipped with 63 diffuser ports, evenly spaced at 40 foot intervals, and angled away from the ocean floor to minimize thermal impacts on the marine environment. The diffusers are placed such that sensitive near shore marine habitat, especially intertidal and shallow subtidal habitat, will not be affected by the warm water from the discharge. [SWRCB 1999][3]

[[3] SWRCB (State Water Resources Control Board) 1999. California State Water Resources Control Board Resolution No. 99 – 028, Approval Of The San Diego Regional Water Quality Control Board's Adoption Of An Exception To The California State Thermal Plan (Thermal Plan) For San Onofre Nuclear Generating Station (SONGS). April 14, 1999]

Independent monitoring by the Marine Review Committee under the auspices of the California Coastal Commission and by SCE during start-up of Units 2 and 3 showed the highest temperature detected in the environment to be approximately 4 degrees Fahrenheit above ambient temperatures at 1000 feet from the discharge structure.

The Thermal Plan and the SONGS current discharge permits require that the effluent from SONGS Units 2 and 3 may not exceed the receiving water temperature by more than 25°F. In May 1997, the San Diego Regional Water Quality Control Board (SDRWQCB) granted SCE an exception to a 20°F receiving water temperature limitation that would allow discharges from Units 2 and 3 to exceed the receiving water temperature by no more than 25° F. [SWRCB 1999]

In its April 1999 resolution on the request, the (California) State Water Resources Control Board determined that "*SCE has provided information which demonstrates that the proposed limitation will protect and maintain balanced indigenous communities in the vicinity of the SONGS discharges based on a number of considerations:*

- *There is no evidence of adverse impacts caused by the thermal component of the discharge.*

- *Effects due to the proposed increase in temperature will be minimal because the discharge structures are designed and placed such that sensitive near shore marine habitat, especially intertidal and shallow subtidal habitat, will not be affected by heat from the discharge. Further, thermal plume modeling of the new discharge conditions as reported in SDRWQCB's Initial Study shows clearly that permit requirements will not be violated as a result of the requested permit modification, and that thermal impacts on the sensitive kelp bed environment will be insignificant."* [SWRCB 1999]

The Regional Water Quality Control Board, San Diego Region concluded, and continues to conclude, that SCE meets NPDES limits for thermal impacts in the marine environment.

As such, there has been no measurable impact due to thermal discharges and the state agency has not required any mitigation measures.

The purpose of the Clean Water Act (CWA) is to "restore and maintain the chemical, physical, and biological integrity of the Nation's water" as already stated by the NRC on page F-4 (lines 12 – 14) of the Draft Generic Environmental Impact Statement (GEIS). As part of the implementation of the CWA, the EPA established a National Pollutant Discharge Elimination System (NPDES) permitting program as described in 40 CFR Part 122 to ensure that the discharge of pollutants such as chlorine, metals, biocides, and thermal heat are regulated to ensure that the chemical, physical and biological integrity of the Nation's water is maintained. Permit conditions are based on two criteria: The State's water quality standards set minimum standards for the ambient quality of water in surface water bodies, and technological standards, such as "best available technology (BAT)"to create a floor of technology that must be applied to any discharge of a certain industrial type. In regard to thermal heat, effluent limitations are established by the permitting agency based either on state and/or water body specific water quality standards or on limitations that the agency has determined that will assure measures necessary for the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is made ("balanced indigenous population"). When determining thermal limitations that will be protective of the plant-specific surface waters, CORMIX modeling studies, specific-site information, or other related thermal monitoring studies are used by the permitting agency for discharge specific evaluation.

Pursuant to federal regulation, NPDES permits may not allow a discharge that causes or contributes to a violation in water quality standards or that, in the case of a thermal discharge, impairs the balanced indigenous population. It should be noted that permitting agencies evaluate thermal heat discharges associated with all nuclear plant facilities (once through cooling, closed-cycle cooling and cooling ponds) during the initial permitting cycle and on a five-year renewal basis thereafter. Discharge specific evaluations are developed during each renewal cycle to establish effluent limitations that assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. For example, Grand Gulf Nuclear Station, a closed-cycle cooling plant, was required to conduct extensive thermal monitoring studies during the operational phase and is currently required to conduct a thermal monitoring study during each permit renewal cycle to ensure that the thermal discharge does not impact the physical, chemical or biological integrity of the Mississippi River.

In addition, as stated in Section 1.7.1 of the draft updated GEIS, the NRC properly defers to the EPA or the State for setting effluent and operational parameters in plant-specific NPDES permits to meet water quality standards that have been established to be protective of the

aquatic environment and its beneficial uses. Language consistent with this statement also appears in the Environmental Protection Plans for new and existing nuclear plants.

Industry submits that the statements in the GEIS that are discussed above along with other EIS references cited below demonstrate that the NPDES permitting program and oversight from the NPDES permitting agencies ensures that impacts from thermal and other effluents from nuclear plants seeking license renewal will be SMALL and that the issue should be categorized as Category 1.

- Page 3-132 (Lines 3 - 6): Impacts of chemical discharges to human health are considered to be small if the discharges of chemicals to water bodies are within effluent limitations designed to ensure protection of water quality and if ongoing discharges have not resulted in adverse effects on aquatic biota.

- Page 4-35: (Lines 37 - 41): Because of State regulatory involvement, and because regulatory and resource agencies have not found significant problems with outfall monitoring, the impacts from the discharge of chlorine and other biocides and minor spills of sanitary wastes and chemicals during license renewal and refurbishment were considered to be small for all plants and designated as Category 1 issues in the 1996 GEIS.

- Page 4-142 (Lines 12 - 13): Discharges of sanitary wastes are regulated by NPDES permit, and discharges that do not violate the permit limits are considered to be of small significance.

- Page 4-221 (Lines 18 - 22): For some resource areas (e.g., water and aquatic resources), the contributions of ongoing actions within a region on cumulative impacts are regulated and monitored through a permitting process (e.g., NPDES) under State or Federal authority. In these cases, it may be assumed that cumulative impacts are managed as long as these actions (facilities) are in compliance with their respective permits.

- Page A-12 (Lines 36 – 40): The amount of the water discharged by each individual plant and the chemical levels in that water are determined by individual States through the National Pollutant Discharge Elimination System permitting program, not the NRC. The licensee is required by the NRC to operate in compliance with all its permits, therefore minimizing the impacts to the environment.

For the four Category 1 issues in the 1996 GEIS — “Cold shock (for all plants),” “Thermal plume barrier to migrating fish (for all plants),” “Distribution of aquatic organisms (for all plants),” and “Premature emergence of aquatic insects (for all plants)”— that have been consolidated with “Heat shock (plants with once-through and cooling pond heat dissipation systems)” in the draft

updated GEIS to form the issue of "Thermal impacts on aquatic organisms (plants with once-through and cooling pond heat dissipation systems)", there is inadequate justification in the GEIS to require site-specific analyses in supplemental EISs. These issues should continue to be resolved generically for all plants as Category 1 issues.

In conclusion, the NPDES permitting process established under the Clean Water Act requires that the permitting agency issue a permit that assures the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. Therefore, the issue of thermal impacts on aquatic organisms (plants with once-through cooling systems or cooling ponds) should be classified as Category 1, consistent with the criteria discussed on page S-5 of the Draft updated GEIS:

- Environmental impacts associated with the thermal issue apply to all plants.
- A single significance level (SMALL) can be assigned to the impacts.
- Mitigation of adverse impacts associated with the thermal issue, if needed, would be placed in the NPDES Permit and re-evaluated every five years during the permit renewal cycle by the permitting agency.

The draft updated GEIS should be changed throughout (i.e., Volumes 1 and 2) to reflect the above-suggested modification in Table B-1 of Appendix B. (NEI1-7(4)-6)

Comment: Page 4-88, lines 32 to page 4-91, line 2: Text from page 4-88, line 32 through page 4-89, line 2 the NRC is encouraged to modify the text to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

In the 1996 GEIS, the NRC determined that for plants with a once-through cooling system or cooling ponds, the effects of thermal discharge on aquatic biota (primarily due to heat shock) was small at many plants. However, because the effects were considered moderate or large at a few nuclear plants, heat shock was considered a Category 2 issue that required a site-specific assessment before license renewal. The potential for thermal discharge effect is considered to be greatest at plants with once-through cooling systems (NRC 1996), primarily because of the higher discharge temperatures and larger thermal plume area.

The potential impacts of thermal discharges during the 20-year license renewal term were evaluated by reviewing published site ERs, license renewal SEISs, and the scientific literature. For all of these plants, it was determined that the impacts of thermal discharges during the license renewal term were small. ~~However, according to York et al. (2005), thermal discharges from the Diablo Canyon and San Onofre plants (located along the California coast) have had significant impacts on aquatic habitats. (Both of these plants employ once-through cooling systems and have not yet been reviewed for license renewal.)~~ ~~Thus~~, *While* thermal discharges could be a concern during the license renewal term for plants with once-through cooling

systems, especially for plants located in areas where restoration efforts are underway to increase fish populations or reestablish migratory fish species or where thermal discharge plumes could encompass otherwise high-quality habitats, no new environmental impacts are anticipated.

In the 1996 GEIS, the NRC considered the impacts of heat shock on aquatic biota during the license renewal term to be small, moderate, or large at plants with once-through cooling or cooling ponds (i.e., a Category 2 issue), and it considered the impacts of cold shock, interference with fish migration, distribution of aquatic organisms, and premature emergence of aquatic insects to be small for all plants (i.e., Category 1). ~~No new information that would alter those conclusions was identified in t~~*The NRC's review of* the plant-specific SEISs prepared to date *and* or in the literature show the impacts to be small.

Thermal discharges are regulated for each plant under the Clean Water Act. The NRC requires nuclear power plants to operate in compliance with all of its permits, thereby minimizing adverse impacts to the environment and on workers and the public. It is anticipated that all plants will continue to operate in compliance with all applicable permits. On the basis of these considerations, the NRC concludes that the impact of thermal discharges on aquatic organisms at nuclear plants with once-through cooling systems or cooling ponds over the license renewal term *would be managed and regulated in accordance with the requirements imposed under the CWA. As a result, thermal impacts on aquatic organisms would be* ~~could be~~ small, ~~moderate, or large~~, and is considered a Category 2*1* issue. ~~The magnitude of the impact would depend on plant-specific characteristics of the cooling system (including location and type of discharge structure, discharge velocities and volume, and three-dimensional characteristics of the thermal plume) and characteristics of the aquatic resource (including the species present and their physiology, habitat, population distribution, status, management objectives, and life history)~~. (NEI1-7(4)-19)

Comment: Aquatic Resource Impacts (Thermal) In the proposed rule and the proposed GEIS revision, NRC continues to utilize a plant's use of a "once-through cooling system or cooling pond" as the sole criterion for determining whether the plant's thermal impact would be a Category 2 issue. TVA believes that the National Pollutant Discharge Elimination System (NPDES) permitting authority's determination that the thermal limits under which the plant discharges its effluent are sufficient to maintain a "balanced indigenous population of fish, shellfish and wildlife" (i.e., the "BIP standard" under Section 316(a) of the Clean Water Act) in the receiving waterbody is a much better index of the magnitude of any thermal impacts. Accordingly, we suggest that the thermal impact of a plant that uses a once-through cooling system be considered a Category 2 issue unless the plant operates under NPDES permit limitations that ensure that the "BIP standard" is met. For example, the existence of a valid Clean Water Act Section 316(a) determination at the time of license renewal should be a sufficient basis to downgrade the aquatic impact to a Category 1 issue. (TVA-32-3)

Response: *The NRC disagrees with these comments. A requirement to be a generic or Category 1 issue is a common level of impact at all plants. The common level of impact cannot be assumed because of the difference between the definition of impact ("BIP standard") for those plants requiring a 316(a) variance under the CWA and the NRC's definitions of impact levels for the purposes of NEPA. For example, a discharge that maintains "a balanced population of fish, shellfish and wildlife" may or may not cause observable affects to aquatic resources and so could satisfy the NRC's definitions of either "MODERATE" or "SMALL" levels of impact, respectively. Further, although NPDES permitting may be sufficient to restrict and mitigate the potential thermal effects of operations so that impacts satisfy NRC's definition of "SMALL," not all plants undergoing license renewal have had recent reviews of their NPDES permits, and many site-specific operational, physical, and biological aspects could influence impacts. Consequently, NRC considers it important that up-to-date evaluations of the extent of thermal changes in the aquatic environment be made and that current and historic information be reviewed to evaluate the level of effects to aquatic resources from license renewal. On this basis, the NRC has classified the issue of thermal impacts on aquatic organisms for plants with once-through cooling systems or cooling ponds as Category 2, which requires site-specific evaluations in license renewal SEISs. The NRC made no changes to the GEIS in response to these comments.*

Comment: These categories are just unfair. To put most of the aquatic issues under a one, generic, well, they're happening and they don't have any big problems. That's because they don't study them. When they turned Morro Bay -- or Diablo Canyon on, they killed all our abalone, and all they took responsibility for was the abalone.

But that's an example of the cumulative effects of this power plant. They didn't go and look at what else they killed. They just killed the big obvious things. The abalone. Our fishing industry has collapsed here. Two billion gallons of water a day to cool a power plant.

We need stuff in here that takes into account, when this plant was opened, the studies that they used to open it, the projections they made to the effects to the environment that should be considered, first and foremost. (PBCA-Nelson-27)

Response: *When many of the nuclear power plants were first licensed, cumulative impact assessment was in its infancy. As described in Section 4.13 of the GEIS, cumulative impact analyses are now conducted that consider the impacts of past, present, and reasonably foreseeable actions on resources of concern. No changes were made to the GEIS in response to this comment.*

Comment: Referring to page 2-11 of the document, it discusses "eutrophication" and says something about "satisfactory mitigation," and the term mitigation is used elsewhere as a panacea, that takes care of whatever the problem was. Mitigation is a very complex issue. It is

not a given, how you mitigate for a problem, and I've certainly learned that in connection with working on "once through cooling" problems.

The question of how you mitigate for the enormous damage that the "once through cooling" does in a plant like Diablo, the billions of gallons of water that go into the plant and kill billions of fish larvae, fish eggs, invertebrate organisms. How you mitigate for that is something that has been very much debated and still is not--nobody can agree on that, and it's also a legal matter, actually.

So please, stop using mitigation so glibly, as a safe concept. (PBCA-Groot-37)

Response: *The NRC staff agrees that mitigation is often complex in both concept and practice. To comply with NEPA, NRC evaluates the effects of continued operations of a nuclear power plant over the 20-year license renewal period. The actual requirements for mitigation are determined among the licensee and Federal or State agencies with jurisdiction over the affected resource. For example, the NPDES permit issued by the EPA or delegated State agency would contain any compliance actions required to mitigate the impacts of impingement or entrainment. As a Federal agency, the NRC consults with other Federal agencies regarding the mitigation of impacts regulated by Federal laws. For example, the NRC is involved in consultations required by the Endangered Species Act among others. The NRC made no changes to the GEIS in response to this comment.*

Comment: I note the admission on page S-13 that nuclear reactor shutdowns (and I conclude that would also be valid for facilities who fail to get an extension of their operating license) would result in "short-term reductions in entrainment and impingement rates and thermal plume characteristics." Since there are differing species around every site (including around the intake and discharge areas), then clearly there must be site-specific (yes, Category 2) examinations of the impact of all facilities on the mix of species in the vicinity − not just if there are listed threatened or endangered species in the area. Also, global climate change combined with ongoing shift in biological communities and with effects from intake and discharge must be predicted for each nuclear power facility in a site-specific manner (thus Category 2). This further makes a mockery out of the claim made in the documents that there is assured environmental stability around all nuclear power facilities.

Nuisance organisms were mentioned in the document. Do some of these nuisance organisms thrive due to the thermal discharge plumes at nuclear power facilities, do some thrive on impinged and entrained organisms, and how would global climate change affect such organisms combined with these other factors? This series of questions requires site-specific analyses. (Campbell-31-10)

Response: *The NRC classifies impingement, entrainment, and thermal impacts as Category 2 issues for plants with once-through cooling systems, due to the individual nature of once-through cooling systems, and the different species around each site. Due to the relatively smaller impacts resulting from reduced water withdrawal from, and heat rejection to, surface waters, the NRC classified impingement, entrainment, and thermal impacts as SMALL for plants with cooling towers or cooling ponds and categorized those issues as generic, or Category 1. NRC considers new and significant site-specific information on this issue as it arises. Although global climate change affects the aquatic resources that power plant operation can also affect, climate change is not a direct or indirect effect of plant operation. The NRC discusses climate change as part of cumulative impacts, which is a site-specific, Category 2 issue. Lastly, the NRC does not assume "environmental stability around all nuclear plant facilities" but rather examines the question of resource stability as part of classifying site-specific impacts as SMALL, MODERATE, or LARGE.*

The NRC has reviewed the question of nuisance organisms living in thermal discharges at nuclear plants in GEIS Section "4.6.1.2 Aquatic Resources," and has found this not to be a problem in plants examined so far. As a result, this issue is considered generic, and hence, a Category 1 issue. In its reviews of license renewal applications, NRC looks for new and significant information on this issue as it does for other Category 1 issues. The NRC made no changes to the GEIS as a result of this comment.

Comment: Inadequate Assessment of Inadvertent Radioactive Releases to the Environment: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

Revised Assessment of Aquatic Resources: The NRC proposes to add a new issue to address "Exposure of Aquatic Organisms to Radionuclides."[16] While analysis of such impacts is important and necessary, unfortunately, the NRC has misguidedly chosen to label this a Category 1 issue, making a generic determination that such impacts will always be small.[17]

[[16] Revised GEIS at 4-98 to 4-100; Revised GEIS Appendices at B-22.]
[[17] Revised GEIS at 4-98 to 4-100; Revised GEIS Appendices at B-22.]

This is problematic because the NRC's consideration of this issue is limited to the impact of radionuclides on aquatic organisms from *normal operations*.[18] Normal operations, by definition, do not include accidental releases of radionuclides from a facility. As such, the NRC's analysis here on its face excludes consideration of the impacts to aquatic biota from inadvertent

releases, despite the earlier recognition that this has been a problem.[19] Instead, the NRC relies on past Radiological Environmental Monitoring Program reports of 15 nuclear power plants to conclude that *"normal operations* of these facilities would not result in negative effects on aquatic biota."[20]

[[18] *See* Revised GEIS at 4-98 ("The potential impacts of radio nuclides on aquatic organisms from *normal operations* of a nuclear power plant during the license renewal term were not identified as an issue in the 1996 GEIS"). (emphasis added); *id.* at 4-99 ("Thus, it is anticipated that *normal operations* of these facilities would not result in negative effects on aquatic biota") (emphasis added).]
[[19] Revised GEIS at 4-46 ("There is a growing concern about radionuclides detected in groundwater at nuclear power plants. These releases have occurred as leaks in at least 14 plants.")]
[[20] *Id.* at 4-99.]

With the noted history of accidental releases at the nation's nuclear power plants, it is absolutely necessary to specifically consider such releases when evaluating impacts to aquatic resources. Given the nature of this ongoing problem, and the likelihood of future unplanned releases, this is simply not an issue that is appropriate for one generic determination at this time. Instead, the NRC should make this a Category 2 issue and require licensees and NRC Staff to specifically consider the impacts of any known inadvertent releases to the environment on aquatic biota at the time of license renewal. This would ensure a full assessment of any impacts to aquatic resources, including nearby critical ecosystems, which are not otherwise specifically encompassed by the Revised GEIS's generic analysis.

For example, the Indian Point nuclear power plant is adjacent to the ecologically critical area of Haverstraw Bay. Haverstraw Bay is a New York State designated Essential Fish Habitat and Significant Coastal Fish and Wildlife Habitat.[21] Despite the considerable amount of inadvertent radionuclide releases from Indian Point over the past few decades, Entergy and the NRC Staff have consistently refused to assess the impacts to the Hudson River ecosystem in the Indian Point license renewal proceeding.[22] Under the proposed changes to the 1996 GEIS, site-specific impacts of unplanned radionuclide releases on aquatic biota would continue to evade assessment. This is utterly illogical, and completely inconsistent with the NRC's recognition that inadvertent releases are an ongoing issue.

[[21] *See* Coastal Fish & Wildlife Habitat Rating Form, http://www.nyswaterrronts.com/downloads/pdfs/sig_hab/hudsonriver/Haverstraw_Bay.pdf·(last accessed Jan. 12, 2010).]
[[22] *See* Entergy, Inc., License Renewal Application, Appendix E: Applicant's Environmental Report, Operating License Renewal Stage, Indian Point Energy Center (ER), *available at,* http://www.nrc.gov/reactors/operating/licensing/renewal/applications/indian-point.html; Indian Point Draft Supplemental EIS at §§ 2.2.7,4.3.]
[[23] *See* Revised GEIS at 4-55 to 4-58; Revised GEIS Appendices at B-12.] (Riverkeeper-20-5)

Response: *The NRC does not agree that this issue should be classified as Category 2. As identified in the comment, the issue of potential radiological impacts on aquatic resources from*

the current routine operation of nuclear power facilities was evaluated in the GEIS using monitoring data for water and sediment using a sample size of 15 facilities. This analysis included monitoring data from each plant's radiological environmental monitoring program (REMP), which represents a range of radionuclides and concentrations found in the environment near each facility. The revised GEIS calculated the dose rates to aquatic biota using a dose evaluation model that used the site-specific radionuclide concentration in water and sediments reported in the REMP reports. The estimated doses to aquatic organisms from the radioactive material present in the environment were less than 0.2 rad/d (0.002 Gy/d) for all of these facilities, which is considerably less than the protective guideline value of 1 rad/d (0.01 Gy/d). Based on this evaluation and each nuclear power plant's expected continued compliance with NRC's radiation protection requirements in 10 CFR Parts 20 and 50, this issue has been classified as Category 1.

The designation of this issue as Category 1 does not imply that potential impacts would not be considered in plant-specific environmental reviews. Changes in plant operating parameters or new information pertinent to the evaluation of impacts would be considered by the NRC during preparation of plant-specific supplements to the GEIS. Thus, even though this issue is considered to be Category 1, there are mechanisms in place to conduct a site-specific review, as required by 10 CFR Part 51.53(c)(iv), if new and significant information is identified by the license renewal applicant or independently by the NRC that shows the potential impacts are outside the bounding conditions evaluated in the revised GEIS.

As discussed in the revised GEIS, the issue, "radionuclides released to groundwater" is classified as Category 2 because of the lack of any beforehand information available for evaluation of potential impacts. It is not possible to predict when, where, how much, and what type of radioactive material would be released from an inadvertent release, and whether the radioactive material reaches the aquatic environment. Therefore, as proposed in 10 CFR Part 51.53 (c)(3)(ii)(P), inadvertent radioactive releases to groundwater will be evaluated on a site-specific basis. For this same reason, the NRC did not attempt to evaluate the impact on aquatic biota from a theoretical inadvertent release because the radiological data would be an assumption and not have a valid technical basis.

Radiological releases, either normal permitted discharges in accordance with NRC regulations or inadvertent releases, are governed by NRC's regulations and are part of the NRC's inspection program. To ensure that nuclear power plants are operated safely, the NRC licenses the plants to operate, licenses the plant operators, and establishes license conditions for the safe operation of each plant. Every NRC-licensed nuclear power plant must comply with all health, safety, and environmental requirements contained within its license as well as complying with all other Federal, State, and local requirements for continued operation. The NRC provides continuous oversight of the plant through its Reactor Oversight Process to verify that it is being operated in accordance with NRC regulations. This oversight includes having full-time NRC

inspectors located at the plant and periodic safety inspections conducted by NRC inspectors based in an NRC Regional Office. The inspections look at a plant's compliance with NRC's regulations that include the following: plant safety, radiation protection of plant workers and members of the public, radioactive effluent releases, radiological environmental monitoring, emergency preparedness, radioactive waste storage and transportation, quality assurance, and training. The NRC has authority to take whatever action is necessary to protect public health and safety. As part of the proposed revised license renewal process, the NRC's environmental review will examine the applicant's radioactive effluent releases, the radiological environmental monitoring data, and the groundwater protection program to determine the potential impact to human health, aquatic and terrestrial biota, and groundwater resources.

No changes were made to the GEIS in response to this comment.

Comment: Then the effects of dredging on aquatic organisms, on page 2-11. It talks about getting permits from the Army Corps of Engineers and state environmental agencies, and other regulatory agencies. This is the same mess that Peg Pinard was talking about.

You know, who is in charge there? Who is going to be responsible? Who is going to figure out how to do these things? Certainly not a good candidate for Category 1. That is a very complex issue, again, that needs a lot of looking at. (PBCA-Groot-38)

Response: *Under the Clean Water Act (CWA) and its amendments, licensees are required to obtain a permit from the U.S. Army Corps of Engineers (USACE) before any dredging can be done in a water body regulated by the CWA. Thus, in response to the comment, the USACE is responsible for conducting the requisite NEPA analysis for the proposed dredging action. Dredging, which the NRC did not analyze in the original GEIS, is addressed in detail in Section 4.6.1.2 of the revised GEIS. The NRC's review of available information found that previous plant-specific ERs and SEISs classified the impact levels of these dredging activities on populations or communities of aquatic organisms as "SMALL" at all plants where they occurred in part because maintenance dredging for nuclear power plant operations occurred infrequently, was of relatively short duration, and affected relatively small areas. Based on this information, the NRC concluded that the impact of dredging on aquatic resources would be "SMALL" for all nuclear plants and is a Category 1 issue. The NRC made no changes to the GEIS in response to this comment.*

Comment: Vol. 1, Page 3-63, lines 23 to 34: Text in lines 23 to 34 on page 3-63 reads as follows:

> Species composition and ecological conditions within riverine environments are largely determined by the geographic area, gradient of the river bed, velocity of the current, and source of nutrients and organic matter at the base of the food

> chain. Thus, ecological communities in rivers become altered if the river is impounded, with the degree of alteration depending on the degree to which various physical and chemical conditions are affected. Environmental threats to rivers include depletion of water, dams that alter flow and temperature characteristics and can block the upstream or downstream movement of aquatic organisms, chemical pollution, and the introduction of nonnative species. For example, the USFWS was concerned that a pond created by damming Oyster Creek to supply a source of water for fighting fires at the Oyster Creek plant in New Jersey could impede the movement of migratory species, such as the American shad *(Alosa sapidissima)* or American eel *(Anguilla rostrata)* (NRC 2007c).

Respectfully, Exelon submits that the statements made by the USFWS during public scoping for the environmental review of license renewal for the Oyster Creek plant were speculative, as demonstrated by the NRC's review of the concern in the final NUREG-1437, Supplement 28 (Sec. 4.7, page 4-51). Accordingly, Exelon urges the NRC to delete the last sentence in the paragraph in lines 23 to 34 on page 3-63 of the draft updated GEIS because, although a concern was raised, the Oyster Creek fire pond dam is not an instructive example of the environmental threats being described. (Exelon-17-3)

Response: *The NRC agrees with this comment and has changed Section 3.6.2.1.1 of the GEIS.*

Comment: Page 3-69, lines 1 and 2: Text in the heading for Section 3.6.2.2 on lines 1 and 2 on page 3-69 reads as follows:

> 3.6.2.2 Overview of the Effects of Existing Nuclear Plant Operations and Transmission Lines on Aquatic Resources.

Because the text in Section 3.6.2.2 does not mention transmission line effects, delete the words "and Transmission Lines" from the title of Section 3.6.2.2 in lines 1 and 2 on page 3-69. (NEI1-7(4)-57)

Response: *The NRC agrees with the comment and has deleted the phrase "and Transmission Lines" from the title of Section 3.6.2.2.*

Comment: Page 3-62, lines 9 to 11: Text on lines 9 to 11 on page 3-62 reads as follows:

The water bodies in the vicinity of the power plants contain a complex assemblage of habitats and species that may be affected by a plant's cooling system and by maintenance of the transmission line ROWs.

Because offsite transmission line ROW maintenance will no longer be considered a component of nuclear power plant operations during the license renewal term, unless as indicated on page 3-24 (lines 13 to 25) the transmission line's continued use during the license renewal term would be contingent on license renewal, consider deleting the words "and by maintenance of the transmission line ROWs" on lines 10 and 11. (NEI1-7(4)-56)

Comment: Page 4-78, lines 12 to 15: Text in lines 12 to 15 on page 4-78 reads as follows:

Continued operations of the nuclear power plants during the 20-year license renewal term includes the operation of the cooling system (once-through, cooling ponds, or cooling towers), transmission line ROW maintenance, releases of gaseous and liquid effluents, facility maintenance, and refurbishment-related construction activities.

The NRC is encouraged to delete the words "transmission line ROW maintenance" in line 14 on page 4-78 because such words appear to be inconsistent with statements on pp. 3-3 (lines 35 – 41) and 3-24 (lines 20 – 21) regarding the scope of the GEIS update with respect to transmission lines. Unless NRC is aware of a nuclear power plant site where aquatic organisms are located onsite beneath the transmission lines that run from the turbine generator building to the onsite switching station, the issue of transmission line maintenance impacts on aquatic resources does not exist. (NEI1-7(4)-18)

Comment: Page 4-104, line 23 to page 4-106, line 3: Text from page 4-104, line 23 through page 4-106, line 3 contains a subsection titled "Impacts of Transmission Line ROW Maintenance on Aquatic Resources," which discusses the impacts on aquatic resources from transmission line ROW maintenance.

The NRC is encouraged to delete the subsection titled "Impacts of Transmission Line ROW Maintenance on Aquatic Resources" located from page 4-104, line 23 through page 4-106, line 3 because the issue of transmission line ROW maintenance impacts on aquatic resources appears to be inconsistent with statements on pp. 3-3 (lines 35 – 41) and 3-24 (lines 20 – 21) regarding the scope of the GEIS update with respect to transmission lines.

Unless NRC is aware of a nuclear power plant site where aquatic organisms are located onsite beneath the transmission lines that run from the turbine generator building to the onsite switching station, the issue of transmission line maintenance impacts on aquatic resources during the term of a renewed nuclear power plant license does not exist. If this discussion is retained, its scope should be confined to impacts within the transmission line ROWs that run from the turbine generator building to the onsite switching station. (NEI1-7(4)-20)

Comment: Secondly, we would like to support the staff's conclusion regarding transmission lines, as far as what is considered in scope. Subsequently to 1996 GEIS, and with deregulation, we feel that the staff's position on transmission lines now more accurately reflects the present situation with utilities. (NMA-NEI-2)

Comment: Page 3-73, General: Text in Section 3.6.3 on page 3-72 describes how many species (plants and animals) occurring near nuclear power plants are either listed as threatened or endangered or are candidates for listing.

To better clarify the scope of the draft updated GEIS regarding assessment of impacts from operation and maintenance of transmission lines associated with nuclear power plants, consider inserting a new paragraph on page 3-72 that would read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

It should be noted that offsite transmission line ROW maintenance will no longer be considered a component of nuclear power plant operations during the license renewal term, unless (as indicated on page 3-24, lines 13 to 25) a transmission line's continued use during the license renewal term would be contingent on license renewal. For this reason, only the 59 known occurrences of listed species on nuclear power plant sites, and possibly a few additional species along transmission line ROWs of very short length near some plant sites, would be within the affected environment. (NEI1-7(4)-58)

Comment: Page 3-73, lines 8 to 10: Text in lines 8 to 13 on page 3-73 reads as follows:

> Nuclear plants known to support listed terrestrial species on the site or along transmission line ROWs generally maintain monitoring programs to identify changes in populations or report impacts to the USFWS and State agencies. Factors that could affect listed terrestrial species include construction-related habitat loss, cooling tower drift, operation and maintenance of cooling systems, transmission line ROW maintenance, avian collisions with cooling towers and transmission lines, exposure to radionuclides, and site operations and maintenance.

To better clarify the scope of the draft updated GEIS regarding assessment of impacts from operation and maintenance of transmission lines associated with nuclear power plants, as indicated on page 3-24 (lines 13 to 25) in the draft updated GEIS, consider modifying the sentence in lines 8 to 10 on page 3-73 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

The owners of ~~N~~*nuclear* plants known to support listed terrestrial species on the site ~~or along transmission line ROWs~~ generally maintain monitoring programs to identify changes in

populations or report impacts to the USFWS and State agencies. Factors that could affect listed terrestrial species include construction-related habitat loss, cooling tower drift, operation and maintenance of cooling systems, ~~transmission line ROW maintenance,~~ avian collisions with cooling towers and transmission lines, exposure to radionuclides, and site operations and maintenance. (NEI1-7(4)-59)

Comment: Page 3-73, lines 28 to 40 and Page 3-74, lines 1 to 5: Text in lines 28 to 40 on page 3-73 and lines 1 to 5 on page 3-74 describes the potential effects of transmission line ROW maintenance activities on plant species listed or proposed for listing as threatened or endangered.

Consider deleting lines 28 through 40 on page 3-73 and lines 1 to 5 on page 3-74 because, as indicated on page 3-24 (lines 13 to 25) in the draft updated GEIS, transmission line ROW maintenance will no longer be considered a component of nuclear power plant operations during the license renewal term, unless a transmission line's continued use during the license renewal term would be contingent on license renewal. In addition, as written, the text in lines 28 through 40 on page 3-73 and lines 1 to 5 on page 3-74 fails to recognize that the owners of many nuclear power plants no longer own and control off-site transmission line ROWs. (NEI1-7(4)-60)

Response: *The NRC disagrees with the changes suggested by the commenters. The NRC's review has concluded that the environmental impacts of in-scope transmission line right-of-way maintenance activities would likely be SMALL, short term, and localized over the license renewal term, as detailed in the revised GEIS. Thus, it is a Category 1 issue. Impacts on terrestrial and aquatic resources from such maintenance activities could occur as a result of the direct disturbance of habitats, soil erosion, changes in water quality (from sedimentation and thermal effects), or inadvertent releases of chemical contaminants from herbicide use throughout the license renewal term. The NRC believes that some level of impact associated with these activities is likely and, therefore, reasonably foreseeable and warrants examination. As a result, the NRC has determined that such impacts should be evaluated in its SEISs with consideration of any new and significant information that could change the conclusion in the GEIS with regard to this issue. Sections 3.1.1 and 3.1.6.5 of the revised GEIS define the extent of in-scope transmission lines subject to license renewal environmental reviews. The NRC made no changes to the GEIS as a result of these comments.*

Comment: Page 3-54, lines 7 to 25: Text describes the Clean Water Act (CWA) controls on impingement and entrainment at cooling water intake structures.

The discussion of impingement and entrainment controls on page 3-54, lines 7 to 25, is not obviously related to the CWA thermal effluent controls, although it now appears in the draft updated GEIS Section 3.5.1.2.1 entitled "Thermal Effluents." Consider moving it to a new,

separate section entitled “Control of Impingement and Entrainment” and amend the discussion to recognize that impingement and entrainment are regulated under the NPDES permit. (NEI1-7(4)-46)

Response: *The NRC agrees with this comment. For clarity and to address interrelated Clean Water Act 316 requirements, the section cited by the commenter has been revised and reorganized into an unnumbered subsection under Section 3.5.1.2 in the revised GEIS titled, “Thermal Effluents and Withdrawal of Cooling Water from Surface Water Bodies.”*

Comment: Aquatic Resource Impacts (Impingement and Entrainment) In the proposed rule and the proposed GEIS revision, the NRC continues to utilize a plant's use of a "once-through cooling system or cooling pond" as the sole criterion for determining whether the plant's entrainment and impingement impact would be a Category 2 issue. TVA believes that the NPDES permitting authority's determination that the design and location of a plant's cooling water intake structure reflects "best technology available" (BTA) to minimize "adverse environmental impacts," is a much better index of the magnitude of any entrainment and impingement impacts.· Accordingly, we suggest that the entrainment and impingement impacts of a plant that uses a once-through cooling system be considered a Class 2 issue unless the plant operates under NPDES permit limitations that require the use of BTA to minimize such impacts. For example, the existence of a valid BTA determination under Clean Water Act Section 316(b), at the time of license renewal, should be a sufficient basis to downgrade the aquatic impact to a Category 1 issue. (TVA-32-4)

Response: *The NRC disagrees with this comment. A requirement to be a generic or Category 1 issue is a common level of impact at all plants. The common level of impact cannot be assumed because BTA is a technology-based standard under the CWA and the NRC’s definitions of impact levels for the purposes of NEPA are based on the response of aquatic resources. Further, although NPDES permitting may be sufficient to restrict and mitigate the potential impingement and entrainment effects of operations so that impacts satisfy NRC’s definition of “SMALL,” not all plants undergoing license renewal have had recent reviews of their NPDES permits, and many site-specific operational, physical, and biological aspects could influence impacts. Consequently, NRC considers it important that up-to-date evaluations of impingement and entrainment be made and that current and historic information be reviewed to evaluate the level of effects to aquatic resources from license renewal. On these bases, the NRC has classified the issue of impingement and entrainment impacts on aquatic organisms for plants with once-through cooling systems or cooling ponds as Category 2, which requires site-specific evaluations in license renewal SEISs. The NRC made no changes to the GEIS in response to this comment.*

Comment: The draft GEIS indicates that "impacts of impingement and entrainment of aquatic organisms are expected to be small at plants with cooling towers. Impingement and

entrainment rates are low at plants that use closed-cycle cooling with cooling towers because the rates and volumes of water withdrawal needed for makeup are minimized." Therefore it has been determined that this is a Category 1 issue. Based on EPA's experience the rates and volumes of water withdrawal for makeup and subsequent blowdown are often optimized more for water conditioning chemicals and any biocide use and not to minimize water withdraws. Large facilities with closed-cycle cooling may still be making what are considered large withdrawals from a waterbody, which could result in large impacts. A single significance level is not representative of the impacts here, as the impacts may be small, moderate, or large. (EPA-3-1)

Comment: Page 4-87, Comment on Lines 28-32:

This section states "... Because the volume of water withdrawn by a power plant is minimized when a closed-cycle cooling system is employed, the impacts to aquatic organisms from impingement and entrainment would be smaller than the impacts from impingement and entrainment that would occur if a once-through cooling system was employed instead." It has been EPA's experience that the volume of water withdrawn by a power plant is not automatically minimized by the use of a closed-cycle cooling system, a facility needs to make an effort to require minimization of make-up and blowdown (which may be more expensive). Furthermore, the rates and volumes of water withdrawal for makeup and subsequent blowdown are often optimized more for chemical use and not to minimize water withdraws. Large facilities with closed-cycle cooling may still be making what are considered large withdrawals from a waterbody, which could result in large impacts. Thus, all impingement and entrainment of aquatic organisms should be a Category 2 issue. A single significance level is not representative of the impacts here, as the impacts may be small, moderate, or large. (EPA-3(1)-21)

Response: *The NRC classified impingement and entrainment at plants with cooling towers operated in closed-cycle mode to be generic, or Category 1, issue not only because the amount of water withdrawn from water bodies is smaller than for plants with once-through cooling systems but also because reviews of past studies and license renewal SEISs reported no reductions in populations of aquatic biota attributable to impingement and entrainment for existing nuclear power plants with cooling towers operating in closed-cycle mode. Even so, the NRC looks for new and significant information about Category 1 issues at each plant when preparing each SEIS for proposed license renewal and performs site-specific assessments for Category 1 issues where it finds such information warrants. The NRC made no changes to the GEIS in response to these comments.*

Comment: Aquatic Ecology Impacts Are Important and Should be Addressed: Degradation of the marine environment due to impingement and entrainment of aquatic organisms, and to

thermal changes, have been long-standing problems in the waters in Diablo Cove. These waters are also prime fishing habitat, and the industry is an important one in the area.

Pacific Gas & Electric Company has been cited by the California Regional Water Quality Control Board for violations to its water permit, and the Company has been forced to take mitigation measures. SLOMFP is concerned about the cumulative impacts on the marine environment of continued operation of Diablo Canyon Nuclear Plant. It is in agreement with the Draft GEIS that Aquatic Resources and the effects of thermal discharges for once-through cooling systems are potentially large impacts that require plant-specific, Category 2 analysis. (SLOMFP-13-16)

Response: *As identified in the comment, thermal impacts and impingement and entrainment are considered Category 2 issues for plants with once-through cooling (or cooling ponds) and require evaluation in plant-specific SEISs. The NRC made no changes to the GEIS in response to this comment.*

Comment: D. The Draft Generic EIS Fails to Adequately Assess Aquatic Impacts in Specific Key Areas: Numerous specific statements in the draft revised Generic EIS need to be addressed by the NRC. These include the NRC's portrayal of the Clean Water Act section 316(b) Phase III rules, the viability of acoustic deterrent systems at plants in Belgium and New York, the role of the consultation process under the federal Endangered Species Act, and the environmental consequences, of alternatives to license renewal.

2. Acoustic Deterrent System at Plant in Belgium: As illustrated in this and in the following point, the NRC also greatly exaggerates the effectiveness of sound deterrent systems as a mitigation measure for impingement.

The NRC's Statement: At the Doel nuclear power plant on the Scheldt Estuary in Belgium, an acoustic deterrent system decreased total impingement of estuarine fishes by about 60 percent. Draft Generic EIS, p. 4-83, lines 19-20.

The NYSDEC's Response: The NRC is wrongly applying the narrow results of the experience at the plant in Belgium. Sonic deterrent systems have only been demonstrated to be effective on clupeids, and in fact, the two species impinged at the Belgium facility are clupeids. The NRC has no basis to state that the use of a sonic deterrent system reduced the impingement of "estuarine fishes" by about 60 percent − one would interpret this to mean that sonic deterrent technology is effective on *all* estuarine fish species, which is not supported by the data. The NRC needs to be more accurate in presenting "facts" and should only present information on fish species found in the United States and nuclear facilities they regulate. We also note that one of the species at issue in the Belgium plant (*Sprattus sprattus*) is a European species not found in United States waters. (NYS DEC-12-7)

Comment: D. The Draft Generic EIS Fails to Adequately Assess Aquatic Impacts in Specific Key Areas: Numerous specific statements in the draft revised Generic EIS need to be addressed by the NRC. These include the NRC's portrayal of the Clean Water Act section 316(b) Phase III rules, the viability of acoustic deterrent systems at plants in Belgium and New York, the role of the consultation process under the federal Endangered Species Act, and the environmental consequences, of alternatives to license renewal.

3. Sound Deterrent System at Fitzpatrick:

The NRC's Statement: At the Fitzpatrick plant in New York, the sound deterrent system reduced the density of fishes near the intake by as much as 96 percent (Ross et al. 1993). Draft GEIS, p. 4-83, lines 27-28.

The NYSDEC's Response: The NRC repeats the mistake it made with its reference to the plant in Belgium. This statement is misleading and overstates the results of the sound deterrent system at another plant. When these studies were conducted in May 1991 at J.A. Fitzpatrick Nuclear Power Plant in New York State, alewives comprised a majority of the impingement mortality at the plant. As the Department stated in the previous comment, sonic deterrent systems are *only* effective on clupeids. By stating that this system has shown a "96 percent reduction in density" again leads one to believe that *all* fish species are affected by this technology. Moreover, although alewives still make up a portion of the impingement mortality, the alewife population on Lake Ontario has crashed in recent years. *See* Mills et al., 2003. Can. T. of Fish. Aquat. Sci. 60:471-490. Thus, NYSDEC would not expect to see those prior results replicated with the current population.

In fact, the sonic deterrent system fails to affect many other fish species impinged at Fitzpatrick. Recent impingement studies (2006-2007) have demonstrated that over 200,000 fish are impinged annually at Fitzpatrick. These are mostly three-spine stickleback that do not respond to the sonic deterrent system. In sum, with a functional sonic deterrent system, yearly impingement mortality of alewife should be reduced by 86 percent, but it does not follow that a sonic deterrent system will reduce the impingement mortality of other fish species.
(NYS DEC-12-8)

Response: *In order to clarify the statements on the effectiveness of sound deterrent systems, the paragraphs on sound deterrent in Section 4.6.1.2 have been deleted and replaced by a sentence that sound has been most effective at plants that primarily impinge clupeids. A sentence has also been added to indicate that most deflection methods have had variable effectiveness.*

Terrestrial Ecology

Comment: Page 4-69, lines 14 to 28: Text in lines 14 to 28 reads as follows:

The potential range of impact levels at plants with cooling ponds or cooling towers using makeup water from a small river with low flow applying for license renewal in the future cannot be determined at this time. The NRC concludes that the impact of water use conflicts with riparian communities is a plant-specific Category 2 issue.

The above-quoted statement appears to conflict with the following statement on page 4-63 (lines 16 – 18) in the draft updated GEIS:

On the basis of these considerations, the NRC concludes that the impact of continued operation of the cooling systems on terrestrial resources would be small for all nuclear plants and is considered a Category 1 issue.

The NRC is encouraged to revise the potential impact classification of water use on terrestrial riparian habitats to Category 1 for the following reasons. The analysis presented in support of the conclusion on page 4-63 classifying the impact of cooling systems (including cooling ponds) on terrestrial resources as Category 1 is appropriate for discussion of impacts on page 4-69. As noted in lines 1 – 4 on page 4-63, restrictions typically exist on water consumption that may require reduction in plant operation which would mitigate impact on riparian and aquatic biota. As noted, impacts would be temporary. (NEI1-7(4)-16)

Response: *The NRC revised Section 4.6.1.1 of the revised GEIS to better differentiate the issues of "Cooling System Impacts on Terrestrial Resources" and "Water Use Conflicts with Terrestrial Resources." Specifically, the NRC modified the issue "Cooling System Impacts on Terrestrial Resources" to state that it is applicable to plants with once-through cooling systems and cooling ponds, typically with low levels of consumptive use, and the issue "Water Use Conflicts with Terrestrial Resources" to state that it is applicable to plants with cooling ponds or cooling towers, typically with high levels of consumptive use and using makeup water from a river. The water use conflicts issue will remain Category 2 due to the possibility of a MODERATE impact level determination at some plants, such as the Wolf Creek findings described in Section 4.6.1.1 of the GEIS. As described in Section 4.5.1.1, the impact of water use conflicts could vary among nuclear plants and would depend on factors such as plant-specific design characteristics affecting consumptive water use, the characteristics of the water body serving as the source for makeup water, and the amount of competing use for that water.*

Comment: Page 3-61, lines 29 to 32: Text in lines 29 to 32 on page 3-61 reads as follows: Cooling system intakes can create an impingement hazard for waterfowl, and water demands for cooling can create water-use conflicts with wildlife. At the Nine Mile Point plant in New York,

for example, approximately 100 greater scaup (*Aythya marila*) ducks were impinged at the cooling water intake structure in 2000 (NRC 2006d).

A reference or additional information should be provided to support the statement in lines 29 and 30 that “water demands for cooling can create water-use conflicts with wildlife”. The Nine Mile Point example does not suggest a water-use conflict resulting from cooling water demand. (NEI1-7(4)-12)

Response: *The NRC agrees with the comment. The NRC modified the text of Section 3.6.1.3 of the GEIS in response to the comment to better explain how water demands for cooling can create water-use conflicts with wildlife.*

Comment: Page 3-60, lines 30 to 32: Text on lines 30 to 32 reads as follows:
At the Nine Mile Point plant in New York, for example, approximately 100 greater scaup (Aythya marila) and lesser scaup (Aythya affinis) ducks were impinged at the cooling water intake structure in 2000 (NRC 2006d).

To better describe the situation that led to the impingement event at Nine Mile Point, change the text to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

At the Nine Mile Point plant in New York, for example, approximately 100 greater scaup *(Aythya marila)* and lesser scaup *(Aythya affinis)* ducks were impinged at the cooling water intake structure in 2000 *while feeding on zebra mussels during reverse flow conditions for deicing of the intake structure* (NRC 2006d). *As a result of this incident, the Nine Mile Point intake structures now undergo annual cleaning to remove zebra mussels (the food source), and reverse flow conditions are scheduled during periods when diving duck feeding is limited (NRC 2006d).* (NEI1-7(4)-55)

Response: *The NRC staff agrees with the proposed changes and has modified the text of Section 3.6.1.3 of the GEIS in accordance with this comment.*

Comment: Avian Mortality: The Prairie Island Indian Community believes that avian mortality should be a site-specific issue (Category 2), as there are many factors, including migration routes and the location of the transmission lines, relative to migratory pathways or corridors, bird species composition, that will be unique for each site.

The 1996 GEIS contained that general statement that "no relatively high collision mortality is known to occur along transmission lines associated with nuclear power plants in the United States, other than the Prairie Island Plant in Minnesota." Since no new plants have been constructed since the 1996 GEIS was issued, we can only conclude that this issue may be

unique for the Prairie Island site. It can't possibly be generic to all plants if it is occurring at one plant. This statement or any mention of the Prairie Island site is not in the revised GEIS.

In the 1970s, Northern States Power commissioned a five-year study to determine whether the transmission lines coming from the PINGP had any impact on migratory birds using the Mississippi River (the PINGP is on the river). The Mississippi River is recognized as a Globally Important Bird Area and Migratory "Flyway" for birds. The Mississippi flyway is heavily utilized because it is uninterrupted by mountains or hills that would interfere with the movements of migrating birds. The Upper Mississippi River and associated ecosystem is very important to birds that are year-round residents and those who are migratory. About 40 percent of all North American waterfowl use the river as a migratory flyway, and 326 species of birds (about 1/3 of all species in North America) use the river corridor as a flyway in their spring and fall migrations. The Mississippi River is a well-known migration corridor for millions of waterfowl, including dabbling ducks, canvasbacks, and scaup that pass through this flyway annually.

The five-year study documented that 453 bird carcasses, representing 53 species, were found along portions of the transmission lines from the PINGP. Sixty-four percent of those carcasses were found along the east-west portions of the transmission lines, which are perpendicular to the Mississippi River or the migration pathway. The report, summarizing the five-year study, concluded with the statement that "the best way to reduce bird kills is to locate transmission lines parallel to bird migration corridors to as great a degree as possible, since locating them perpendicular to the line of migration results in many more birds being killed."

This issue is not generic, can have many factors, and should be evaluated on a site-specific basis. (PIIC-8-8)

Response: *Based on its review of existing information, including the license renewal review for the Prairie Island plant in Minnesota (NRC 2009), the NRC concluded that the impacts of bird collisions with transmission lines would be SMALL for all plants. The Prairie Island SEIS indicated that the impacts of bird collisions with Prairie Island transmission lines are SMALL due to several factors: (1) placement of marking devices on lines in areas with a known history of avian collisions; (2) the development of an Avian Protection Plan for Minnesota by Xcel Energy based on its Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service (FWS) to ensure compliance with the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act; (3) semiannual reports on avian injury and mortality along Xcel Energy transmission lines, begun in 2002 under the MOU, report only one incident, a dead cormorant; and (4) Xcel Energy established Avian Protection Standards in 2006. Another important consideration is that the scope of the transmission line review for future license renewals will be limited to those transmission lines currently needed to connect the plant to the first substation of the regional electric grid. As noted in Section 3.1.6.5 of the GEIS, in-scope transmission lines include only those lines that would not continue to operate if a plant's license was not renewed.*

Using this criterion, in-scope transmission lines are those lines that connect the plant to the first substation of the regional electric grid. This substation is frequently, but not always, located on the plant property. Section 4.6.1.1 of the GEIS notes that the length of transmission lines associated with nuclear plants is considerably less than the total length of transmission lines estimated within the United States. Therefore, transmission lines associated with nuclear power plants are likely responsible for only a small fraction of total bird collision mortality. It should be noted that for this and other Category 1 issues, a complete review of the issue would be required if new and significant information indicates that impacts could be MODERATE or LARGE. No changes were made to the GEIS in response to this comment.

Comment: Inadequate Assessment of Inadvertent Radioactive Releases to the Environment: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

Revised Assessment of Terrestrial Resources: The NRC also proposes a new Category 1 issue to address "Exposure of Terrestrial Organisms to Radionuclides."[23] While the intention of this new issue is admirable, it suffers from the same problems articulated above. In particular, this issue, once again, only applies to radioactive releases from *normal operations.*[24] Based on this assumption, the NRC made a generic determination that impacts to terrestrial resources are small.[25]

However, it is necessary for the NRC to require consideration of radioactive releases that are not part of the normal course of operation.[26] This would be the only way [to] ensure an accurate· and complete assessment of impacts to terrestrial biota. Accordingly, the NRC should make this a Category 2 issue and require licensees and the NRC Staff to look at radionuclide impact to terrestrial resources on a site-specific basis.

[[23] *See* Revised GEIS at 4-55 to 4-58; Revised GEIS Appendices at B-12.]
[[24] *See* Revised GEIS at 4-55 ("Releases into terrestrial environments often result from deposition of small amounts of radionuclide particulates released from power plant vents during *normal operations")* (emphasis added); *id.* at 4-58 ("[T]he NRC concludes that the impact of *routine radionuclide releases* from past and current operations on terrestrial biota would be small at all nuclear power plants and ·would not be expected to appreciably change during the renewal period") (emphasis added).]
[[25] *See* Revised GEIS at 4-58; Revised GEIS Appendices at B-12.] (Riverkeeper-20-6)

Response: *The NRC does not agree that the revised GEIS has an inadequate discussion of the impacts from radioactive effluents. One of the purposes of the GEIS is to evaluate the various potential environmental impacts associated with the expected normal operation of a*

nuclear power plant for an additional 20 years. Accordingly, the revised GEIS evaluates the potential impacts to human health and to two new issues (aquatic and terrestrial biota) using radioactive effluent release data from nuclear power plants operating at normal conditions. The 1996 GEIS and the revised GEIS evaluate the potential consequences from routine operations with a focus on the impacts to human health, for which the NRC has specific regulatory dose limits. The NRC does not have regulations in place for the protection of biota from radiation. As discussed in the revised GEIS, the NRC uses protection standards from national and international scientific organizations to make its NEPA determination. However, while the two biota issues are proposed to be generic issues classified as Category 1, if NRC's review of the impacts to biota from radioactive effluents is outside the bounding conditions used in the GEIS, the issue will be treated as "new and significant" and a site-specific evaluation will be performed and reported in the SEIS.

The revised GEIS's discussion of inadvertent radiological releases is not a generic evaluation of the potential environmental impacts from such releases. This is because such releases are site-specific and must be evaluated individually. Accordingly, the NRC has proposed that evaluation of radionuclides released into groundwater be a Category 2 issue, requiring an applicant to provide a site-specific evaluation of inadvertent releases into groundwater. If an inadvertent or abnormal radioactive release were to exceed NRC regulations and result in an impact to a Category 1 issue (i.e., human health or terrestrial and aquatic biota) beyond the impacts evaluated by the GEIS, then the issue would have to be fully evaluated to account for the new and significant information, as required by 10 CFR Part 51.53(c)(iv), and included in the applicant's environmental report. Therefore, the revised GEIS's evaluation of the potential impacts to terrestrial and aquatic biota using routine radioactive effluent data from nuclear power plants and the resultant classification of the issues as Category 1 is appropriate.

No changes have been made to the GEIS in response to these comments.

Comment: Page 3-58, line 33 to page 3-59, line 5: Text from line 33 on page 3-58 through line 5 on page 3-59 discusses the effects on vegetation and habitats of placing and maintaining transmission line ROWs in undeveloped areas.

In light of the discussion on page 3-24, lines 13 through 25, which indicates that after the GEIS has been updated the scope of assessment in license renewal SEISs will no longer include transmission lines that would remain in place and energized regardless of the decision on license renewal, the NRC is encouraged to consider whether the paragraph addressing transmission line ROWs (on pages 3-58 and 3-59) remains relevant, and the paragraph should be either modified to clarify its relevance or deleted. (NEI1-7(4)-11)

Comment: Page 4-68, lines 31 to 36: Text in lines 31 to 36 on page 4-68 reads as follows:

There are no reports of relatively high [bird] collision mortality occurring at the transmission lines associated with nuclear power plants in the United States. The length of transmission lines associated with nuclear plants is considerably less than the total 500,000 mi (800,000 km) of transmission lines estimated within the United States (Manville 2005). Therefore, transmission lines associated with nuclear power plants are likely responsible for only a small fraction of total bird collision mortality.

On page 3-3 in lines 38 and 39, the draft updated GEIS states that "only those transmission lines that connect the plant to the switchyard are considered within the scope of [the updated GEIS] review." On page 3-24 in lines 6 to 11, the draft updated GEIS states that "Power-transmission systems associated with nuclear power plants and considered within the scope of this review consist of switching stations (or substations) usually located on the plant site and the transmission lines that connect the plant to those substations. These systems are required to transfer power from the plant to the utility's network of power lines in its service area (the regional electrical distribution grid)." In addition, on page 3-24 the draft updated GEIS states that "in most cases, the transmission lines originating at the power plant substations are no longer owned or managed by the nuclear power plant licensees." Based on these limitations of the scope of impacts from transmission lines to be considered in the draft updated GEIS, the NRC is encouraged to modify the text in lines 31 through 36 on page 4-68 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

There are no reports of relatively high collision mortality occurring at the transmission lines associated with nuclear power plants in the United States. The length of transmission lines associated with nuclear plants is considerably less than the total 500,000 mi (800,000 km) of transmission lines estimated within the United States (Manville 2005). *This is particularly true considering, as was previously discussed in section 3.1.6.5, that power-transmission systems associated with nuclear power plants and considered within the scope of this review are limited to switching stations (or substations) usually located on the plant site and the transmission lines that connect the plant to those substations.* Therefore, *the* transmission lines associated with nuclear power plants *for the purpose of this review* are likely responsible for only a ~~small~~*tiny* fraction of total bird collision mortality. (NEI1-7(4)-14)

Response: *Sections 3.6.1.1 and 4.6.1.1 of the GEIS have been updated to provide clarification of the scope of the power transmission system analysis.*

Comment: Page 4-75, line 29 to page 4-77, line 37: Text from page 4-75, line 29 through page 4- 77, line 37 contains subsections titled "Honeybees" and "Wildlife and Livestock," which respectively discuss the effects of EMF on honey bees and on wildlife and livestock located within or very near transmission line rights-of-way.

The NRC is encouraged to delete the subsections titled “Honeybees” and “Wildlife and Livestock” because these discussions appear to be inconsistent with statements on pp. 3-3 (lines 35 – 41) and 3-24 (lines 20 – 21) regarding the scope of the GEIS update with respect to transmission lines. Unless NRC is aware of a nuclear power plant site where honeybees, wildlife, and/or livestock are located onsite beneath the transmission lines that run from the turbine generator building to the onsite switching station, these issues do not exist in the context of license renewal. The “Conclusion” subsection on pages 4-77 and 4-78 should also be modified to reflect the deletions. (NEI1-7(4)-17)

Response: *The subsections titled “Honeybees” and “Wildlife and Livestock” will be retained, because the first substation is not always located on plant property. However, NRC revised Section 4.6.1.1 of the GEIS to clarify that the analysis considers only those transmission lines that connect the facility to the first substation of the regional electric grid.*

Threatened and Endangered Species

Comment: In the proposed rule and the proposed GEIS revision, the NRC continues to classify this as a Category 2 issue regardless of the incremental impact of the license renewal activities on threatened, endangered, and protected species and essential fish habitat. TVA recommends that activities associated with license renewal should be considered a Category 2 issue only if the proponent determines such activities could adversely affect federally listed species or designated critical habitat, in which case these activities would be subject to the formal consultation requirements under Section 7 of the Endangered Species Act, and to the requirement that a plant-specific analysis be included in the licensee's environmental report. (TVA-32-5)

Response: *The NRC agrees with the commenter’s assertion that in the majority of cases, the incremental effects of license renewal does not adversely affect Federally listed species or essential fish habitat. Because Federal agencies, and not license renewal applicants, must comply with Section 7 of the Endangered Species Act, however, the NRC, and not license renewal applicants, must make a determination as to whether license renewal would be likely to jeopardize the continued existence of any endangered or threatened species, or destroy or adversely modify any designated critical habitat. Similarly, Federal agencies, and not license renewal applicants, must comply with the requirements for EFH Consultation under the Magnuson-Stevens Act. Therefore, the NRC must make a site-specific determination based on its independent evaluation of impacts to protected species and habitats from the license renewal regardless of the conclusions of the applicant. This will remain a Category 2 issue. The NRC made no changes to the GEIS in response to this comment.*

Comment: D. The Draft Generic EIS Fails to Adequately Assess Aquatic Impacts in Specific Key Areas: Numerous specific statements in the draft revised Generic EIS need to be addressed by the NRC. These include the NRC's portrayal of the Clean Water Act section 316(b) Phase III rules, the viability of acoustic deterrent systems at plants in Belgium and New York, the role of the consultation process under the federal Endangered Species Act, and the environmental consequences, of alternatives to license renewal.

4. Endangered Species Act Consultation Process: The NRC's Statement:

Prior to license renewal, the NRC should consult with the USFWS and NMFS to determine the presence of and possible impacts on any ESA-listed aquatic species....The NRC should also contact the NMFS for license renewal applications for plants located in areas that may contain EFH for Federally managed marine or anadromous fisheries or for plants that may have an effect on protected marine mammals. Draft Generic EIS, p. 4-113, lines 18, 21-23.

The NYSDEC's Response: By using the word "should" in this statement, the draft revised Generic EIS makes the consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service on Endangered Species Act and Essential Fish Habitat issues appear to be precatory and discretionary. Consultation is mandatory under the Endangered Species Act, and the text must reflect this. NYSDEC recommends the following changes as necessary to address this significant oversight:

- Change the sentence on line 18 to read as follows: "Prior to license renewal, the NRC *shall* consult with the USFWS and NMFS to determine the presence of and possible impacts on any ESA-listed aquatic species."

- Change the sentence on lines 21-23 to read as follows: "The NRC *shall* also contact the NMFS for license renewal applications for plants located in areas that may contain EFH for Federally managed marine or anadromous fisheries or for plants that may have an effect on protected marine mammals." (NYS DEC-12-9)

Response: *The NRC consults with the FWS and NMFS regarding threatened and endangered species and essential fish habitat for all license renewals to determine if these resources could be affected by license renewal. The NRC revised Section 4.6.1.3 of the GEIS to better describe this consultation.*

A.2.1.7 Comments Concerning Historic and Cultural Resources

Comment: Page S-14: Historic and Cultural Resources**:** Please use the term "historic properties". Those are the only resources of concern under Section 106 of the National Historic Preservation Act. Also include Tribal Historic Preservation Officers and "recognized" Native American Tribes as consulting parties as well as others listed in 36 CFR 800.2. (BIA-19-1)

Response: *The term "historic properties" is used when discussing Section 106 compliance activities and "historic and cultural resources" is used when generically referencing the resource. The NRC considers historic and cultural resources as an all-inclusive term that includes prehistoric, historic, and cultural properties. In addition, while NHPA requires agencies to take into account the effects of their undertakings on historic properties, NEPA requires the consideration of the cultural environment; thus the issue is termed "Historic and Cultural Resources" (see NEPA Statute Sec. 101 42 USC § 4331(b) 4). No changes were made to the GEIS in response to the first part of the comment. However, Sections 3.7.1 and 4.7.1.of the GEIS have been revised to clarify the role of Tribes and consulting parties under 36 CFR Part 800.2 in the Section 106 process in response to the second part of the comment. Since there are no commercial nuclear power plants located on Tribal lands, Tribal representatives rather than THPOs are consulted.*

Comment: Table 2.1-1**.** Summary of Impacts Associated with License Renewal Under the Proposed Action. Page 2-12, Historic and Cultural Resources**.** Again, please focus on historic properties and consulting parties identified in 36 CFR 800.2. It is not known what the impacts of refurbishment would be, since not all cultural resources identified within an Area of Potential Effect (APE) have been evaluated for the National Register of Historic Places. (BIA-19-2)

Response: *The term "historic properties" is used when discussing Section 106 compliance activities and "historic and cultural resources" is used when generically referencing the resource. The NRC considers historic and cultural resources as an all-inclusive term that includes prehistoric, historic, and cultural properties. Impacts from continued operations and refurbishment on historic and cultural resources are addressed in nuclear plant-specific license renewal environmental reviews. This is why impacts to historic and cultural resources are a Category 2 issue. No changes were made to the GEIS in response to this comment.*

Comment: Describe existing conditions in Area of Potential Effect (APE). (BIA-19-3)

Response: *The Area of Potential Effect (APE) typically encompasses the nuclear power plant site, its immediate environs including viewshed, and in-scope transmission lines. The APE may extend beyond the nuclear plant site and transmission lines when these activities may affect historic properties. This determination is made irrespective of land ownership or control.*

Existing conditions in the APE are described in nuclear plant-specific license renewal environmental reviews. No changes were made to the GEIS in response to this comment.

Comment: Page 3-78, paragraph 1: Please use the recognized term historic properties, not historic and cultural resources. Cite the definition of historic property as it is written in 36 CFR 800.16(l). (BIA-19-4)

Response: *The term "historic properties" is used when discussing Section 106 compliance activities and "historic and cultural resources" is used when generically referencing the resource. The NRC considers historic and cultural resources as an all-inclusive term that includes prehistoric, historic, and cultural properties. In addition, while NHPA requires agencies to take into account the effects of their undertakings on historic properties, NEPA requires the consideration of the cultural environment; thus the issue is termed "Historic and Cultural Resources" (see NEPA Statute Sec. 101 42 USC § 4331(b) 4). No changes were made to the GEIS in response to the first part of the comment. The text in Section 3.7 of the GEIS has been revised to reflect the definition of historic property per 36 CFR Part 800.16(l)(1) in response to the second part of the comment.*

Comment: Page 3-78, Box with Definitions: What are the sources for these definitions? They are not used in compliance language. Consider using: District, Site, Building, Structure and Object as they are defined in National Register Bulletin 15, and Traditional Cultural Property as defined in National Register Bulletin 38. (BIA-19-5)

Response: *The definition of Traditional Cultural Properties in the text box referred to in this comment has been revised to reflect the definition used in National Park Service (NPS) Bulletin 38: "Guidelines for Evaluating and Documenting traditional Cultural Properties."*

Comment: Page 3-78, lines 2-11: The "designated applicant" has no authority to make a determination of eligibility or effect. The federal agency official can only delegate that authority to a federal, state or tribal government official (36CFR 800.2(a)) (BIA-19-6)

Comment: Historic and Cultural Resources: Historic and cultural resources are discussed on pages 3-78 to 3-80 in Chapter 3 (Affected Environment) and pages 4-116 to 4-119 in Chapter 4 (Environmental Consequences and Mitigating Actions). Chapter 3 mentions State Historic Preservation Offices, but fails to mention Tribal Historic Preservation Offices (THPO), which have responsibilities similar to the SHPO's and should be consulted with as part of the development of the license renewal SEIS.

The process for determining whether a historic or cultural resource is eligible for listing on the National Register of Historic Places (NRHP) should be clarified. On page 3-79 of the revised GEIS, it is stated, "The lead Federal agency or the designated applicant must determine if

historic and cultural resources eligible for listing on the NRHP are present." Is not clear whether the "designated applicant" is the applicant for license renewal (i.e., the utility owning or operating the plant) or the owner of the historic or cultural resource that may be impacted by license renewal. This should be clarified. As well, we do not believe that it should be up to the utility owning or operating the power plant to determine whether a property or resource is eligible for listing on the NRHP. This should be done by or in concert with the SHPO and/or a THPO (if appropriate).

Although both chapters 3 and 4 mention that impacts to historic and cultural resources must be "mitigated," there does not seem to be any instruction as to whether mitigation would be required or just suggested. (PIIC-8-7)

Response: *Eligibility of historic properties for listing on the NRHP is determined by applying the NRHP criteria in consultation with the appropriate SHPO, Indian Tribes, and other interested parties. The license renewal applicant, and other consulting parties, can provide information to the Federal agency that can be used to make these determinations.*

Based on its limited statutory authority, NRC cannot impose mitigation measures that are not related to public health and safety from radiological hazards or common defense and security. Mitigation measures can be implemented to avoid, minimize, or mitigate any adverse effects to historic properties. Any mitigation would be discussed in plant-specific supplements to the GEIS. Sections 3.7.1 and 4.7.1 of the GEIS have been revised in response to these comments.

Comment: Page 3-78, lines 19-24: The complete definition of an undertaking is also found in 36 CFR 800.16(y). (BIA-19-7)

Response: *The text of Section 3.7.1 of the GEIS has been modified to include citation 36 CFR 800.16(y).*

Comment: Page 3-78, lines 31-36: The act also established the Tribal Historic Preservation Offices that should also be mentioned beside the SHPO and the Advisory Council. (BIA-19-8)

Response: *Since there are no commercial nuclear power plants located on Tribal lands, Tribal representatives rather than THPOs are consulted. The text in Section 3.7.1 of the GEIS has been modified in response to this comment to explain the role of consulting parties per 36 CFR 800.2.*

Comment: Page 3-78, line 38: Please use historic properties, since this term is used more frequently. The average reader may think that all sites would be of concern and not just those eligible for the National Register. Also see page 3-79, lines 1; also see pages 35-36; page 4-116, line 26; page 4-117, lines 1, 3-5, 7-8, 10-11, 14, 25-26, 28, 30-32, 34; page 4-118,

lines 2-4, 6-7, 12, 14, 17, 19, 21-22, 26, 30, 32; 38-39; page 4-119, lines 2, 12, 14-15, 20, 23-24, 29, 34; page 4-120, lines 3, 7-8, 10, 17-18, 22-23, 27, 32; page 4-204, lines 14, 21, 25, 28-29; page 4-225, lines 4 and 7; Page 7-28, line 26; Volume 2 page D41, lines 20,23,35,38; page D-42, lines 2, 8-9, 11-12, 21,29. (BIA-19-9)

Response: *The term "historic properties" is used when discussing Section 106 compliance activities and "historic and cultural resources" is used when generically referencing the resource. The NRC considers historic and cultural resources as an all-inclusive term that includes prehistoric, historic, and cultural properties. In addition, while NHPA requires agencies to take into account the effects of their undertakings on historic properties, NEPA requires the consideration of the cultural environment, thus the issue is termed "Historic and Cultural Resources" (see NEPA Statute Sec. 101 42 USC § 4331(b) 4). No changes were made to the GEIS in response to the comment.*

Comment: Pages 3-78, line 38-40 to page 3-79, lines 1-11: Rewrite paragraph to be more in line with the 36 CFR 800 process (generally §800.3 to §800.6). Do you want to define what a generic APE might consist of for any particular plant? (BIA-19-10)

Response: *The text in Section 3.7.1 of the GEIS has been modified in response to this comment. The revised text provides a generic definition of the APE for any nuclear power plant to assist the reader in understanding the 36 CFR Part 800 process.*

Comment: Page 3-80, lines 1-40: Change the title, eliminate the first two paragraphs and revise the last two paragraphs of this section and discuss the types of National Register classifications that could be found in the APEs. Insert the revised last two paragraphs after the classifications. (BIA-19-11)

Response: *Section 3.7.2 of the GEIS provides a description of the types of historic and cultural resources that are commonly found at nuclear power plant sites. Section 3.7.2 provides a contextual overview for the regional setting for most plants. Most historic and cultural resources on plant sites are unknown. As a result, historic and cultural resources are a Category 2 issue that can only be addressed at the plant-specific environmental reviews. Site-specific information is needed for the NRC to access the potential impact to historic and cultural resources and make determinations that are required under the NHPA. No changes were made to the GEIS in response to this comment.*

Comment: [In Section 4.7,] analyze all potential adverse effects to historic properties. Identify possible mitigation measures to adverse effects. (BIA-19-12)

Response: *In Section 4.7 of the GEIS, Historic and Cultural Resources is a Category 2 issue, which means that impacts are determined in plant-specific environmental reviews. Historic and*

cultural resources are different at each nuclear power plant site. Any mitigation would be addressed in plant-specific supplements to the GEIS. No changes were made to the GEIS in response to this comment.

Comment: Page 4-117, lines 19 to 22: Text in lines 19 to 22 on page 4-117 reads as follows:

Only one impact issue is evaluated:

• Impact of continued operations and refurbishment activities on historic and cultural resources located onsite and in transmission line rights-of-way.

The NRC is encouraged to delete the words "and in transmission line rights-of-way" in line 22 on page 4-117. These words appear to be inconsistent with statements on pages 3-3 (lines 35 – 41) and 3-24 (lines 20 – 21) regarding the scope of the GEIS update with respect to transmission lines. According to pages 3-3 (lines 35 – 41) and 3-24 (lines 20 – 21), the evaluation in the draft updated GEIS of impacts of transmission line maintenance on historic or cultural resources should be limited to such resources located onsite beneath the transmission lines that run from the turbine generator building to the onsite switching station. (NEI1-7(4)-22)

Response: *Although the scope of the transmission line review in the GEIS revision has been reduced from that in the 1996 GEIS, the issue remains a Category 2 issue, and, as such, would require a site-specific evaluation. As discussed in Section 3.1.6.5 of the GEIS, in-scope transmission lines are those that connect the nuclear power plant to the first substation where electricity is fed into the regional electric grid and power lines that feed the nuclear power plant from the grid during outages. The text in Section 4.7.1 of the GEIS has been modified to clarify that these statements only refer to in-scope transmission lines. Since portions of the transmission lines are within scope, a review of potential effects on historic properties is warranted.*

Comment: Page 4-118, lines 16 to 23: Text in lines 16 through 23 on page 4-118 reads as follows:

Under Section 106 of the NHPA, the NRC must take into account the effect of the undertaking on any historic and cultural resources included or eligible for inclusion in the *National Register.* Therefore, to assess the impact of continued operations on these resources, all historic and cultural resources that could be affected must be known at the time of license renewal. To achieve this objective, field investigations should be performed on the entire plant site. The eligibility of a historic and cultural resource for listing on the *National Register* should be determined, and a process for considering these resources should be developed before renewing the license." [emphasis added]

The underlined text in the above-quoted text is not consistent with the Advisory Council on Historic Preservation's (ACHP) Section 106 Archaeology Guidance (available online at www.achp.gov/archguide). Based on the ACHP guide, it is NOT necessary for the NRC to require field investigations of the "entire plant site," which frequently includes undeveloped areas on which no refurbishment or operations activities are planned during the period of extended operation. Accordingly, the NRC is encouraged to delete the above-quoted text in lines 16 to 23 on page 4-118. (NEI1-7(4)-23)

Response: *Section 4.7.1 has been revised in response to this comment and to indicate that the APE is the Area of Potential Effect for plant-specific evaluations of the effects of license renewal on historic and cultural resources.*

Comment: Page 4-119, lines 15 to 17: Text in lines 15 through 17 on page 4-119 reads as follows:

For activities connected to license renewal, the resources in the transmission line ROWs must be identified. The means for considering the effects of transmission line maintenance on these resources should be determined before renewal of the license."

Consideration should be given to revising the above-quoted sentences in light of the statements on pp. 3-3 (lines 35 – 41) and 3-24 (lines 20 – 21) regarding the scope of the GEIS update with respect to transmission lines. If a transmission line ROW not owned by the license renewal applicant is at issue, it would be inappropriate for the license renewal schedule to be jeopardized because the ROW owner failed to cooperate in determining a means for considering the effects of transmission line maintenance on cultural and archaeological resources within the ROW. (NEI1-7(4)-24)

Response: *As discussed in Section 3.1.6.5 of the GEIS, in-scope transmission lines are those that connect the nuclear power plant to the first substation where electricity is fed into the regional electric grid and power lines that feed the nuclear power plant from the grid during outages. The text in Section 4.7.1 of the GEIS has been modified to clarify that these statements only refer to in-scope transmission lines.*

Comment: Page 4-119, line 40 to page 4-120, line 33: Text from line 40 on page 4-119 to line 33 on page 4-120 discusses the impacts on historic and cultural resources of constructing alternative energy power plants in lieu of renewing the license for a nuclear power plant.

The introductory text for Section 4.7.2 on pages 4-119 and 4-120 should explain why impacts on historic and cultural resources are not evaluated for the fossil energy and new nuclear plant alternatives to the proposed action. Also, an explanation should be provided as to why impacts on historic and cultural resources of construction and operation of biomass, solar thermal, and

solar photovoltaic power plants are not addressed in Section 4.7.2.1 on page 4-120. (NEI1-7(4)-25)

Response: *The impacts from the construction of all replacement power facilities (including both power plants and renewable power facilities) are generically discussed in Section 4.7.2. The text in Section 4.7.2 has been revised to clarify the generic impacts from constructing and operating replacement power facilities on historic and cultural resources. These impacts are discussed in greater detail in plant-specific environmental reviews.*

Comment: Pages 4-116 to 4-119: The APE should be presented in the Affected Environment. Discuss Assessment and Resolution of Adverse Effects (§800.5 and §800.6). (BIA-19-14)

Response: *Section 3.7.1 of the GEIS has been revised to include a description of the license renewal APE. Since impacts to historic and cultural resources is Category 2, the assessment and resolution of any adverse effects on historic properties are addressed in plant-specific SEISs.*

Comment: Page 4-118, lines 18-23: It is impossible to know "all" the historic and cultural resources that could be affected by future undertakings. It should be a staged approach where sites are evaluated as they are found. This impossible standard should not hold up a license renewal. (BIA-19-16)

Response: *In accordance with the provisions of the NHPA, the NRC is required to make a reasonable effort to identify historic properties included in or eligible for inclusion on the NRHP in the Area of Potential Effect (APE). Since many existing nuclear power plants were not surveyed for historic and cultural resources prior to construction, a survey of previously disturbed areas of the nuclear power plant site should be conducted by qualified professionals to effectively determine if these areas could potentially contain historic and cultural resources. Continued operations during the license renewal term and refurbishment activities at a nuclear power plant can also affect historic and cultural resources through ground-disturbing activities associated with plant operations and ongoing maintenance.*

Historic and Cultural Resources is a Category 2 issue, which means that impacts to historic and cultural resources are determined in plant-specific environmental reviews. Plant-specific cultural resources protection procedures are used by licensees to identify and protect historic and cultural resources during plant operations. These procedures also ensure resources are considered prior to any ground disturbance during future plant operations and maintenance activities. The text in Section 4.7 has been revised in response to this comment.

Comment: Pages 4-119 to 4-120: Environmental Consequences of Alternatives to the Proposed Action.

Hydroelectric Energy Sources. Erosion can affect streamside cultural resource sites.
Wind. Above ground structures could be visually impacted. (BIA-19-17)

Response: *Section 4.7.2 of the GEIS has been modified in response to this comment to better capture the potential effects of alternatives on historic properties.*

Comment: Page 4-204, lines 16-26: Isn't some of this information more cumulative than resulting from termination of plant operations? (BIA-19-18)

Response: *The commenter is referring to GEIS Section 4.12.2.1, which discusses the environmental consequences of delaying the termination of nuclear power plant operations and decommissioning because of license renewal. The environmental consequences of decommissioning itself would be addressed in a separate environmental NEPA review. After termination, the majority of impacts associated with plant operations would cease with reactor shutdown; however, some environmental impacts would remain unchanged, while others would continue at reduced or altered levels. Delaying the termination of nuclear power plant operations and eventual decommissioning because of a renewed operating license would not affect historic and cultural resources. These impacts could be considered cumulative; however, a brief discussion of generic cumulative impacts is presented in Section 4.13.9. As explained in the GEIS, Cumulative Impacts is a Category 2 issue, which is discussed in greater detail in plant-specific supplements to the GEIS. No changes were made to the GEIS in response to this comment.*

Comment: Page 4-225: Cumulative effects are based on past, present and reasonably foreseeable actions upon the resource. (BIA-19-19)

Response: *The definition of cumulative impacts, consistent with the comment, is presented in the introduction to Section 4.13. No changes were made to the GEIS in response to this comment.*

Comment: Pages D41-D42: What is a Region of Influence? Please distinguish between non-significant resources and historic properties. (BIA-19-23)

Response: *As explained in Chapter 7 (Glossary), the Region of Influence is the area occupied by affected resources and the distances at which impacts associated with license renewal may occur. It is the physical area that bounds the environmental, sociological, economic, or cultural feature of interest for the purpose of analysis. NRC does not use the term "non-significant resources" in the GEIS or Appendix D. No changes were made to the GEIS in response to this comment.*

A.2.1.8 Comments Concerning Socioeconomics

Comment: Socioeconomics: Population and housing impacts would be small for all plants. Regional population and housing availability and value would not change during the license renewal term unless significant changes in plant employment would occur. With no increase in employment expected during the license renewal term, population and housing availability and values would not be affected by continued power plant operations. Any changes in population and housing availability and value due to changes in the workforce at the plant would have a greater effect on sparsely populated areas than areas with higher density populations. This is a Category 1 issue. July 2009 S-15 NUREG-1437, Revision 1.

Housing issues around nuclear power plants cannot be considered Category 1 issues, especially in light of the ongoing national financial crisis involving the plummeting real estate market and the wide fluctuations in home prices and dwindling new construction. While there may be no anticipated increase in the *number* of workers at the plant during a relicense period, there may be a significant difference in the age and status of those workers. Although the NRC continues to fail to track the demographics of an aging and retiring nuclear workforce, at least one utility, Southern California Edison, is concerned enough to have included in their proceedings before the California Public Utilities Commission, a request for ratepayer funding to enhance hiring bonuses and housing allowances to allow for the increased cost of housing near the SONGS reactor in order to accommodate new workers to replace retiring workers. They had to justify in a public hearing the problems of attracting replacement workers to an area of high housing costs. It cannot be assumed, as the NRC statement quotes above indicates, that "Any changes in population and housing availability and value due to changes in the workforce at the plant would have a greater effect on sparsely populated areas than areas with higher density populations" because the area surrounding SONGS is second only to Indian Point in New York in terms of population, with a surrounding population of over 12 million people. In this case, SONGS would merit a site specific look at housing economics in Category 2.

A4NR, et al, recommend that "Population and housing" impacts be removed from Category 1 and placed in Category 2 for site specific analysis. (A4NR-11-35)

Response: *Although higher housing prices or fluctuations in housing prices in the regions surrounding nuclear power plants may be an issue for utilities that might have to recruit replacement workers over the license renewal term, the purpose of the GEIS is to evaluate any potential impact of continuing plant operations on the housing market. Since employment levels at nuclear power plants are not expected to change during the license renewal terms at any of the reactor sites, there would be no change in demand for permanent housing associated with continued reactor operations. Therefore, there would be no MODERATE or LARGE impacts on local and regional housing markets because of the renewed operating license.*

In addition, changes in housing prices and the affordability of houses in the region surrounding any nuclear power plant are difficult to predict, and it is not possible to determine how general trends in housing prices and affordability would be differentially impacted by license renewal. Median housing prices and the availability of housing in the vicinity of a nuclear power plant are currently described as part of the affected environment in plant-specific environmental reviews. Therefore, no change in the Category 1 designation for the issue of population and housing is warranted in the GEIS and no changes were made to the GEIS in response to this comment.

Comment: Page 3-86, lines 20 to 22: Text in lines 20 to 22 on page 3-86 reads as follows:

Among the 11 plants located in semi-urban economies shown in Table 3.8.5, none provided 1 percent or more of regional employment, while average plant earnings at most plants (particularly Millstone and Indian Point) were higher than the regional average.

Because Table 3.8-5 contains only four plants, modify the sentence in lines 20 through 22 on page 3-86 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Among the 11 plants *listed in Table 3.8-1, the four shown in Table 3.8-5 are* located in semi-urban economies ~~shown in Table 3.8-5~~,. None *of these four plants* provided 1 percent or more of regional employment, *and* ~~while~~ average plant earnings at ~~most~~*these* plants (particularly Millstone and Indian Point) were higher than the regional average. (NEI1-7(4)-62)

Response: *The NRC agrees with the suggested changes, and Section 3.8.2.2 of the GEIS has been revised in response to this comment.*

A.2.1.9 Comments Concerning Human Health

Comment: Electric Shock Hazards: Finding in Table B-1 of Appendix B in the draft updated GEIS (Volume 2) for the issue labeled “Electric shock hazards” reads as follows:

Small, moderate, or large impact (Category 2). Electrical shock potential is of small significance for transmission lines that are operated in adherence with the National Electrical Safety Code (NESC). Without a review of each nuclear plant transmission line conformance with NESC criteria, it is not possible to determine the significance of the electrical shock potential.

On page 3-3 in lines 38 and 39, the draft updated GEIS states that “only those transmission lines that connect the plant to the switchyard are considered within the scope of [the draft updated GEIS] review.” On page 3-24 in lines 6 to 11, the draft updated GEIS states that “Power-transmission systems associated with nuclear power plants and considered within the scope of this review consist of switching stations (or substations) usually located on the plant site and the transmission lines that connect the plant to those substations. These systems are

required to transfer power from the plant to the utility's network of power lines in its service area (the regional electrical distribution grid)." In addition, on page 3-24 the draft updated GEIS states that "in most cases, the transmission lines originating at the power plant substations are no longer owned or managed by the nuclear power plant licensees." Based on these limitations of the scope of impacts from transmission lines to be considered in the updated GEIS, the NRC should modify the above-quoted text in Table B-1 of Appendix B in the draft updated GEIS (Volume 2) for the issue labeled "Electric shock hazards" to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Small, moderate, or large impact (Category 2). Electrical shock potential is of small significance for transmission lines that are operated in adherence with the National Electrical Safety Code (NESC). Without a review of ~~each nuclear plant transmission line~~ conformance with NESC criteria *for each transmission line that connects a particular nuclear power plant to the switching station required to transfer power from the plant to the offsite network of power lines*, it is not possible to determine the significance of the electrical shock potential *for those transmission lines*.

The draft updated GEIS should be changed throughout (i.e., Volumes 1 and 2) to reflect the above-suggested modification in Table B-1 of Appendix B. (NEI1-7(4)-5)

Response: *Table B–1 was modified to clarify that the findings for "Electric shock hazards" apply only to those transmission lines that are "in-scope" for license renewal. Sections 3.1.1 and 3.1.6.5 of the revised GEIS define the extent of in-scope transmission lines subject to license renewal environmental reviews.*

Comment: A commenter submitted two 2006 Internet articles on tritium leaks into the groundwater at San Onofre (and related human health concerns) and a Nukewatch Fact Sheet entitled, "Groundwater Contamination by U.S. Reactors," that discusses radionuclide groundwater contamination events occurring at several nuclear power plants and tritium hazards. (Anon2-23-5, Anon2-23-7, Anon2-23-8)

Comment: Groundwater wells must be installed and tested for tritium and other radioactive isotopes, as many aging reactors are now at the eleventh hour revealing their inability to contain radioactive water, and recent science has shown that Tritium and exposure to other radioisotopes poses a far greater risk to the health [of] women, children and the fetus than the previous GEIS indicated. Thus all tables in the GEIS dealing with latent and early mortality must be re-calculated and new, more stringent standards must be set based on the maximally exposed individual, not Reference Man. Thorough health studies comparing local with regional cancer rates, autoimmune illnesses, Down's Syndrome and other non-lethal genetic mutations, and the miscarriage rate in the vicinity of [nuclear power plants] must be conducted to make proper use of the 40 years of data we now should have access to. (Shaw-15-5)

Response: *The NRC's mission is to protect the public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects (i.e., cancer and other biological impacts) of radiation on humans. The limits are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations. The NRC actively participates and monitors the work of these organizations to keep current on the latest trends in radiation protection. If the NRC determines that there is a need to revise its radiation protection regulations, it will initiate a rulemaking. The models recognized by the NRC for use by nuclear power reactors to calculate dose incorporate conservative assumptions and account for differences in gender and age to ensure that workers and members of the public are adequately protected from radiation.*

Although radiation may cause cancers at high doses, currently there are no reputable scientifically conclusive data that unequivocally establish the occurrence of cancer following exposure to low doses (i.e., below about 10 rem [0.1 Sv]). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold, dose response relationship is used to describe the relationship between radiation dose and adverse impacts such as incidents of cancer. Simply stated, any increase in dose, no matter how small, results in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably overestimates those risks. Based on this theory, the NRC conservatively establishes limits for radioactive effluents and radiation exposures for workers and members of the public. While the public dose limit in 10 CFR Part 20 is 100 mrem (1 mSv) for all facilities licensed by the NRC, the NRC has imposed additional constraints on nuclear power reactors. Each nuclear power reactor has enforceable license conditions that limit the total annual whole body dose to a member of the public outside the facility to 25 mrem (0.25 mSv). The amount of radioactive material released from nuclear power facilities is well measured, well monitored, and known to be very small. The doses of radiation that are received by members of the public as a result of exposure to nuclear power facilities are so low (i.e., less than a few millirem) that resulting cancers attributed to the radiation have not been observed and would not be expected.

Radiation doses to members of the public from the current operations of nuclear power plants have been examined in the 1996 GEIS and the revised GEIS from a variety of perspectives (i.e., releases of radioactive gaseous and liquid effluents, radiation from radioactive waste storage buildings, radiological impacts from refueling and maintenance activities, and inadvertent leaks of radioactive liquids), and the impacts were found to be within dose standards specified in NRC's 10 CFR Part 20 and Appendix I to 10 CFR Part 50, as well as EPA's 40 CFR Part 190. Radiation doses are calculated for the maximally exposed individual (MEI) (that is, the real or hypothetical individual potentially subject to maximum exposure). The doses are

calculated by using site-specific radioactive effluent release data where available. For those cases in which site-specific data are not readily available, conservative (overestimated) assumptions are used to estimate dose. Public doses are expected to remain within dose standards. Because there is no reason to expect that radioactive effluents will increase during the license renewal term, doses from continued operation are expected to be within regulatory standards.

In addition to NRC's requirements to monitor radioactive effluents (routine and inadvertent) discharged into the environment, each nuclear power plant is required to have a radiological environmental monitoring program (REMP). The REMP quantifies the environmental impacts associated with radioactive effluent releases from the plant. The REMP monitors the environment over time, starting before the plant operates to establish background radiation levels and throughout its operating lifetime to monitor radioactivity in the local environment. The REMP provides a mechanism for determining the levels of radioactivity in the environment to ensure that any accumulation of radionuclides released into the environment will not become significant as a result of plant operations. The REMP also measures radioactivity from other nuclear facilities that may be in the area (i.e., other nuclear power plants, hospitals using radioactive material, research facilities or any other facility licensed to use radioactive material). Thus, the REMP monitors the cumulative impacts from all sources of radioactivity in the vicinity of the power plant. To obtain information on radioactivity around the plant, samples of environmental media (e.g., surface water; groundwater; drinking water; air; milk; locally grown crops; locally produced food products; river, ocean, or lake sediment; and fish and other aquatic biota) are collected from areas surrounding the plant for analysis to measure the amount of radioactivity, if any, in the samples. The media samples reflect the radiation exposure pathways (i.e., inhalation, ingestion, and physical location near the plant) to the public from radioactive effluents released by the nuclear power plant and from background radiation (i.e., cosmic sources, naturally occurring radioactive material, including radon and global fallout). The NRC has standards for the amount of radioactivity in the sample media, which, if exceeded, must be reported to the NRC and the licensee must conduct an investigation. The REMP supplements the radioactive effluent monitoring program by verifying that measurable concentrations of radioactive materials and levels of radiation in the environment are not higher than expected when compared against data on the amount of radioactive effluent discharged. As part of its license renewal environmental review, the staff reviews several years of REMP reports to look for adverse data or evidence of a buildup of radioactivity in the environment. The results of the staff's review are discussed in each plant-specific SEIS. In addition to the REMP, the nuclear power industry responded to the multiple events involving the inadvertent releases of radioactive liquids from plant systems and buried piping by committing to the NRC to have site-specific groundwater protection programs (see Sections 3.5.2 and 3.9.1.3 in the revised GEIS for additional information). Each site-specific groundwater protection program was developed based on an assessment of plant systems, components, buried piping, and site hydrology. The program is designed to provide early indication of a leak of radioactive liquid from a plant

system or buried pipe in order for plant personnel to take corrective action. Typically, plants have installed a series of groundwater monitoring wells near the plant systems, components, and buried piping containing radioactive liquids. The NRC monitors the effectiveness of the industry's groundwater protection program as part of its routine radiological inspection program at all nuclear power plants.

Although a number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted, there are no studies to date that are accepted by the scientific community and show a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public. The following is a listing of radiation health studies that the NRC recognizes:

- *In 1990, at the request of Congress, the National Cancer Institute conducted a study of cancer mortality rates around 52 nuclear power plants and 10 other nuclear facilities. The study covered the period from 1950 to 1984, and evaluated the change in mortality rates before and during facility operations. The study concluded there was no evidence that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in populations living nearby.*

- *In June 2000, investigators from the University of Pittsburgh found no link between radiation released during the 1979 accident at the Three Mile Island power plant and cancer deaths among nearby residents. Their study followed 32,000 people who lived within 5 miles (8 kilometers) of the plant at the time of the accident.*

- *The American Cancer Society in 2000 concluded that although reports about cancer clusters in some communities have raised public concern, studies show that clusters do not occur more often near nuclear plants than they do by chance elsewhere in the population. Likewise, there is no evidence that links strontium-90 with increases in breast cancer, prostate cancer, or childhood cancer rates. Radiation emissions from nuclear power plants are closely controlled and involve negligible levels of exposure for nearby communities.*

- *In 2000, the Illinois Public Health Department compared childhood cancer statistics for counties with nuclear power plants to similar counties without nuclear plants and found no statistically significant difference.*

- *The Connecticut Academy of Sciences and Engineering, in January 2001, issued a report on a study around the Haddam Neck nuclear power plant in Connecticut and concluded radiation emissions were so low as to be negligible and found no meaningful associations to the cancers studied.*

- *In 2001, the Florida Bureau of Environmental Epidemiology reviewed claims that there are striking increases in cancer rates in southeastern Florida counties caused by increased radiation exposures from nuclear power plants. However, using the same data to reconstruct the calculations on which the claims were based, Florida officials were not able to identify unusually high rates of cancers in these counties compared with the rest of the State of Florida and the nation.*

On April 7, 2010, the NRC announced that it asked the National Academy of Sciences (NAS) to perform a state-of-the-art study on cancer risk for populations surrounding nuclear power facilities (ADAMS Accession No. ML100970142). The NAS has a broad range of medical and scientific experts who can provide the best available analysis of the complex issues involved in discussing cancer risk and commercial nuclear power plants. The NAS is a nongovernmental organization chartered by the U.S. Congress to advise the nation on issues of science, technology, and medicine. Through the National Research Council and Institute of Medicine, it carries out studies independently of the Government, using processes designed to promote transparency, objectivity, and technical rigor. More information on its methods for performing studies is available at http://www.nationalacademies.org/studycommitteprocess.pdf.

The NAS study will update the 1990 U.S. National Institutes of Health National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities" (NCI 1990). The study's objectives are to: (1) evaluate whether cancer risk is different for populations living near nuclear power facilities; (2) include cancer occurrence; (3) develop an approach to assess cancer risk in geographic areas that are smaller than the county level; and (4) evaluate the study results in the context of offsite doses from normal reactor operations. The study began in the summer of 2010 and is expected to be completed within four years. The revised GEIS contains a discussion on the NRC's sponsorship of this follow-up to the 1990 NCI study.

No changes have been made to the GEIS in response to this comment.

Comment: Page 2-6 to 2-16: Summary of Impacts Associated with License Renewal Under the Proposed Action: Issue Impact (Category 1 - small)

A4NR, et al, agrees with the comments filed by Pilgrim Watch (PW), "issues improperly listed as Category 1 include: Solid Waste Management; Emergency Planning; Human Health, Radiation − exposures to the public & occupational workers and impact from chemicals; Postulated Accidents; Termination of Nuclear Power Plant Operations and Decommissioning." As one example, Human Health; Radiation exposures to the public; Radiation exposures to occupational workers are listed as category 1. And yet the NRC has stated in its own fact sheet: Update to the Report "Cancer in Populations Living Near Nuclear Facilities" (http://www.cancer.gov/cancertopics/factsheet/Risk/nuclear-facilities) that the agency does not expect to have a draft of this report available until 2011, with a completed report to appear later.

Such assumptions about Human Health and Radiation Exposures should not be made until such time as this report has been peer reviewed and made available for public comment. (A4NR-11-18)

Response: *The NRC does not agree that it incorrectly classified the issues cited in the comment as Category 1. The basis for NRC's categorization of the environmental impacts as Category 1 or Category 2 is explained in Section 1.5 of the revised GEIS, and each issue is appropriately evaluated in the GEIS. The issues cited by the commenter were evaluated using technical information and data relevant to the issues and, based on the information, the staff made a conclusion on the appropriate classification and impact. The commenter has provided no information to support its assertion that the NRC incorrectly classified the cited issues. The NRC fact sheet cited by the commenter refers to a study being conducted, at NRC's request, by the National Academy of Sciences (NAS) to study cancer risk in populations living near nuclear power facilities. The NAS study will update a 1990 U.S. National Institutes of Health National Cancer Institute report, "Cancer in Populations Living Near Nuclear Facilities," that concluded there was no evidence that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in populations living nearby. With regard to health impacts of occupational and public exposure, the NRC must make decisions and judgments based on currently available information and, as discussed in the revised GEIS in Section 3.9.1.3, "Public Radiological Exposures," Section 4.9, "Human Health," and Appendix D.8, "Human Health," the currently available information supports the Category 1 designation for occupational and public radiation exposures. As new information on particular issues becomes available, it will be appropriately considered and addressed.*

To the extent that the commenter states agreement with a similar comment from Pilgrim Watch (PW-6-3), the NRC does not agree with the commenter that it has misinterpreted the BEIR VII report and incorrectly classified the impacts to human health from radiation exposure as Category 1. The NRC staff performed a thorough review of the BEIR VII report issued in 2005. As reported to the Commission in SECY-05-0202,[(v)] the staff stated "…that the findings presented in the National Academies BEIR VII report contribute to our understanding of the health risks from exposure to ionizing radiation. The major conclusion is that current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. Therefore, the NRC's regulations continue to be adequately protective of public health and safety and the environment. Consequently, none of the findings in the BEIR VII report warrant initiating any immediate change to NRC regulations or Federal Guidance."

(v) SECY-05-0202 can be accessed at http://pbadupws.nrc.gov/docs/ML0526/ML052640532.pdf.

Further, in 2007, the NRC denied a petition for rulemaking (PRM-51-11; see ADAMS Accession No. ML061770056) which asked the NRC to reconcile its Generic Environmental Impact Statement for nuclear power plant operating license renewal applications with the radiological findings in the BEIR VII report. In denying the petition, the Commission, in SECY-07-0155, stated, "The Commission has approved the staff's recommendation to deny the subject petition for rulemaking, PRM-51-11. The Commission agrees that the NRC's existing regulations continue to be protective of public health and safety and the environment and that none of the findings in the BEIR VII report warrant initiating any immediate change to NRC regulations or guidance."

Based on the above, the NRC's protection standards are adequately protective of public health and safety and the environment. Accordingly, the GEIS has appropriately assessed the radiological impacts to human health as SMALL for this Category 1 issue.

No change has been made to the GEIS as a result of this comment.

Comment: Health Impacts Should Be Designated Category 2, Site-Specific: Health impacts are site specific due to: history of operations, such as the use of bad fuel and above normal releases, as was the case at Pilgrim NPS; demographic characteristics of past and projected population, an increase for example in population groups most susceptible to radiation such as children, women, the elderly; meteorology, for example gravity drainage or plumes over water that can carry radiation to more distant yet heavily populated areas; evidence of radiation-linked diseases in the affected community; proximity to other toxic emitters that could act synergistically with radiation enhancing its impact, a cumulative impact.

In sum, any Petitioner in a license renewal proceeding deserves the opportunity to show any new and significant information that demonstrates that the off-site radiological consequences of another twenty years of operations may be greater than previously thought − evidence that the particular affected population is more susceptible to more radiation-linked damage than was contemplated when the plant was licensed. (PW-6-6)

Response: *Not all human health issues are considered generic (Category 1). The radiological impacts on human health (both to the public and to plant workers) and noise are considered generic (Category 1) issues. However, the impacts of microbiological organisms on public health, under certain facility configurations, and electric shock hazards are considered to be site-specific (Category 2) issues. With regard to the human health conclusions that are considered Category 1, as with all Category 1 conclusions, the review evaluates each application and the site to determine if there is new and significant information that would change the conclusion in the GEIS. New and significant information of in-scope environmental impacts would be considered in a plant-specific SEIS. The details of how the NRC addresses*

new and significant information are discussed in response to comment CEC 9(1)-10. No change was made to the GEIS as a result of this comment.

Comment: I wonder how often the water is tested and how many other nuclear plants are on sites so close to swimming. Maybe somebody -- after the meeting, maybe somebody can tell me that it's common to put nuclear plants close to where people swim. (DPCA-Exelby-30)

Comment: All nuclear facilities vent radioactive isotopes to the public. HEPA filters were originally designed in the 1940s for cleaning the air of radioactive particles but they only achieve a 99.97% success rate (by definition). 3 particles in 10,000 may not sound like a lot, and might have been good enough for The Manhattan Project, but when you are releasing billions of billions of particles every day INTO the filters, it means you are letting a lot of children die in your community DESPITE the filters. And HEPA filters don't work for isolating tritium (a lot more H3 could be removed, but not that way) nor do they do anything to stop the release of the noble gases, which flow right through them. The legal limit for releases of tritium each year by each reactor at San Onofre is about one thirtieth of a teaspoon. Tritium is extremely hazardous, and even this seemingly small amount is way, way too much. And besides, whenever they release more than a thirtieth of a teaspoon, the NRC gives them two special dispensations: One not to say anything, and one not to do anything. (Hoffman-30-2)

Response: *The commenter is correct that nuclear power plants release radioactive material into the environment. However, the radioactive releases are controlled and monitored, and the types and quantities are required to be within the limits imposed by NRC regulations.*

All nuclear plants were licensed with the expectation that they would release some radioactive material to both the air and water during normal operation. NRC regulations require that radioactive gaseous and liquid releases from nuclear power plants be monitored and must meet radiation dose-based limits specified in 10 CFR Part 20, the "as low as is reasonably achievable" (ALARA) dose criteria in Appendix I to 10 CFR Part 50, and the EPA's radiation protection standards in 40 CFR Part 190. These regulations limit the radiation dose that members of the public might receive from radioactive material released by nuclear plants. Nuclear power plants are required to submit an annual report to the NRC on the types and amounts of radioactive gaseous and liquid effluents released into the environment each year. The annual radioactive effluent release reports submitted to the NRC are available to the public through the NRC's ADAMS electronic reading room on the NRC Web site (www.nrc.gov).

The NRC provides continuous oversight of each plant under the NRC's inspection and enforcement programs. The NRC's Reactor Oversight Process integrates the NRC's inspection, assessment, and enforcement programs. The operating reactor assessment program evaluates the overall safety performance of operating commercial nuclear reactors and communicates those results to licensee management, members of the public, and other government agencies. The assessment program collects information from inspections and performance indicators in order to enable the NRC to arrive at objective conclusions about a

licensee's safety performance. Based on this assessment information, the NRC determines the appropriate level of agency response, including supplemental inspection and pertinent regulatory actions ranging from management meetings up to and including orders for plant shutdown. The NRC conducts follow-up actions, as applicable, to ensure that the corrective actions designed to address performance weaknesses are effective.

Tritium is one of the radionuclides released from nuclear power plants. Tritium is a weakly radioactive isotope of hydrogen with a half-life of 12.5 years that decays by emitting a low-energy beta particle (or electron). Tritium is produced in nuclear reactors, but also occurs naturally in the environment due to cosmic rays interacting with atmospheric gases. The most common form of tritium is in water, since both tritium and nonradioactive hydrogen react in the same way with oxygen to produce water. Tritiated water is colorless and odorless. Tritium can also be found in such everyday self-illuminating devices as watches and exit signs. As previously discussed, nuclear power plants control the amount of radioactive effluents released in accordance with NRC regulations.

The commenter's assertion that the NRC gives nuclear power plants "two special dispensations: One not to say anything, and one not to do anything" is false and without basis. As discussed above, the NRC has radiation safety requirements for the protection of the public and an inspection program to ensure nuclear power plants comply with those requirements.

No changes were made to the GEIS in response to this comment.

Comment: During a given year, what percentage of the time does a nuclear reactor operate? I used to hear nuclear reactors were shut down close to half the time, though have heard they might be operating a greater percentage of the time in recent years (of course not including those reactors involved in the throes of steam generator or other replacement of major nuclear power facility components). So, let us use perhaps 40% (or analyze another figure while giving supporting evidence that it is valid) of the time that nuclear reactors are shut down in a given year. So if it operates for 60% of the time in a year, then it operates for about 219 days. One can calculate how many minutes in a 24-hour period (I come out with 1440) and then multiply that amount by 219 (I come out with 315,360 minutes). Even though wind and heat rising and other factors can result in different measurements as far as radioactive emissions within a given minute, but generally I think that is fairly trustworthy to consider a minute as a useful unit to get a good idea of the range of measurements of radioactive emissions in a given day -- meaning it would likely be difficult to hide a certain burp or other larger emission if one measured radioactivity every minute. With the aforementioned in mind, about how many measurements in regard to radioactive emissions does the average or median nuclear power facility submit to the NRC every year? If a given measurement fairly accurately reflects the amounts of radioactive emissions in a given minute, what percentage of minutes during the time a reactor is operating during a year is indicated by those submitted measurements? What kinds of rays/radiation and which radionuclides are usually measured for? Are certain kinds measured more for in the air, while tritium is measured more relating to water and water infiltration and migration?

Seeing that it is likely the utility rather than NRC (let alone an independent entity) who takes such measurements of radioactive emissions, and seeing that in some situations (such as with the "sweetheart" rate deal which Pacific Gas and Electric got from former California Attorney General Van de Kamp) a utility and its private investors make more money the larger percentage the time that the reactor operates. This would tempt some to avoid some repairs in order to maximize profit, and hope that a certain strained component will last until the planned replacement of a couple of other components in the future. Thus, due to that profit motive, a number of utilities are untrustworthy because they are under pressure to maximize profit for their investors. How will the NRC assure that public (and worker) health and safety is respected when the main goal is to make money for investors and the well-paid executives (some of whom having their substantial stock options? (Campbell-31-5)

Comment: Please define for me clean air if a nuclear containment wall leaks? How much can we clean up? Why bother with sure a devastating invention of fuels? (Mack-1-1)

Response: *NRC's statutory mission is to ensure public health and safety and to protect the environment. The profitability of licensees is not a factor for NRC in determining the actions licensees must take to assure protection of the workers, the public, and the environment from harmful effects of radiation.*

Nuclear power reactors routinely release radioactive gaseous and liquid effluents into the environment. These effluents contain radioactive material that gives off alpha and beta particles and gamma rays. Tritium is present in both gaseous and liquid effluents. The NRC requires these effluents to be monitored and controlled in accordance with its radiation protection standards in 10 CFR Part 20. Each nuclear power plant has radiation monitoring instruments and procedures to control the release of these radioactive effluents. If radiation measurements exceed preset limits, alarms warn plant personnel of the problem in order to take action. Each nuclear power plant operator must submit an annual radioactive effluent release report to the NRC summarizing the types and quantities of radioactive materials released into the environment. Based on the type and amount of radioactivity released, the dose to a member of the public is calculated. Radiation doses to members of the public from the current operations of nuclear power plants have been examined in the 1996 GEIS and the revised GEIS from a variety of perspectives (i.e., releases of radioactive gaseous and liquid effluents, radiation from radioactive waste storage buildings, radiological impacts from refueling and maintenance activities, and inadvertent leaks of radioactive liquids), and the impacts were found to be within dose standards specified in NRC's 10 CFR Part 20 and Appendix I to 10 CFR Part 50, as well as EPA's 40 CFR Part 190. Radiation doses are calculated for the maximally exposed individual (MEI) (that is, the real or hypothetical individual potentially subject to maximum exposure). Because there is no reason to expect that radioactive effluents will increase during the license renewal term, doses from continued operation are expected to be within regulatory standards.

In addition to NRC's requirements to monitor radioactive effluents (routine and inadvertent) discharged into the environment, each nuclear power plant is required to have a radiological environmental monitoring program (REMP). The REMP quantifies the environmental impacts associated with radioactive effluent releases from the plant. The REMP monitors the environment over time, starting before the plant operates to establish background radiation levels and throughout its operating lifetime to monitor radioactivity in the local environment. The REMP provides a mechanism for determining the levels of radioactivity in the environment to ensure that any accumulation of radionuclides released into the environment will not become significant as a result of plant operations. The REMP also measures radioactivity from other nuclear facilities that may be in the area (i.e., other nuclear power plants, hospitals using radioactive material, research facilities, or any other facility licensed to use radioactive material). Thus, the REMP monitors the cumulative impacts from all sources of radioactivity in the vicinity of the power plant. To obtain information on radioactivity around the plant, samples of environmental media (e.g., surface water; groundwater; drinking water; air; milk; locally grown crops; locally produced food products; river, ocean, or lake sediment; and fish and other aquatic biota) are collected from areas surrounding the plant for analysis to measure the amount of radioactivity, if any, in the samples. The media samples reflect the radiation exposure pathways (i.e., inhalation, ingestion, and physical location near the plant) to the public from radioactive effluents released by the nuclear power plant and from background radiation (i.e., cosmic sources, naturally occurring radioactive material, including radon and global fallout). The NRC has standards for the amount of radioactivity in the sample media, which, if exceeded, must be reported to the NRC and the licensee must conduct an investigation. The REMP supplements the radioactive effluent monitoring program by verifying that measurable concentrations of radioactive materials and levels of radiation in the environment are not higher than expected when compared against data on the amount of radioactive effluent discharged. As part of its license renewal environmental review, the staff reviews several years of REMP reports to look for adverse data or evidence of a buildup of radioactivity in the environment. The results of the staff's review are discussed in each plant-specific SEIS.

No changes have been made to the GEIS in response to this comment.

Comment: Human Health: Since the GEIS was published in 1996, a number of studies have reported elevated rates and/or risks for cancer experienced by populations residing proximal to nuclear facilities. Many of these studies were completed subsequent to the release of the 1996 GEIS and should have been included in the analysis for the revised GEIS. These studies, we believe, support a finding that human health impacts from radiation should be a Category 2, or site-specific impact.

In particular, elevated rates of leukemia have been observed among populations in England (Gardner *et al.,* 1987), Spain (Silva-Mato *et al.,* 2003) and Germany (Hoffmann *et al.,* 2007; Spix *et al.,* 2008; Kaatsch P, Spix C, Schulze-Rath R, *et al.,* 2008).

The most recent of the above studies involving populations residing in the vicinity of 16 German nuclear power plants (the KiKK study) are among the methodologically strongest studies that have to date been completed (BFS 2007).

The KiKK study included all 16 large reactor locations where 20 nuclear power plants in Germany were in operation during the 24-year period of study (1980 - 2003).

The distance between the children's homes and the power plants was precisely determined to [be] within 25 meters (or approximately 82 feet). The main questions posed by the study were: "Do children under five years of age more frequently develop cancer when living near a nuclear power plant?" and "is there a negative distance trend?" (In other words: is the risk greater the nearer the child lives to the plant?) The results showed not only a 60% increase in the cancer rate and a 117% increase in leukemia in infants within the 5 km radius (or approximately 3 miles), but also a significant increase in the risk of cancer and leukemia the closer one lived to the nuclear power plant.

In the second part of the study, which covered a shorter period of time and a selection of diagnoses (leukemia, lymphomas and tumors of the central nervous system), it was tested whether other risk factors (confounders) could have had any appreciable effect on the main result of the study - the negative distance trend. This proved not to be the case for any of the studied risk factors. The proximity of residence to the nuclear power plant remains the only plausible explanation at this time.

Recently, results were also reported for a comprehensive meta-analysis (Baker and Hoel, 2007) concerning leukemia in children living near nuclear power plants contained in 17 international studies carried out in Germany, Spain, France, Japan and North America during the period between 1984 and 1999. Distance dependent increased risks of 14% - 21% for leukemia in children under nine years of age were observed. When age was expanded to include the population up to 25 years of age, an increased probability of morbidity of 7-10% and increased mortality of 2-18% were observed.

Taken together, these studies are consistent with the hypothesis that children who live near nuclear power plants develop cancer and leukemia more frequently that those living further away. If emissions have been correctly measured by monitoring the areas surrounding nuclear installations, as has been claimed by both the plant operators and the regulatory authorities, then either the currently accepted calculation models for determining radiation exposure of local residents are incorrect, or the biological effects of incorporated radionuclides have been badly underestimated, at least for young children and embryos (human fetuses).

The indications over many years that there are increased levels of morbidity near to nuclear power plants are given added support by results of the KiKK study. The possibility of an

increased risk for older children and adults living near nuclear power plants cannot be ruled out. It is important to point out that the radiation health standards established by BEIR VII are consistent with the above research findings regarding both cancer and non-cancer health outcomes given any level of low dose exposures. Furthermore, the BEIR VII committee also concludes "that the current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose-response relationship between exposure to ionizing radiation and the development of cancer in humans." In other words, there exists general consensus on the radiation health risks by exposure and living near nuclear power plants. Consequently, the most effective mitigation of such risks will rely on either 1) avoiding the area surrounding the plant, or 2) reducing the nuclear energy operational level, or 3) implementing risk management options based on the mechanistic understanding of cancer or non-cancer epidemiology.

A number of studies have observed that risk of leukemia for children under the age of 5 increases with decreasing distance of residence from nuclear power plants in Germany, the United Kingdom and in the United States (Hoffman, *et al.,* 2007 and Kaatsch, *et al.,* 2007).

The KiKK and USC studies are among the strongest methodologically speaking and utilize state-of-the-art epidemiological methods.

The methodology of modeling the continuous distance variables is adequate. Models applied in the studies show good adaptation to the collected data. The models permit an assessment of the incidence risks associated with distance of the home to the nearest nuclear power plant site.

The risk to contract childhood cancer and leukemia significantly and continuously increases with increasing vicinity of the home to a nuclear power plant. The studies are the methodically most elaborate and comprehensive investigation of this interrelation worldwide. The association between vicinity of the home and increased risk of leukemia has been observed repeatedly in well-designed studies in Germany, the USA and UK.

The causal role of ionizing radiation in these studies remains to be investigated using state-of-the-art genomic, molecular and cellular diagnostics and testing technologies that have only recently become available for medical and healthcare research. The estimated exposures are far below those levels that are known to be leukemogenic or carcinogenic. Some of the associations are ecologic in nature, individual dosimetry is lacking and potentially important confounders such as competing risks (exposure and disease), length of residence, etc., are not measured. These factors can and should be further examined in a site-specific (Category 2) analysis for license renewals. (PIIC-8-5)

Comment: I object to the document citing industry studies which apparently conclude that there is no increase in cancers in the vicinity of nuclear power facilities. Please specify the

methodologies related to the study, and inform the public as to whether any such studies have been peer- reviewed. (Campbell-31-2)

Comment: The very same month that the GEIS documents came out, an article came out authored by Rudi H. Nussbaum in the Journal of Occupational Environmental Health July - September 2009 (the article was called "Childhood Leukemia and Cancers Near German Nuclear Reactors: Significance, Context, and Ramifications of Recent Studies") which reviewed the results of a very thorough study with superior study design which was commissioned by the German government called the Epidemiological Study on Childhood Cancer in the Vicinity of Nuclear Power Plants. This article can be found at:

http://www.nirs.org/radiation/radhealth/kikkcommentary0709ijoeh.pdf

The last paragraph of the article on this study concluded that, "The KiKK study points out the need for a critical reexamination of uncertainties, flaws, and inappropriate generalizations in fundamental assumptions and models on which current radiation safety standards and regulations are based. A US government-sponsored case-control study, similar in design to the German KiKK study, would provide invaluable additional data for a sound scientific basis for such a reexamination since there are only minor design variations between US and German nuclear reactors. The KiKK study's ramifications add to the urgency of a policy debate regarding the high toll exacted in public health for nuclear power production." (Campbell-31-3)

Comment: Will the NRC review this German government-commissioned report, as well as other reports in cancers and leukemias in the vicinity of nuclear power reactors, and include them in their risk assessments and other analyses in the final documents on generic matters, and will they be considered at all in more site-specific Category 2 situations? (Campbell-31-4)

Comment: A commenter submitted an Internet article asserting that childhood leukemia mortality rates around U.S. nuclear power plants have been significantly higher than the national average in the past two decades. The article cited the study, "Childhood Leukemia Near Nuclear Installations" (authors Joseph Mangano and Janette Sherman), as the basis for this assertion. The commenter submitted an additional Internet article pertaining to a 1994 law suit filed against Southern California Edison by a nuclear power plant worker suffering from cancer that he alleges he contracted because of his exposure to radiation at San Onofre. A third Internet article submitted by the commenter focused on cancer rates near San Onofre. (Anon2-23-2, Anon2-23-3, Anon2-23-6)

Response: *The NRC has asked NAS to perform a state-of-the-art study on cancer risk for populations surrounding nuclear power facilities. The NRC is aware that, as a part of its review, NAS will consider the German KiKK study in its deliberations on the potential human health effects of radiation from nuclear power plants.*

The NAS has a broad range of medical and scientific experts that can provide the best available analysis of the complex issues involved in discussing cancer risk and commercial nuclear power plants. The NAS is a nongovernmental organization chartered by the U.S. Congress to advise the nation on issues of science, technology, and medicine. Through the National Research Council and Institute of Medicine, it carries out studies independently of the government using processes designed to promote transparency, objectivity, and technical rigor. More information on its methods for performing studies is available at http://www.nationalacademies.org/ studycommitteprocess.pdf.

The NAS study will update the 1990 U.S. National Institutes of Health National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities" (NCI 1990), which concluded there was no evidence that nuclear facilities may be linked causally with excess death from leukemia or from other cancers in populations living nearby. The study's objectives are as follows:

- *Evaluate whether cancer risk is different for populations living near nuclear power facilities.*
- *Include cancer occurrence.*
- *Develop an approach to assess cancer risk in geographic areas that are smaller than the county level.*
- *Evaluate the study results in the context of offsite doses from normal reactor operations.*

The study began in the summer of 2010 and is expected to be completed within four years.

Section 3.9.1.3 of the GEIS has been updated to include a discussion on NRC's sponsorship of this follow-up study to the 1990 NCI study.

The NRC's mission is to protect the public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects of radiation on humans. The limits are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations (International Commission on Radiological Protection [ICRP], National Council on Radiation Protection and Measurements [NCRP], and the National Academy of Sciences [NAS]) and are conservative to ensure that the public and workers at nuclear power plants are protected.

Health effects from exposure to radiation are dose-dependent, ranging from no effect at all to death. Above certain doses, radiation can be responsible for inducing diseases such as leukemia, breast cancer, and lung cancer. Very high (hundreds of times higher than a rem), short-term doses of radiation have been known to cause prompt (or early, also called "acute") effects, such as vomiting and diarrhea, skin burns, cataracts, and even death.

Although radiation may cause cancers at high dose rates and high doses, currently there are no reputable scientifically conclusive data that unequivocally establish the occurrence of cancer following exposure to low dose rates and doses below about 0.1 Sv (10 rem). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and adverse impacts such as incidents of cancer. Simply stated, any increase in dose, no matter how small, results in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably over-estimates those risks. Based on this theory, the NRC conservatively establishes limits for radioactive effluents and radiation exposures for workers and members of the public, as found in 10 CFR Part 20, and 10 CFR Part 50, Appendix I.

The amount of radioactive material released from nuclear power facilities is well measured, well monitored, and known to be very small. The doses of radiation that are received by members of the public as a result of exposure to nuclear power facilities are so low that resulting cancers have not been observed and would not be expected. Although a number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted, there are no studies to date that are accepted by the scientific community that show a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public.

No changes have been made to the GEIS in response to these comments.

Comment: 1. HUMAN HEALTH: NRC incorrectly assigns "small impact" and Category 1 designation to radiation exposures to the public and occupational works at 3-130, contrary to their own definitions, provided in footnote 1.

[[1] July 2009, S-5, NUREG-1437, Rev.1: NRC defines in the Draft small impact as, "Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts do not exceed permissible level in the Commission's regulations are considered small." Moderate impact as, "Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource." Large impact as, "Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource."]

a. Health Impacts Are Mischaracterized By NRC To Be Of Small Impact: NRC incorrectly found health impacts to be small or "so minor" by:

- Misrepresenting the National Academy of Science BEIR VII Report and "cherry picking" current research to avoid acknowledging new and significant research on radiation health effects; and…

(1) Misrepresenting BEIR VII: NRC explains on the basis of a selective NRC staff analysis of BEIR VII (NRC 2005b) (ADAMS accession number ML052640532) that, t*he NRC completed a review of the BEIR VII report and documented its findings in the Commission paper SECY -05-0202, "Staff Review of the National Academies Study of the Health Risks from Exposure to Low Levels of Ionizing Radiation (BEIR VII)," dated October 29, 2005 (NRC 2005b) (ADAMS accession number ML052640532). In this paper, the NRC concluded that the findings presented in the BEIR VII report agree with the NRC's current understanding of the health risks from exposure to ionizing radiation. The NRC agreed with the BEIR VII report's major conclusion that current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the process the NRC uses to develop its standards of radiological protection. Therefore, the NRC's regulations continue to be adequately protective of public health and safety and the environment*.

NRC arrives at the absurd conclusion that "NRC's regulations continue to be adequately protective of public health and safety and the environment" by avoiding discussing BEIR VII's principle and relevant findings (new and significant information); if they had, there is no way that there could be a determination that "NRC's regulations continue to be adequately protective of public health and safety" − that the significance of radiation exposure is "small." What did BEIR VII actually say?

- BEIR VII concludes that if 100,000 people were each exposed to 10,000 millirem (1100) people would get a cancer from the radiation and half of them would die. This is above and beyond the number who would have gotten cancer in the absence of the additional radiation. NRC may think that is a small effect; the families of the cancer victims might think differently.

- The BEIR VII report reaffirmed the conclusion of the prior report that every exposure to radiation produces a corresponding increase in cancer risk. The average risks to the population are estimated to be *10 to 15 percent higher* than the reference value now used for radiation protection of the general population (565 cancer fatalities per million rem exposure in BEIR VII compared to 500 typically cited in the literature on radiation protection). While this average risk is in the general range of uncertainties and values reported previously, it indicates an *increase of mortality risk overall.*

- BEIR VII found *cancer incidence risk* is *considerably greater* − a point ignored by NRC. BEIR VII found cancer incidence risks to be about a third higher than previously presumed in the previous BEIR reports and by agencies such as NRC. Federal Guidance Report 13, prepared with support from NRC, had previously set the cancer incidence risk at 8.76 cancers per 10,000 person-rem. BEIR VII sets it at 11.4.

- Workers: NRC permits doses to workers of 5 rem/per year. A worker who received that dose every year he or she worked, never going over the limit, would receive a dose of 250 /rem. NRC's own risk figures say 1 in 8 workers so exposed would die from cancer induced by that dose. BEIR VII says ~twice that number — ~1 in 4 — would get cancer from that exposure. NRC may say risks of 1 in 4 or 1 in 8 are small; hard to say so with a straight face to the quarter of workers who would get cancer from exposure to the "permissible" dose. Unions should demand hazard pay.

- The Draft ignores BEIR VII's analysis of the effects on women and young children. In 1990, the NAS estimated that the risks of dying from cancer due to exposure to radiation were about five percent higher for *women* than for men. In BEIR VII, the *cancer mortality* risks for females are 37.5 *percent higher.* The risks for all solid tumors, like lung, breast, and kidney, liver, and other solid tumors added together are almost 50 percent greater for women than men, though there are a few specific cancers, including leukemia, for which the risk estimates for men are higher." (Summary estimates are in Table ES-1 on page 28 of the BEIR VII report prepublication copy, on the Web at http://books.nap.edu/books/030909156X/html/28.html.)

- The BEIR VII report estimates that the differential risk for *children* is even greater. For instance, the same radiation in the first year of life for boys produces three to four times the cancer risk as exposure between the ages of 20 and 50. Female infants have almost double the risk as male infants. (Table 12 D-1 and D-2, on pages 550-551 of the prepublication copy of the report, on the Web starting at http://books.nap.edu/books/030909156X/html/550.html).

- While the report states there is no direct evidence of harm to human offspring from exposure of parents to radiation, the committee noted that such harm has been found in animal experiments and that there is "no reason to believe that humans would be immune to this sort of harm." (Page 20, prepublication copy).

- BEIR VII also noted that relatively high levels of radiation exposure increase risk of heart disease and stroke, though it did not give specific risk estimates. The committee also noted children born to parents that have been exposed to radiation could be affected by those exposures and study was warranted.

- In sum, cancer mortality and incidence risk has indeed gone up and there is greater recognition that health effects, other than cancer, must be considered. Therefore "NRC's regulations (do not) continue to be adequately protective of public health and safety and the environment" and the impact cannot be considered "small."

- Further BEIR VII was published prior to more recent studies that demonstrate radiation is far more dangerous than that assumed by the National Academies. These studies were ignored by NRC in the Draft GEIS. (PW-6-3)

Comment: 1. HUMAN HEALTH

a. Health Impacts Are Mischaracterized By NRC To Be Of Small Impact

NRC incorrectly found health impacts to be small or "so minor" by:

- Misrepresenting the National Academy of Science BEIR VII Report and "cherry picking" current research to avoid acknowledging new and significant research on radiation health effects; and…

(2) Health Research Cited in Draft - Problems: Methodologically Flawed & NRC Avoided New & Significant Research

(a) <u>County statistical studies cited in the Draft included</u>: NCI 1990; Florida Department of Health, 2001; Illinois Department of Health 2000 & 2006. Each study compared cancer rates in counties with nuclear reactors to those without nuclear reactors and concluded that there was no impact from the reactors. Obviously the studies were flawed because, for example, they assumed that: counties with reactors and counties without were comparable in all other respects; reactors were located dead center in the county and not closer to the county line so that in fact it impacted an adjacent county more; and that the expected impact affected the whole county and not pockets closer to the reactor. Despite these obvious methodological weaknesses, apparently these studies gave the "right answer" for NRC Staff to decide to include them in the Draft.

(b) <u>Significant Studies that concluded an impact from exposure were not mentioned in the Draft where NRC is obligated in its rulemaking to review pertinent new information</u>. For example:

- Elizabeth Cardis, "Risk of cancer risk after low doses of ionizing radiation: retrospective cohort study in 15 countries." *British Medical Journal* (2005) 331:77. Cardis published the largest study of occupational radiation exposures ever conducted. It found, by examining nuclear workers in 15 nations, cancer induction per unit dose is about 6 times higher than currently assumed by EPA and NRC; and similar findings recently were

reported in the Techa River cohort (Krestina et al (2005).[3] Both studies give similar values for low dose, protracted exposure, namely (1) cancer death per Sievert (100 rem). In the United States a series of other occupational studies, including several from the Department of Energy's Santa Susana Field Laboratory, Oak Ridge, and Hanford nuclear facilities, suggest current agency risk estimates may be low by as much as an order of magnitude.

[[3] Krestinina LY, Preston DL, Ostroumova EV, Degteva MO, Ron E, Vyushkova OV, et al. 2005. Protracted radiation exposure and cancer mortality in the Techa River cohort. Radiation Research 164(5): 602-611.]

- Kaatsch P, Spix C, Schulze-Rath R, et al., *Leukaemia in young children living in the vicinity of German nuclear power plants,* Int. J Cancer. 2008; 1220:721-726. A government-sponsored study of childhood cancer in the proximity of 16 German commercial nuclear power plants (German acronym KiKK) found that children < 5 years living < 5 km from the plants had twice the risk for contracting leukemia as those residing > 5 km. The study was very large: it examined 593 under-fives with leukaemia and 1766 controls. The study was consistent with other European childhood leukemia studies and radiation exposure.[4]

  [[4] Baker PJ, Hoel DG. Meta-analysis of standardized incidence and mortality rates of childhood leukemia in proximity to nuclear facilities. Eur J Cancer Care. 2007; 16:355-363; Fairlie I. J Radiol Protect. 2007; 27: 157-168; CERRIE. Report of the Committee Examining the Radiation Risks of Internal Emitters. Chilton: Health Protection Agency, 2004. www.cerrie.org
  Guizard, Boutou O, Pottier D, et al. The incidence of childhood leukaemia around the La Hague nuclear waste reprocessing plant (France): a survey for the years 1978-1998. J Epidem Comm Health. 2001; 55(7): 469-480]

- Southeastern Massachusetts Health Study [published in the Archives of Environmental Health, Vol. 51, p.266, July-August 1996] found a four-fold increase in adult leukemia the closer one lived or worked to the Pilgrim NPS. (PW-6-4)

Comment: Now we can get down to human health that should be a category two issue just because, in this, I'm sorry, when I read those two books, see this is why I have glasses, I went up to 2.5 actually but when I read through them, I said, you know, who wrote this? This is a PR piece for the industry. This is, you know, relax, be happy everybody, we are the friend atom. You do mention that you did read BEIR 7, but I guess it didn't say the right things because you blew it off as, oh well, that essentially said the same thing as BEIR 5.

Well I don't know, I must have read a funny BEIR 7, but it said three times more damaging were the effects than they had decided in BEIR 5. That sounded significant to me. It also talked about the increased damage to women, small children. It also talked about, hey, let's just not talk about cancer, let's get into research that is looking at other diseases, not just cancer and birth defects and reproductive disorders, let's add the heart and a few other things.

Well it's clear, and it's very clear, that there has been new and significant information by --. I always thought the National Academy of Sciences were a reputable group, they weren't raving anti-nuclear people, to the best of my knowledge, and the fact that that information is not being considered, there is something wrong with that. And there is something wrong in not then going further, hey, are there demographic characteristics around some sites that would fit into a great susceptibility, number two? (NMA-PW-10)

Response: *The NRC does not agree with the comments that it has misinterpreted the BEIR VII report and incorrectly classified the impacts to human health from radiation exposure. The NRC staff performed a thorough review of the BEIR VII report issued in 2005. As reported to the Commission in SECY-05-0202,[w] the staff stated "…that the findings presented in the National Academies BEIR VII report contribute to our understanding of the health risks from exposure to ionizing radiation. The major conclusion is that current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. Therefore, the NRC's regulations continue to be adequately protective of public health and safety and the environment. Consequently, none of the findings in the BEIR VII report warrant initiating any immediate change to NRC regulations or Federal Guidance."*

Further, in 2007, the NRC denied a petition for rulemaking (PRM-51-11; see ADAMS Accession No. ML061770056) which asked the NRC to reconcile the 1996 GEIS with the radiological findings in the BEIR VII report. In denying the petition, the Commission, in its staff requirements memorandum, SRM-SECY-07-0155,[x] stated, "The Commission has approved the staff's recommendation to deny the subject petition for rulemaking, PRM-51-11. The Commission agrees that the NRC's existing regulations continue to be protective of public health and safety and the environment and that none of the findings in the BEIR VII report warrant initiating any immediate change to NRC regulations or guidance."

Based on the above, the NRC asserts that its radiation protection standards are adequately protective of public health and safety and the environment. Accordingly, the GEIS has appropriately assessed the radiological impacts to human health as SMALL for this Category 1 issue.

The NRC's mission is to protect the public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects (i.e., cancer and other biological impacts) of radiation on humans. The limits are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations (International Commission

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(w) SECY-05-0202 can be accessed at http://pbadupws.nrc.gov/docs/ML0526/ML052640532.pdf.
(x) SRM-SECY-07-0155 can be accessed at: http://www.nrc.gov/reading-rm/doc-collections/commission/srm/2007/2007-0155srm.pdf.

on Radiological Protection [ICRP], National Council on Radiation Protection and Measurements [NCRP], and the National Academy of Sciences [NAS]) and are conservative to ensure that the public and workers at nuclear power plants are protected. The NRC actively participates and monitors the work of these organizations as well as some of the radiation health studies conducted in the United States and internationally to keep current on the latest trends in radiation protection. The GEIS did not review the studies cited in the Pilgrim Watch comment.

The 1996 GEIS and the revised GEIS contain thorough and comprehensive discussions on NRC's radiation protection requirements and the potential risks to plant workers and members of the public from exposure to radiation from nuclear power plants during the period of license renewal. Based on its evaluation, the GEIS concluded that the impacts were SMALL.

In 2009, the Commission, in its staff requirements memorandum, SRM-SECY-08-0197,[(y)] directed the staff to engage stakeholders and interested parties to initiate development of the technical basis for possible revision of the NRC's radiation protection regulations, as appropriate and where scientifically justified, to achieve greater alignment with the 2007 recommendations of the ICRP contained in ICRP Publication 103. In SRM-SECY-08-0197, the Commission stated that it agreed "with the staff and the Advisory Committee on Reactor Safeguards (ACRS) that the current NRC regulatory framework continues to provide adequate protection of the health and safety of workers, the public, and the environment. From a safety regulation perspective, ICRP Publication 103 proposes measures that go beyond what is needed to provide for adequate protection. This point should be emphasized when engaging stakeholders and interested parties, and thereby focus the discussion on discerning the benefits and burdens associated with revising the radiation protection regulatory framework."

In conclusion, the current NRC regulatory framework continues to provide adequate protection of the health and safety of workers, and the public. Accordingly, the GEIS has appropriately assessed the radiological impacts to human health as SMALL for this Category 1 issue.

No changes have been made to the GEIS in response to these comments.

Comment: Page 3-140, lines 16 to 18: Text in lines 16 to 18 on page 3-140 reads as follows:

For purposes of evaluating the impacts of license renewal, the transmission lines of concern are those lines that currently connect the nuclear plant to the regional electrical distribution grid and that would remain energized only if the plant's operating license was renewed.

(y) SRM-SECY-08-0197 can be accessed at: http://www.nrc.gov/reading-rm/doc-collections/commission/srm/2008/2008-0197srm.pdf.

On page 3-3 in lines 38 and 39, the draft updated GEIS states that "only those transmission lines that connect the plant to the switchyard are considered within the scope of [the updated GEIS] review." On page 3-24 in lines 6 to 11, the draft updated GEIS states "Power-transmission systems associated with nuclear power plants and considered within the scope of this review consist of switching stations (or substations) usually located on the plant site and the transmission lines that connect the plant to those substations. These systems are required to transfer power from the plant to the utility's network of power lines in its service area (the regional electrical distribution grid)." Consistent with the observation on page 3-24 that "in most cases, the transmission lines originating at the power plant substations are no longer owned or managed by the nuclear power plant licensees," consider modifying the sentence in lines 16 through 18 on page 3-140 as follows for consistency with the above-quoted statements regarding the scope of the GEIS update with respect to transmission lines (~~strikethrough~~ font = deletion; *italics* font = addition):

For purposes of evaluating the impacts of license renewal, the transmission lines of concern are those lines that *(1) would only remain energized if NRC renewed the nuclear plant's operating license and (2)* currently connect the nuclear plant to the *switchyard where the electric voltage is stepped up and fed into* the regional electrical distribution grid ~~and that would remain energized only if the plant's operating license was renewed~~. (NEI1-7(4)-71)

Comment: Page 3-143, lines 14 to 21: Text in lines 14 to 21 on page 3-143 reads as follows:

With respect to shock safety issues and license renewal, three points must be made. First, in the licensing process for the earlier licensed nuclear plants, the issue of electrical shock safety was not addressed. Second, some plants that received operating licenses with a stated transmission line voltage may have chosen to upgrade the line voltage for reasons of efficiency, possibly without reanalysis of induction effects. Third, since the initial NEPA review for those utilities that evaluated potential shock situations under the provision of the NESC, land use may have changed, resulting in the need for a reevaluation of this issue. Electrical shock potential is minimized for transmission lines that are operated in adherence with the NESC.

Consider amending the paragraph quoted above (lines 14 through 21 on page 3-143 of the draft updated GEIS) because the information it presents is not consistent with statements on pp. 3-3 (lines 35 to 41) and 3-24 (lines 20 to 21) in the draft updated GEIS regarding the scope of environmental review for transmission lines during the license renewal process for nuclear power plants. (NEI1-7(4)-72)

Comment: Page 4-152, lines 4 to 19: Text in lines 16 to 19 on page 4-152 reads as follows:

> Without a review of the conformance of each nuclear plant's transmission lines with NESC criteria, it is not possible to determine the significance of the electrical shock potential

generically; it could be small, moderate, or large. The impact of this hazard is a Category 2 issue.

The information provided in lines 4 to 19 on page 4-152 should be expanded to explain the scope of the GEIS update with respect to transmission lines, as presented on pp. 3-3 (lines 35 – 41) and 3-24 (lines 20 – 21). (NEI1-7(4)-27)

Response: *The text of Sections 3.9.5.2 and 4.9.1.1 of the GEIS have been modified in response to these comments to make the discussion of transmission line scoping consistent with other sections of the GEIS.*

Comment: Page 4-142, lines 6 to 9: Text in lines 6 to 9 on page 4-142 reads as follows:

Major changes in the operation of the cooling system are not expected during the license renewal term, so no change in the effects of biocide discharges on the quality of the receiving water is anticipated. Any such changes would require a separate NEPA review that would include an examination of human health effects.

Clarification is needed regarding the above-quoted statement that a separate NEPA review for human health effects would be required if major changes were made in the operation of the cooling system at a nuclear power plant. It is not clear why NRC staff believes that a NEPA review would be necessary for this type of operational change. It should be noted that changes in chemicals, including biocides, used on site that are subsequently discharged to the environment would require modification to the site's NPDES permit. The NPDES permitting process involves a review of the environmental impacts. (NEI1-7(4)-26)

Response: *The commenter is correct that clarification is needed. While major changes in cooling water system operations (e.g., those affecting the plant's licensing basis and triggering a license amendment) would certainly require a separate NEPA review, other changes such as proposed use of different cooling water treatment chemicals may not. Additionally, proposed changes in the use of cooling water treatment chemicals would separately require review and possible modification of the plant's NPDES permit by the permit-issuing authority, including review of possible health effects. Section 4.9.1.1.2 of this GEIS has been revised to make this distinction.*

Comment: EMFs: Health impacts from electromagnetic fields are discussed on pages 4-146 to 4-150. The issue remains a "NA" Category. The statement, "Because of inconclusive scientific evidence, the chronic effects of EMF are considered uncertain, and currently, no generic conclusion on human health impacts is possible" leads us to think that the NRC will err on the side of caution and continue to evaluate this issue on a site-specific basis.

The statement on line 26 of page 4-150, that "If the NRC finds that the appropriate Federal health agencies have reached a consensus that there are adverse health effects, all future license renewal applicants will have to address the health effects in the license renewal process," however, seems to suggest that the NRC has already determined that there are no health impacts from EMF's.

Since there is no scientific consensus on whether human health is compromised, there is NO assurance that there are NO adverse health effects (i.e., chronic health effects, increased risks to cancer). In fact, the United States EPA's Office of Radiation and Indoor Air offers only two recommendations for people who want to protect themselves from possible risks from power lines to reduce their exposure: "[i]ncreasing the distance between you and the source" and "[l]imiting the time spent around the source." *(See* "Electric and Magnetic Field (EMF) Radiation from Power Lines," available at www.epa.gov/radtown/power-lines.html). This does not seem to be a viable solution for the public.

We recommend that the scope of every SEIS include a discussion of specific health impacts to members of the public resulting from exposure to electromagnetic energy and radiation emanating from the transmission lines. (PIIC-8-9)

Response: *The potential effects of electromagnetic fields (EMFs) are discussed in Section 4.9.1.1. The GEIS discusses the results from several health studies managed by the U.S. Department of Energy (DOE) and the National Institute of Environmental Health Sciences (NIEHS). The NIEHS released a report that concluded that the health risk from exposures from low-level electromagnetic fields is weak. Further, NIEHS expressed an opinion that such a weak finding is insufficient to warrant aggressive regulatory concern. The GEIS concludes that because of inconclusive scientific evidence, the chronic effects of EMF are considered uncertain, and currently no generic conclusion on human health effects is possible. The NRC will continue to monitor the research initiatives—both those within the national EMF program and others internationally—to evaluate the potential carcinogenicity of EMF as well as other progress in the EMF study disciplines. If the NRC finds that the appropriate Federal health agencies have reached a consensus on the potential human health effects from exposure to EMF, the NRC will revise the GEIS to include the new information and determine what to require of all future license renewal applicants. No changes were made to the GEIS in response to this comment.*

Comment: a. Health Impacts Are Mischaracterized By NRC To Be Of Small Impact

NRC incorrectly found health impacts to be small or "so minor" by:

- Incorrectly assuming that reported releases are accurate and reliable. NRC assumed that monitoring releases into the air and water on site and environmental sampling offsite

is "state-of-the art" and provides an accurate record of what is released in order to determine that impacts do not exceed permissible level in the Commission's regulations and are therefore small:

(3) Monitoring Releases Into The Air And Water Onsite And Environmental Sampling Offsite – Unreliable So That Health Impact Cannot Be Determined By Applicant's Emission Data: Neither the NRC, licensee nor the public knows for certain what is released into the air and water from reactors to say, as the Draft incorrectly does say, that releases are within limits and therefore have no negative impacts. The NRC knows what we say is true. For example, in the *Liquid Radioactive Release Lessons Learned Task Force Final Report,* September 1, 2006[5] NRC says that,

[[5] Liquid Radioactive -:Release Lessons Learned Task Force Final Report, September 1, 2006, NRC http ://www.nrc.gov/reactors/operating/ops-experience/grndwtr-contam-tritium.html]

"[The Branch Technical Division]...*does not require ground water monitoring* within the licensee's site for general detection and monitoring purposes. Ground water monitoring within the licensee's site is only required if the ground water is tapped for drinking or irrigation purposes." P. 18 [Emphasis added]

"The radiation detection capabilities specified in the [branch technical position] are the 1970's state-of-the-art for routine environmental measurements in Laboratories. More sensitive radiation detection capability exists today, but there is no regulatory requirement for the plants to have this equipment. The guidance primarily focuses on gamma isotopic analysis of environmental material and on tritium in water samples. There are minimal requirements for analyzing environmental samples for beta- and alpha-emitting radionuclides." P. 18 [Emphasis added]

"The regulatory guidance provides built in flexibility in the scope of the REMP. It…allows licensees to reduce the scope of and frequency of the sampling program, without the NRC approval, on historical data…. if a licensee's environmental samples have not detected licensed radioactive material in several years, then the licensee typically reduces the scope and sample frequency of the associated environmental pathway. *NRC inspections have observed reductions in the scope and frequency of licensee programs…"* p.19 [Emphasis added]

Reactors are not required to have real-time combination radiation/meteorological monitoring stations (measuring high and low let alpha and beta, in addition to gamma) located in appropriate offsite communities, placed according to meteorological studies, and computer linked to the NRC, state Departments of Public Health, and available on line to the public.

Only with such a requirement would there be "reasonable assurance" that releases were within allowable limits; and would there be real and reliable data to look backwards to determine a link between any evidence of pockets of radiation-linked disease and the reactor.

Only with real-time monitors, as described, would NRC then be qualified to determine the impact of releases. (PW-6-5)

Response: *The NRC does not agree with the comment. The comment refers to recommendations made by the NRC staff in the Liquid Radioactive Release Lessons Learned Task Force Final Report, dated September 1, 2006 (ADAMS Accession No. ML062650312). It is important to note that the task force's review was focused on the unplanned and unmonitored or inadvertent releases of radioactive liquids into the groundwater from plant systems, components, and buried piping, not the well-established routinely monitored effluent pathways from each nuclear power plant.*

As stated in the task force report: "The most significant conclusion of the task force regarded public health impacts. Although there have been a number of industry events where radioactive liquid was released to the environment in an unplanned and unmonitored fashion, based on the data available, the task force did not identify any instances where the health of the public was impacted."

Additionally, the task force concluded, "There is an extensive list of NRC regulations which provide a framework to ensure that the public health is protected from the release to the environment of licensed radioactive material. This regulatory framework has generally been successful in limiting public radiation doses to below the ALARA guidelines (less than 3 mrem per year due to liquid releases)."

The recommendations contained in the task force report cited by the commenter were designed to focus the staff's evaluation of its regulatory guidance for potential improvements in radioactive effluent and environmental monitoring to address the inadvertent releases of radioactive liquids into the groundwater.

The NRC's safety regulations are based on the Atomic Energy Act of 1954, as amended, and require a finding of reasonable assurance that the activities authorized by an operating license can be conducted without endangering the health and safety of the public, and those activities will be conducted in compliance with the NRC's regulations.

The NRC provides continuous oversight of each plant under the NRC's inspection and enforcement programs. The NRC's Reactor Oversight Process integrates the NRC's inspection, assessment, and enforcement programs. The operating reactor assessment program evaluates the overall safety performance, including the release of radioactive effluents,

of operating commercial nuclear reactors and communicates those results to licensee management, members of the public, and other government agencies. The assessment program collects information from inspections and performance indicators in order to enable the agency to arrive at objective conclusions about a licensee's safety performance. Based on this assessment information, the NRC determines the appropriate level of agency response, including supplemental inspection and pertinent regulatory actions ranging from management meetings up to and including orders for plant shutdown. The NRC conducts follow-up actions, as applicable, to ensure that the corrective actions designed to address performance weaknesses were effective.

The NRC has requirements to ensure adequate protection of public health and safety through design, construction, operation, maintenance, modification, and quality assurance measures. Consistent with that purpose, enforcement actions have been used as a deterrent to emphasize the importance of compliance with these requirements and to encourage prompt identification and prompt, comprehensive correction of violations. The NRC enforcement program supports the overall safety mission in protecting the public health and safety and the environment. The enforcement program: (1) assesses the significance of individual inspection findings and events, (2) formulates the appropriate agency response to these findings and events, (3) emphasizes good performance and compliance, (4) provides incentives for performance improvement, and (5) provides public notification of the NRC's views on licensees' performance and actions.

Radiological monitoring and inadvertent liquid radioactive releases are discussed in Section 3.9.1.3 of the revised GEIS. Each nuclear power plant is responsible for the control and monitoring of its radioactive effluent releases in accordance with NRC requirements. In accordance with NRC regulation, 10 CFR Part 50.36a, each plant is required to report on an annual basis the types and quantities of radioactive material released from its facility. This information, as well as each plant's radioactive effluent control program (i.e., plant equipment, operating procedures, personnel and training records), is reviewed by NRC personnel during the periodic radiation protection inspections. The NRC considers this process adequate to ensure radioactive effluents are appropriately controlled.

Based on the above, the NRC asserts that its radiation protection standards are adequately protective of public health and safety and the environment. Accordingly, the GEIS has appropriately assessed the radiological impacts to human health as SMALL for this Category 1 issue.

No change was made to the GEIS in response to this comment.

Comment: Does the NRC recognize the conclusion by Dr. John Gofman first made in the 1960s which declared that there is no safe level of radiation? If not, why not? Thus, even if no emissions exceeded "design basis", would not his scientific conclusion indicate that there would be deleterious impacts from exposure to radiation even if it is within some formal or legal radiation emission level? (Campbell-31-11)

Response: *The NRC's mission is to protect public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects of radiation on humans. The limits are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations (International Commission on Radiological Protection [ICRP], National Council on Radiation Protection and Measurements [NCRP], and the NAS) and are conservative to ensure that the public and workers at nuclear power plants are protected.*

Health effects from exposure to radiation are dose-dependent, ranging from no effect at all to death. Although radiation may cause cancers at high doses, currently there are no reputable scientifically conclusive data that unequivocally establish the occurrence of cancer following exposure to low doses below about 0.1 Sv (10 rem). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and adverse impacts such as incidents of cancer. Simply stated, any increase in dose, no matter how small, results in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably overestimates those risks. Based on this theory, the NRC conservatively establishes radiation dose limits, in 10 CFR Part 20 and 10 CFR Part 50, Appendix I, to ensure adequate protection of workers and members of the public.

A recent report by the National Research Council (2006), BEIR VII Phase II, "Health Risks from Exposure to Low Levels of Ionizing Radiation," supports the linear, no-threshold dose risk model. This model suggests that the risk of cancer proceeds in a linear fashion at lower doses without a threshold and that the smallest dose has the potential to cause a small increase in risk to humans. As previously discussed, the NRC accepts and uses the linear, no-threshold dose model for its radiation protection standards. The BEIR VII report is discussed in Section 3.9.1.4 of the revised GEIS.

NRC provides oversight of all licensed commercial nuclear reactors to ensure that the dose to members of the public from radioactive releases is within the established limits. NRC regulations require that radioactive gaseous and liquid releases from nuclear power plants be monitored and must meet radiation dose-based limits specified in 10 CFR Part 20, the "as low

as is reasonably achievable" (ALARA) dose criteria in Appendix I to 10 CFR Part 50, and the EPA's radiation protection standards in 40 CFR Part 190. These regulations limit the radiation dose that members of the public might receive from radioactive material released by nuclear plants. Nuclear power plants are required to submit an annual report to the NRC on the types and amounts of radioactive gaseous and liquid effluents released into the environment each year. The annual radioactive effluent release reports submitted to the NRC are available to the public through the NRC's ADAMS electronic reading room on the NRC website (www.nrc.gov).

No change was made to the GEIS in response to this comment.

A.2.1.10 Comments Concerning Uranium Fuel Cycle and Waste Management

Comment: The law in California forbids the building of new nuclear power plants until such time as there exists a Federal Government repository for high-level nuclear waste. There is no repository at the present time and there is no program at this time to find a repository for nuclear waste. (DPCA-UNASFV-3)

Response: *The proposed action described in the GEIS does not involve building new plants, but rather renewal of licenses for existing plants. For license renewal actions, the Commission is aware that a high-level nuclear waste repository may not be available. As an interim measure to the disposal of spent nuclear fuel and other high-level nuclear waste in a repository, the Commission has considered the storage of spent nuclear fuel on reactor sites where it is generated. The impacts associated with onsite storage of spent nuclear fuel are discussed in Section 4.11.1 of the GEIS. Onsite storage of spent nuclear fuel during the license renewal term is a Category 1 issue. No changes were made to the GEIS in response to this comment.*

Comment: For many, many years, I was the Director of the Alliance for Survival here in Orange County and I testified in front of the NRC and Edison at a number of different hearings over the years and in many ways, this is deja vu. It could have been what is going on here today 25 years ago, 20 years ago, 15 years ago. We were discussing the same thing. What can we do with the waste? How do we take care of the waste? We still don't have the answer. (DPCA-Pack-42)

Response: *Current practices in waste management at existing nuclear power plants are discussed in Section 3.11 of the GEIS. Environmental consequences and mitigation actions for waste management that are associated with license renewal are discussed in Sections 4.11 and 4.12 of the GEIS. As discussed in the aforementioned sections, there are feasible methods for managing all waste types generated at the reactor sites and at associated nuclear fuel cycle facilities. No changes were made to the GEIS in response to this comment.*

Comment: So I'm concerned about nuclear power and its poor track record, and the abominable idea of long-term storage of nuclear waste on our pristine coast, turning it into a biohazard dump and a terrorist target. (PBCA-Biesek-40)

Comment: You also made the assumption that things have been a certain way, and so there's the, kind of the assumption that it's sort of okay then. It's not okay. There were things that were done, that were not right when they were done. And I'll give you, for example, very clearly, the area where the dry cask storage is at Diablo Nuclear Power – Power -- Diablo Nuclear Power Plant. Sorry. I still get nervous, so bear with me.

When that came up, we heard time and time again how safe it was, that this site was determined to be safe. Of course this is post 9/11, and you've got your dry casks sitting in full view of the ocean.

Now there's not too many people who are going to "buy" that that would be where you would put it, if you had your choice, with all the other acreage that's available.

So the question has to be asked, and was asked, and totally ignored -- Why was it put there? The reason? That was the left-over piece from when the plant was initially [sited]. So it was covered in the full EIR and PG&E did not want to spend the money to do a full-blown EIR on a other part that was not covered, initially.

That's how you got the safety, was because that was the little corner that was left over from the original footprint. That does not define safety for any of us. (PBCA-Pinard-16)

Comment: Deal with it or do NOT produce it. Storage on site is NOT properly dealing with it.

<u>Finding spot for N-waste</u>.

To the Editor:

I was arrested in front of Diablo Canyon Power Plant in 1978 because they did not know what they were going to do with their nuclear waste.

Nipomo is downwind of Diablo. I do not consider storage on site next to two earthquake faults an intelligent answer.

I suggest these casks of the nuclear waste be placed in the backyards of NRC and Diablo. This will disperse the problem and give the big shots a chance to actually solve the problem they created by permitting Diablo to exist. (Denneen-22-1)

Response: *The NRC addressed the safety and environmental aspects of the dry cask spent fuel storage facility at Diablo Canyon, including a potential terrorist attack, during its review and licensing of Diablo Canyon's ISFSI facility. The impacts associated with onsite storage of spent nuclear fuel at nuclear power plant sites during the license renewal term are discussed in Section 4.11.1.2 of the GEIS.*

Storage of spent fuel at public places as suggested by one of the commenters is not a feasible option. No change was made to the GEIS as a result of this comment.

Comment: Incidentally, this, this -- Peg was talking about how the dry casks are not [very] safe, the storage area for the dry casks is not very safe. The only thing I wanted to add to that, Peg, is that they're also right under the high-power lines, which sometimes spark, you know. (PBCA-Groot-39)

Response: *ISFSIs that use dry casks for storage of spent fuel must comply with NRC's safety requirements in 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." As such, appropriate safety concerns for ISFSIs are addressed in the regulation and must be followed by the licensee. Subpart H, "Physical Protection," of 10 CFR Part 72 addresses the physical protection requirements for the physical security and safeguards of the ISFSI. In addition, Subpart E, "Siting Evaluation Factors," requires a licensee to investigate and assess site characteristics that may affect the safety or environmental impact of the ISFSI. Specifically, the ISFSI must be examined with respect to the frequency and the severity of external natural and man-induced events that could affect the safe operation of the ISFSI. Thus, if an ISFSI were to be built under electric transmission lines, the licensee's evaluation would have to include the potential impact to the storage casks from the power lines to ensure that it would not affect the safe operation of the ISFSI. No change was made to the GEIS in response to this comment.*

Comment: Just one quick example, cost. We ask what does it cost? We've heard that the League. They were asked the question by the Energy Commission. Predict for us please the future of the uranium fuel cycle in terms of cost and availability and PG&E provided a five-page detailed footnoted researched answer of various factors which concluded they predict a global problem In uranium supply and cost by the year 2015.

Edison's answer was much simpler. It was less than -- well, it was only one sentence. We see no foreseeable problem in the future.

Okay. Now, you have the two major default utilities in the state providing completely diametrically opposed answers to the State's Energy Commission. The State Energy Commission has now the cold fact before them and said explain. (DPCA-A4NR2-40)

Comment: Availability of Uranium Fuel Should Be Addressed: Optimistic projections of the availability of uranium fuel supplies show that resource running out in about 2020 − BEFORE the period at stake in the possible Diablo license extensions. [See December 1, 2009 publication of an article by Brian Wang titled "Uranium Supplies are Likely to be Adequate until 2020," available at www.theoildrum.com/]. If this is true, all nuclear plants in the country will be affected. SLOMFP advocates that the industry apply its considerable resources toward establishing renewable sources of energy. (SLOMFP-13-4)

Response: *Uranium is an element found in soils and rocks around the world. Its availability is more of an economic consideration for the licensees than is physical availability. The NRC does not consider the economic factors affecting the licensees in making its licensing decisions regarding license renewal. No changes were made to the GEIS in response to this comment.*

Comment: Someone needs to point out that we are failing. We're failing on many levels. Let me give you your report card to the nuclear industry, the NRC, and nuclear technology, in general.

Stewardship of the land. Building a nuclear power plant that is not sustainable is outright ludicrous. We are, in essence, benefiting from this power, here, in 2009, and leaving it up to umpteen future generations to maintain our waste until the year 5009, 10009, 12,009. This is unprecedented in the history of mankind, and I do not think we have the right to steal from future generations and expect them to maintain our hazardous wastes. (PBCA-Biesek-44)

Response: *The NRC is committed to ensuring that both spent nuclear fuel and low-level radioactive wastes are managed to prevent health impacts to the public. Spent nuclear fuel is currently stored at reactor sites in the spent fuel pools and/or in independent spent fuel storage installations (ISFSIs). This practice is expected to continue until DOE is ready to take possession of the spent nuclear fuel. At this time, it is uncertain when this will happen.*

Interim storage needs vary among plants, with older units having less available pool storage capacity than newer ones. However, given the uncertainty as to when a geologic repository will open and lack of other options, it is likely that some sort of expanded spent fuel storage capacity beyond the original design capacity will be needed at all nuclear power plants. The impacts associated with onsite storage of spent nuclear fuel during the license renewal term are discussed in Section 4.11.1.2 of the GEIS.

No change was made to the GEIS in response to this comment.

Comment: The same goes for low level waste [see identifier NMA-PW-8 for the related comment]. Why should that be a category two issue? Because, number one, not every reactor site is in a state that's a member of a compact. Massachusetts is not a member of a compact.

There is no room at the inn in Barnwell for us, so we will be storing that on a receding coastline overlooking Cape Cod Bay, number one.

Number two, as pointed out by R.J. Machagianni's group, the Institute of Environment and Energy Research, that low level waste, there is nothing low about it. It is categorized low simply because of where it comes from, not because of the toxicity or the longevity of the waste, and so each reactor site has a unique geographic location, if you will, which could make it more or less susceptible to environmental concerns. There would be a different amount of waste that would be required to be on site and to then blow it off as well we have rules that determine whether it is safely stored or not then gets you down to another layer up to these rules that don't even make any sense anyway.

There should be an opportunity to adjudicate these issues, which you have not allowed, again, based upon new and significant information. (NMA-PW-9)

Comment: Solid Waste Management**:** The impacts on low-level waste (LLW) storage and disposal are expected to be small at all nuclear plants. The comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that the radiological impacts on the environment would remain small during the term of a renewed license. This is a category 1 issue. 1 July 2009 S-17 NUREG-1437, Revision 1

With the closure of the Barnwell LLW facility in South Carolina and the availability of other low level waste disposal limited to those reactors already in contractual compacts, the volume of LLW accumulating and stored at reactor sites could grow beyond the anticipated design strategies. Regardless of whether the NRC or the nuclear utilities had hoped for or wished for more LLW storage facilities to be available at this time on a national level, they have failed to materialize, and the communities in which this waste will be stored may find the quantities growing beyond the initial plan. Therefore, these should be moved to Category 2 site specific issues. (A4NR-11-36)

Comment: The impact of on site storage of "low level radioactive waste" such as septic sludge, radioactive sand and soils, and other contaminants must be evaluated and open to public comment. (Shaw-15-3)

Comment: Inadequate Assessment of Nuclear Waste Storage Impacts - Low-Level Waste Storage and Disposal: The Revised GEIS recognizes that the Barnwell disposal facility in South Carolina has stopped accepting waste from States that are not part of the Atlantic compact as of July 2008.[96] The Revised GEIS further acknowledges the difficulty this poses to the 36 States who now have limited options for disposal of low-level waste. And yet, the NRC proposes to once again generically dispose of this as Category 1 issue. However, in light of the closure of the aforementioned disposal facility, it should be incumbent on licensees to perform a site-

specific assessment of the environmental impacts of the accumulating volumes of low-level waste, which may now have to remain onsite on a long-term basis. Accordingly this should be re-categorized as a Category 2 issue.
[[96] Revised GEIS at 4-165.] (Riverkeeper-20-16)

Comment: I object to the dismissal in the documents of the impacts from "low-level" radioactive waste. The documents must admit that so-called "low-level" waste sometimes has as hot and long-lived waste as "high-level" waste because if high-level waste is spilled, it is my recollection that it and the materials involved with cleanup are then declared "low-level" radioactive waste. (Campbell-31-9)

Comment: So-called "low-level" waste, such as the old steam generators, and the old pumps, pipes, valves, etc., which are being swapped out at the same time as the steam generator replacement project is going on, will be irradiating people, and will get into our children's braces eventually.

No reactor should ever be restarted. Period. Shut them ALL down and dismantle / decommission them. All other choices are folly. (Hoffman-30-3)

Comment: SOLID WASTE MANAGEMENT [S-17]: NRC incorrectly assigns "small impact" and a Category 1 designation to solid waste management, low level waste storage and disposal and onsite storage of spent fuel.

Low-Level Waste Storage & Disposal: NRC assigns a "small impact" and a Category 1 designation to Low-Level Waste Storage and disposal, Table 2.1-1. We disagree. (a) There is nothing low about so-called "low-level waste." Radioactive waste is characterized according to where it comes from, not according to its toxicity and longevity; therefore it can indeed impact public health and safety. Low dose concentration does not equate with low dose exposure; especially if the material is ingested or inhaled.[6] (b) Sites vary on whether or not the state in which the site is located has access to an off-site storage facility; site specific geography and acreage; and potential impact of climate change (increased frequency and severity of storms and eroding coast lines) and terrorism. All of the foregoing factors are site specific and new and significant information. Petitioners should be allowed to bring these forward as Category 2 issues.

[[6] High-Level Dollars Low-Level Sense, A Critique Of Present Policy For The Management Of Long-Lived Radioactive Waste And Discussion Of An Alternative Approach, Arjun Makhijani, Scott Saleska, A Report of the Institute for Energy and Environmental Research, 1992.] (PW-6-7)

Response: *Representative quantities of low-level waste (LLW) generated at the licensed reactor facilities and a general description of management practices for LLW are discussed in*

Section 3.11.1.1 of the GEIS. Low-level radioactive waste includes items that have become contaminated with radioactive material or have become radioactive through exposure to neutron radiation. This waste is typically contaminated protective shoe covers and clothing, wiping rags, mops, filters, reactor water treatment residues, equipment and tools, and laboratory glassware. The more radioactive wastes are typically found in the water treatment residues, piping that contained reactor coolant, and small gauges containing radioactive material. The NRC's waste classification system for low-level radioactive waste is based on the waste's potential hazards, and has specified disposal and waste form requirements for each of the general classes of waste: Class A, Class B, and Class C waste. Although the classification of waste can be complex, Class A waste generally contains lower concentrations of long half-lived radioactive material than Class B and C wastes.

The impacts associated with LLW storage and disposal are discussed in Section 4.11.1.1. It is stated that the operators of nuclear plants are able to ship their Class A LLW to one of the currently operating LLW disposal facilities. The two operating LLW disposal facilities that can accept Class B and C LLW; in Barnwell, South Carolina, and Richland, Washington, are not accepting waste from States that are not in their low-level radioactive waste compact. Therefore, some of the reactors currently do not have an available disposal facility for their Class B and C LLW. However, Waste Control Specialists LLC (WCS), which has been licensed by the Texas Commission on Environmental Quality (TCEQ), is considering whether it should open its facility to some or all of waste generators in States outside of its Compact for disposal of their Class A, B, and C wastes. In addition, the industry is investigating alternate disposal pathways for Class B and C LLW to include (1) compaction and storage at offsite vendor locations until disposal is secured, and (2) blending of waste types in order to reduce its classification to Class A waste with subsequent disposal at available disposal sites.

The NRC anticipates that licensees that do not currently have a disposal pathway would temporarily store Class B and C LLW onsite until offsite storage locations are available. Several operating nuclear power plants have successfully increased onsite storage capacity in the past in accordance with existing NRC regulations. This extended waste storage onsite resulted in no significant increase in dose to workers or the public. In addition, the NRC issued information for extended onsite interim storage of LLW in two Regulatory Issue Summaries 2008-12 and 2008-32 (NRC 2008a,b). Examples of considerations included storing waste in a manner that minimizes potential exposure to workers which may require adding shielding and storing waste in packaging compatible with the waste composition (e.g., chemical and thermal properties).

The NRC concludes that the radiological impacts from LLW storage would be SMALL and fall within current regulatory requirements. There should be no significant issues or environmental impacts associated with interim storage of LLW generated by nuclear power plants. Interim storage facilities would be used until these wastes could be safely shipped to licensed disposal facilities.

As a Category 1 issue, an applicant for license renewal does not have to evaluate the potential impacts from the storage of LLW except if it identifies new and significant information that would result in impacts beyond those discussed in the GEIS. Therefore, unless the applicant's assessment finds new and significant information related to LLW, no site-specific radiological assessment is required to be submitted by the applicant in its Environmental Report. However, as part of the license renewal process, the staff will perform an independent evaluation of all Category 1 issues to look for new and significant information that would require a more detailed evaluation of a particular issue. Regardless of whether or not new and significant information is found, the staff will include a discussion of the issues in the SEIS.

No changes were made to the GEIS in response to this comment.

Comment: I do represent CREED, but I also represent my neighbors and myself and we live along the beach just south of the pier in San Clemente. So, a lot of our concerns are just nervous concerns all the time.

They said I could probably have one question. So, my neighbors asked me, they couldn't come tonight, if we could find out about the spent fuel pool at San Onofre and how they're doing it in any of the nuclear plants that are in the planning that we're checking on. Because we understand from our research that this is a very dangerous part with terrorism and I know I'm reaching a subject that's bad, but it's one that's always in our mind. So, if there's someone here who's knowledgeable and could tell us. For instance, is the pool at San Onofre covered and how secure is it? Could something come in and cause it to be our explosion instead of the actual plant? And that's the extent of my question. (DPCA-CREED1-6)

Comment: And so, because they can't, they haven't been able to, I shouldn't say can't, we never say can't, they feel that -- it isn't a feeling. It's a conviction and it was expressed to me tonight by one of the gentlemen here that they are convinced that the Federal Government will find a way to take care of the waste.

And it's not just repository. Several people said repository. Our state law says disposal. Proven disposal and you all know the difference between what we have now repository on our beach or disposal which is something that we don't have to think about anymore. It's finished. (DPCA-CREED4-46)

Comment: Congress charges the NRC with protecting public safety, not with ensuring industry profits. Therefore, no license renewal should be approved by the NRC until and unless a plan is implemented to safely and permanently store fuel-related radioactive waste, plus the additional waste which would be generated during extended licensing periods.

Aging reactors with collocated high-level, above-ground radioactive waste facilities, within two and a half miles from two major active faults, should be a clear indication that license renewal recommendations should be to deny an additional 20 years, and certainly seismic should come up to stage two, or Category 2 concern [see identifier PBCA-Cochran-7 for the comment on seismic]. (PBCA-Cochran-6)

Comment: I also am concerned about the storage of waste. We hear about the seismic activity that the generating plant can withstand, but how about the storage areas? Are they vulnerable? I mean how much can they take? I know in the last year we had a couple of minor 4.0s off of our coast between here and San Clemente Island, but I'd like to know more about that. (DPCA-Exelby-29)

Comment: Someone needs to point out that we are failing. We're failing on many levels. Let me give you your report card to the nuclear industry, the NRC, and nuclear technology, in general.

Long-term storage plan. F. In 1977, we were promised, in writing, that the radioactive nuclear waste would be restored in a repository, a safe site outside of California, to be provided by the U.S. Government, and that Diablo was only going to temporarily hold these wastes.

This idea, alone, negates any license possibility for Diablo, in my humble opinion. Fool me once, shame on me. Fool me twice, ask George Bush. (PBCA-Biesek-42)

Comment: Well, we still do not have a way of disposing of the waste and San Onofre's Units 1 and or excuse me, Units 2 and 3 initially were licensed to 2013 and 2014 and so, if it's not a violation of the spirit -- I'd say the letter of the law, it certainly is a violation of the spirit of the law in that now these reactors are going to be operating past that time to at least 2022 and certainly Edison is concerning on further into the future. (DPCA-Pack-45)

Comment: My main problem, and what I want to address in my comment, is that you have made on-site storage of spent nuclear fuel in a small impact Category 1, category, you know, and the way I read it, you explain it, saying the expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants.

If a permanent repository, or mountaintop retrievable storage is not available, well, so far we always heard Yucca Mountain was the goal for PG&E. That looks less and less, the chance that we'll get it there.

Now I cannot see how this is a generic issue. I mean, the NRC's argument for generic is a simple one. First, as stated, it can be safely accommodated, and because it's safe you can

make it a generic issue. That doesn't make that much sense to me. If the NRC predetermines that prolonged outside storage is safe at all plants, then there's almost no point to take public input on it.

By allowing the utilities to fill the pools way beyond the original licensed capacity, the NRC has allowed a doubling of possibilities for nuclear catastrophe. A meltdown, as we always had to worry about, but now also about a pool fire. Actually, the possibility of a pool fire has been not recognized by the NRC until the year of 2000. (PBCA-Schumann-8)

Comment: Onsite storage of spent nuclear fuel

Small impact (Category 1).
The expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated onsite with small environmental effects through dry or pool storage at all plants, if a permanent repository or monitored retrievable storage is not available.

I cannot see how this could be a "Generic Issue". The NRC's argument for "generic" is circular. The issue is: what is safe at what plant. If the NRC predetermines that prolonged on-site storage is safe at all plants, then there is no point to take public input. By allowing the utilities to fill the pools way beyond the original licensed capacity, the NRC has allowed a doubling of possibilities for nuclear catastrophe, i.e. a meltdown and a pool fire. [NOTE: Until the year 2000, the NRC did not even officially recognize the possibility of such spent fuel pool fire].

1. Safe accommodation.
At SONGS and Diablo, the earthquake and tsunami dangers are completely different from any other plant. The same is true for terrorist aspects for any plant, because of location and/or design [see Finding 3D National Academy of Sciences Report (NAS)on terrorism aspects for Spent Fuel Pools, 2005. Quote: "The potential vulnerabilities of spent fuel pools to terrorist attacks are plant-design specific. Therefore, specific vulnerabilities can only be understood by examining the characteristics of spent fuel storage at each plant".

Furthermore, another 20 years of exposure to intense radiation and heat will likely cause further "embrittlement" of components, such as pool racking and/or fuel cladding. The g-forces generated in earthquakes depend largely on the strength of the quake and the, distance from the epicenter. This aspect alone could require very different mitigation measures at different plants. For instance, the dry casks at Diablo are bolted to the storage pads but not, to my knowledge, at any other plant. Accordingly, the "safe accommodation" of spent fuel storage on-site depends on different mitigation measures at each site and must therefore be evaluated in a site-specific EIS.

2. Small environmental impact.
A pool fire or breach of a dry cask are not "small environmental impacts". In fact, some of the NRC's own studies identify a pool fire as potentially having "comparable consequences" to a reactor meltdown. The NAS report finds, that a pool fire is possible and that such a fire could result in releasing large amounts of radiation to the environment, hardly a small impact. Moreover, the NAS report suggests a host of possible mitigation measures, depending on "site by site" evaluations. Such measures could include lower pool density, reconfiguration of SFA's in the pool racking, additional sprinkler systems etc., all depending on different conditions at each plant (NAS Report Finding 3D, page 6). Even more important, conditions may change. Another fault was just recently discovered near Diablo, terrorists might get access to new, more destructive weapons, etc. (Anon2-23-1)

Comment: Even more important, condition may also change, as we just experienced here at Diablo. Another fault was just recently discovered here. You know, terrorists might get access to more destructive weapons, and so on.

So I would really urge you to make this issue of on-site spent fuel storage for prolonged periods of time, take it out of the Category 1 issues and make it a site-specific one. Thank you very much. (PBCA-Schumann-12)

Comment: The other thing that the NRC has come forward saying, many times, and I personally have problems with, is when I spoke with NRC representatives, when I was a supervisor, regarding the casks, I said, Is this the best cask that's available?

I knew if I said, Is this the safest that we could make? somebody would say, hey, we can't ever afford the safest we can make. So I'm "politically real" in that. Is this the best cask that's available? And the answer was no; it's adequate. I don't think from a national security standpoint, we can say adequate is okay anymore.

We need to make sure that we are protecting people in the best available manner. (PBCA-Pinard-18)

Comment: I'm here as a citizen of Morro Bay, and as a citizen of the county. I came here in 1979, and I marched on Avila to try to stop it from being opened, and some of my concerns then -- I was kind of naive --was nuclear waste. I was told, then, that there would be no nuclear waste stored in our country. That was a huge guarantee back then.

A lot of people went along with it because they were going to have a solution to this. Now in this Environmental Impact Statement here, you're not really taking that into consideration again. I mean, we don't have a place to put this stuff. (PBCA-Nelson-25)

Comment: We know there is something wrong, fundamentally wrong with this process, so what should be on the table? [See identifier NMA-PW-7 for the commenter's introduction to this comment.] Well let's start out with solid waste management. It is clear that there are site specific issues going on, irrespective of this foolishness of the nuclear waste confidence job that was done on this. We have the National Academy of Sciences that pointed out the difference between the GE Mark 1 and Mark 2, such as the Pilgrim and the Oyster Creek and Vermont. There were, what, 32 of them where it's all stored in a densely packed pool in the attic of the reactor.

That's a very different situation than, let's say, for Seabrook or some of the Indian Points where it's adjacent, not that that's a beautiful situation either, but the spent fuel pool is not in the attic of the main reactor building outside primary containment, it's in an adjacent building. But again, the mountains of information to say that, oh, everything will be stored on site, there's another rule coming up for even longer for these casks than previously believed. This obviously needs a site specific review because each site is different for its capability to handle being a dump site, which is what nobody in these communities expected it to be, and each reactor sites has a different capability to store and how much is being stored, whether it's densely packed or not.

Again, a mountain of independent research that is totally disregarded by the NRC, so how can there be any respect? (NMA-PW-8)

Comment: I would say for the nuclear waste, confidence, which we call a confidence job, update, it's the same thing, that it's a cherry picking here and there, the ignoring of the mountains of expert witness testimony provided by the California Attorney General, Massachusetts Attorney General, New York Attorney General, and so what does this mean? What it means is that we have to, I don't know, how many cookies can I bake, you know, to pay for this? Or our states that are strapped, they have to go to federal circuit court to find any relief. (NMA-PW-6)

Comment: Spent Nuclear Fuel And Yucca Mountain National Waste Repository**:** As noted above, the Nuclear Waste Policy Act, as amended in 1987, designated Yucca Mountain, Nevada as the nation's nuclear waste repository. Over the last 20 years approximately $14 billion has been spent to study and develop the site by the Department of Energy ("DOE"). DOE submitted an application to the NRC for a license to operate the repository. Secretary of Energy Dr. Steven Chu has publicly stated that "Yucca Mountain as a repository is off the table. .... The NRC is saying that the dry cask storage at current sites would be safe for many decades, so that gives us lime to figure out what we should do for a long-term strategy."[3] On July 30, 2009, Senator Harry Reid announced that DOE and the federal administration will terminate all funding related to license review in the 2011 budget and that the only future funding will be that necessary to conclude the project.[4]

[[3] Technology Review, May 14,2009, http://www.technologyreview.com/business/22651/?nlid=2027]
[[4] Reid Announces Yucca Mountain License Application Funds To Be Eliminated in Budget, July 30, 2009, http://reid.senate.gov/newsroom/073009 yucca.cfm

Yucca Mountain has no reasonable chance of opening in the foreseeable future and most likely will never open. Even if it ever did open, it would probably already be too small for all of the waste it was to accommodate. Department of Energy ("DOE") facilities have accumulated approximately 13,000 tons of waste, and civilian power reactors have generated an additional 58,000 tons. The Report to the President and the Congress by the Secretary of Energy on the Need for a Second Repository, December 2008, p.5. As civilian reactors add about 2,000 tons annually, current estimates are that by the time the last existing reactor finishes its period of licensed operation, total waste generated by the current fleet of reactors will total between 109,300 and 130,000 tons, depending on how many reactors are granted license extensions. *Id.* Yucca Mountain, even if it opened tomorrow, is statutorily limited to hold only 77,000 tons of waste. *See* National Waste Policy Act of 1982, Public Law 97-425, 42 U.S.C. 10101 *et seq.,* § 114(d). In fact, the head of DOE's civilian nuclear waste program told Congress that by 2010 − this year − the amount of waste produced by the country's 104 nuclear power plants plus defense waste will already exceed the total allowable storage capacity for Yucca Mountain. *See* The Report to the President and the Congress by the Secretary of Energy on the Need for a Second Repository, December 2008, p. 2. (CT AG-10-2)

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Onsite storage of spent nuclear fuel: Onsite storage of spent nuclear fuel was not considered during the original licensing of many nuclear facilities. Continued operation of a nuclear facility may exhaust space available for onsite storage and increase environmental risk attributable to onsite spent fuel storage. As such, onsite storage of spent nuclear fuel should be considered in a SEIS. (NY DOS-18-8)

Comment: Spent Fuel: According to the revised GEIS, spent fuel remains a Category 1 issue and will not be evaluated in the SEIS. The revised GEIS cites the current Waste Confidence Rule and the Yucca Mountain License Application as evidence that waste can safely be stored onsite and that a repository will be available someday.

As we mentioned in our introductory comments, the PINGP has a site-specific ISFSI, which will eventually store 98 dry casks indefinitely. Based on recent events, we have no assurance that the spent fuel from the PINGP will ever move beyond the borders of the ISFSI.

In the last year we heard prominent politicians declare that Yucca Mountain was dead. The fact that funding for the Yucca Mountain project has all but ceased supports this position. Revisions to the Waste Confidence rule seem to be stalled due to the uncertainty of the National Repository at Yucca Mountain.

The section on spent fuel in the revised GEIS must be revised to reflect the current reality: that there will be no mined-geologic repository anytime soon and spent fuel will remain on-site indefinitely. Given that the current Administration seems to be starting the process anew, it is uncertain how long it will take to identify a new pathway forward. It is certain that new "solution" is sure to have political and societal objections that will take years to address and spent nuclear fuel will be stranded on-site indefinitely. (PIIC-8-11)

Comment: Waste Management and Pollution Prevention Discussion is Inadequate: In Section 4.11, waste management is improperly labeled a Category 1 issue; SLOMFP insists that it is a large impact site-specific Category 2 issue.

Like all U.S. nuclear power plants, the Diablo Canyon facility includes the storage of all the high-level radioactive wastes generated by its reactors since it began operation. Currently, most of the spent fuel is stored in over-crowded pools. A small portion has been transferred to a few of the dry casks. To add another 20 years' worth of high level wastes at a seismically active site would significantly add to the safety and security problems at Diablo.

Furthermore, the Draft GEIS continues to promote the myth that Yucca Mountain will be available to accept high level waste from nuclear facilities. (4-166, lines 4-10) 4-167 in the GEIS provides a litany of totally unjustified "reasonable assurance" that spent fuel can be safely stored on-site until the DOE provides a long-term waste storage facility. These assurances amount to wishful thinking and nothing more. Optimistic assumptions are not an acceptable basis for allowing the continued generation of high-level wastes that will need to be stored in isolation from the biosphere for many thousands of years. No known human civilization has remained intact for even a fraction of the length of time radioactive wastes will remain toxic. A more realistic assumption is that there is no way to assure adequate safeguarding of nuclear wastes. (SLOMFP-13-12)

Comment: Inadequate Assessment of Nuclear Waste Storage Impacts—Onsite Storage of Spent Nuclear Fuel: The Revised GEIS continues to hide behind the generic determination of no significant environmental impact in 10 C.F.R. § 51.23(b), stemming from the NRC's Waste Confidence Decision, to avoid requiring site-specific review of onsite nuclear waste storage impacts.[97] This is highly problematic for numerous reasons.

[97 *See id.* at 1-9 to 1-10, 4-165 to 4-168.]

To begin with, a pending proposal, which the Revised GEIS acknowledges, to update the NRC's Waste Confidence Decision, if finalized, would extend the finding of no significant impact an additional 30 years.[98] A concomitant proposed rule change, would omit any reference to how long spent fuel can safely be stored in "temporary" on- or off-site facilities, arid simply state that such waste can be so temporarily stored without significant impact "until a disposal facility can reasonably be expected to be available."[99] Given the status of the Yucca Mountain proposal and lack of a clear long-term disposal solution, it is reasonably foreseeable that spent nuclear fuel and high level waste will have to remain onsite indefinitely. If the proposed rule changes are implemented, the NRC's generic finding of no significant impact would essentially be extended to some indefinable point in the future. Foregoing any analysis of impacts of decades and decades of spent nuclear waste storage because of the NRC's "waste confidence" is, thus, improper.

[[98] Waste Confidence Decision Update, 73 Fed. Reg 59,551, 59551,59563-59569 (Oct. 9, 2008) ("WCD Update").]
[[99] Proposed Rule on the Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation, 73 Fed. Reg. 59547,59551 (Oct. 9, 2008).]

The NRC's reasonable assurance of safe interim storage, first instituted over a quarter of a century ago and never supported by an environmental assessment or environmental impact statement under NEPA,[100] simply does not hold up given current knowledge and circumstances. Most blatantly, the NRC's generic assurance of benign spent fuel pool storage is completely undermined by the evidence of leaks at reactors across the United States.[101] For example, at Indian Point, the Unit 1 pool began leaking as early as the 1990s, and the leaks from Unit 2 were discovered in 2005.[102] With spent fuel pool degradation already at nuclear plants, it is patently absurd to rely on the generic no impact finding to project the long-term integrity of the pools for decades into the future. Given this circumstance, a generic finding about the impacts of pool storage is simply not appropriate, and a site-specific review should be performed at the license renewal juncture.

[[100] Final Waste Confidence Decision, 49 Fed. Reg. 34658 ("[T]he Commission finds that NEPA does not require an EIS to support the [temporary storage] finding"); *see also* 40 C.F.R. § 1508.9 (explaining that environmental assessments under NEPA should provide sufficient evidence and analysis for determining whether to prepare an EIS or a FONSI).]
[[101] *See Liquid Radioactive Release Lessons Learned Task Force Final Report,* U.S. Nuclear Regulatory Commission, at 5-6 (September 1, 2006) (hereinafter "Radioactive Release Task Force Report").]
[[102] *See* Entergy's Environmental Report, at 5-4; Groundwater Investigation Executive Summary (Indian Point Energy Center, Buchanan, N.Y., Jan. 2008), *available at* http://jic.semo.state.ny.us/Resources/ExecutiveSummary%20GW%20final.pdf; *see also* Riverkeeper's Exhibit A.]

The NRC's Waste Confidence Decision also fosters unbridled assurance in the safety of dry cask storage, yet this is also questionable. It is far from clear what environmental impacts will result f dry casks remain loaded with spent fuel beyond their design life.[103] In light of the fact

that these casks will remain on the banks of the Hudson River indefinitely into the future, the NRC Staff must perform a site specific assessment of impacts of such long-term storage.

[[103] *See* Riverkeeper's Scoping Comments at 9-10.]

The NRC's generic finding of no significant impact also flies in the face of new information about the risks of accidents at on-site nuclear waste storage facilities. Numerous reports and studies show that fuel storage pools are potentially susceptible to fire and radiological release from natural phenomena.[104] As discussed above, the environmental impacts of a fire in a spent fuel pool may be severe, extending over a geographic area larger than a state's legal boundaries and continuing for decades.[105]

[[104] *See, e.g.,* NUREG-1738, Final Technical Study of 1 Spent Fuel Pool Accident Risk and Decommissioning Nuclear Power Plants (NRC: January 2001); National Academy of Sciences Committee on the Safety and Security of Commercial Spent Nuclear Fuel Storage, Safety and Security of Commercial Spent Nuclear Fuel Storage (The National Academies Press: 2006); Gordon Thompson, Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants (May 25, 2006); Jan Beyea, Report to the Massachusetts Attorney General on the Potential Consequences of a Spent-fuel Pool Fire at the Pilgrim or Vermont Yankee Nuclear Plant (May 25, 2006).]
[[105] *See generally,* Thompson Report.]

Despite such ominous potential consequences, the Revised GEIS would continue to completely ignore the vulnerability of stored spent fuel to natural phenomenon, such as earthquakes. For example, recent new information from seismologists at Columbia University's Lamont-Doherty Earth Observatory, who published a study in August 2008 on earthquakes in the greater New York City Area, indicates that Indian Point sits on a previously unidentified intersection of two *active* seismic zones.[106] Indeed, several recent earthquakes in New Jersey right near the Ramapo fault, which runs directly underneath Indian Point, starkly demonstrate the active nature of the seismic areas around the facility.[107] The Columbia study further found that historic activity of earthquakes of a magnitude more than 5 has been higher in southeastern New York than in many other areas of the central and eastern United States, and that the fault lengths and stresses suggest magnitude 6 or 7 quakes (which would be 10 and 100 times bigger than magnitude 5, respectively) are “quite possible.”[108]

[[106] *See* Lynn R. Sykes, John G. Armbruster, Won-Young Kim, & Leonardo Seeber, *Observations and Tectonic Setting of Historic and Instrumentally Located Earthquakes in the Greater New York City-Philadelphia Area,* Bulletin of the Seismological' Society of America, Vol. 98, No.4, pp. 1696-1719 (August 2008) ("2008 Columbia Earthquake Study").]
[[107] *See, e.g.,* Lawrence Ragonese, *Morris County Shows Signs of Stress: Four Quakes,* The Star-Ledger (Feb. 18, *2009), available at,* http://www.nj.com/news/index.ssf/2009/02/morris_county_shows_sign_of_st.html.]
[[108] 2008 Columbia Study; *see also* Robert Roy Britt, *Large Earthquakes Could Strike New York City* (Aug. 21, 2008), *available at* http://www.livescience.com/environment/080821-new-york-earthquakes.html.]

Yet, due to the categorical exclusion of nuclear waste storage impacts, the Revised GEIS would not require consideration of such information. This is notwithstanding the new issue in the

Revised GEIS related to new seismological information,[109] which would ostensibly not extend to impacts to nuclear waste in light of NRC's reliance on the Waste Confidence Rule. There is no certainty whatsoever that the dry casks or spent fuel pools at plants like Indian Point are designed so as to be able to withstand such natural occurrences in light of the new seismic information. The existence of such new information highlights why a generic determination of environmental safety for long-term on-site storage of spent fuel is totally inappropriate.

[[109] *See* Revised GEIS at 3-49 to 3-50.]

The NRC Staff also relies upon the NRC's generic safety determination to further justify its refusal to consider the risks to spent fuel storage from intentional acts of sabotage.[110] However, the likelihood and seriousness of such risks necessitates a thorough review of the impacts of long-term storage of spent fuel at Indian Point. As discussed above, future terrorist attacks at Indian Point remain reasonably foreseeable, and such risks must be fully assessed in the licensing proceeding.

[[110] *See* Waste Confidence Decision Update, 73 Fed. Reg. 59551.]

Based on the foregoing, it is clear that the NRC's generic determination cannot form the basis for continued exclusion of this issue in all future license renewal proceedings. Based on the changed landscape, NRC must make this a Category 2 issue and require site-specific analysis of the impacts of long-term on-site storage. (Riverkeeper-20-17)

Comment: Inadequate Assessment of Nuclear Waste Storage Impacts—Offsite Radiological Impacts of Spent Nuclear Fuel and High-Level Waste Disposal: The Revised GEIS continues to review the offsite radiological impacts from spent nuclear fuel and high level waste disposal in relation to the use of Yucca Mountain as the future long-term geologic repository. This flies in the face of recent indications that Yucca is no longer a viable option. Indeed, there is no dispute that the current Administration has brought the axe down on the Yucca project. Most recent accounts indicate that the U.S. Department of Energy intends to stop pursuing a license for the Yucca repository by this December.[111] Even the NRC Commissioner's have acknowledged the current plan to eliminate the Yucca Mountain Project.[112]

[[111] *See, e.g.,* Keith Rogers, *Yucca Mountain: Memo casts doubt on license for Yucca repository,* LAS VEGAS REVIEW-JOURNAL (Nov. 10, 2009), http://www.lyrj.com/news/memo-casts-doubt-on-license-for-yucca-repository-69639342.html (last visited Jan. 12, 2009).]
[[112] *See* Notation Vote of Commissioner Klein, SECY-09-0090 − Final Update of the Commission's Waste Confidence Decision (September 16,2009), *available at,* http://www.nrc.gov/reading-rm/doc-collections/commission/cvr/2009/2009-0090vtr-dek.pdf; Notation Vote of Commissioner Svinicki, SECY -09-0090 − Final Update of the Commission's Waste Confidence Decision (September 24, 2009), *available at,* http://www .nrc.gov/reading-rm/doc-collections/commission/cvr/2 009/2009-0090vtr-kls.pdf ("Svinicki Vote on WCD").]

It is, thus, curious, that a document that will serve as a generic environmental impact statement for decades to come would continue to rely upon this eventuality. Indeed, the Revised GEIS explicitly relies upon dose limits from documents filed in connection with the Department of Energy's Yucca Application.[113] In addition to misguidedly relying upon a pending application, such information was developed specifically in relation to Yucca, and is therefore essentially unusable in light of the aforementioned circumstances.

Given the uncertainly of long-term disposal of nuclear waste, and the likelihood of essentially indefinite on-site storage, it makes far more sense to perform a site specific review to discern the offsite impacts of this waste at particular plants. While the NRC will undoubtedly claim that they are relying in good faith on the Department of Energy's pending application which has not been withdrawn yet, the NRC must not "shut...[their] ears to the din of current debate" as Commissioner Svinicki has articulated.[114]

[[113] *See* Proposed Rule at 38127.]
[[114] Svinicki Vote on WCD at 3.] (Riverkeeper-20-18)

Comment: 2. Solid Waste Management [S-17]: NRC incorrectly assigns "small impact" and a Category 1 designation to solid waste management, low level waste storage and disposal and onsite storage of spent fuel.

b. Onsite Storage of Spent Fuel: NRC assigns a "small impact" and a Category 1 designation to onsite storage of spent nuclear fuel, Table 2.1-1.

(1) Impact Potentially Large Under Severe Accident Situations: The Draft incorrectly determined that the impact was small. There would be nothing small about the potential impact on the environment from a spent fuel pool fire in a densely packed spent fuel pool.

NRC's Waste Confidence Rule: The Draft justifies determining "small impact" by reference to NRC's Updated Waste Confidence Rule. However NRC's rule is based upon documents that the public cannot see because of "safeguards." This places the public in an Alice in Wonderland situation. It contradicts Chairman Jaczko's September 24, 2009 warning that NRC "is *strengthened by public involvement and input,* and by (NRC) being open and transparent about what we do and why." (PW-6-9)

Comment: Beyond the complete failure of the Revised GEIS to address the issue of increased SNF resulting from relicensing, the document is based upon a fundamental error – a continuing assumption that there will be a national repository for off-site disposal of spent fuel. As long ago as 1979, the United States Court of Appeals for the District of Columbia Circuit, in *State of Minnesota v. NRC,* 602 F.2d 412, 413-14 (D.C. Cir. 1979), questioned whether there would be offsite storage available for SNF from certain power stations after license termination.

Intervenors in that case argued that any expansion of on-site storage could occur only after analysis of environmental implications.

NRC staff believed that NEPA did not require the preparation of an environmental impact statement, because any modifications as to where and how SNF would be stored would not "significantly affect the quality of the human environment," See Atomic Safety and Licensing Appeal Board. *Id.* at 414-15. The D.C. Circuit found that the Commission's "implicit" policy conclusion that a "reasonable assurance that methods of safe permanent disposal of high-level wastes can be available when they are needed" was unsupported by the record and remanded the issue to the Commission to undertake a record-based rulemaking proceeding to establish a supportable policy. *Id.* at417. The result was the 1984 Waste Confidence Decision which established several findings necessary to permit the continued licensing of nuclear power plants in the absence of an existing national storage repository. The key findings were that the Commission found reasonable assurance that one or more mined geologic repositories for commercial SNF will be available by the years 2007-2009, and that sufficient repository capacity will be available within 30 years beyond the expiration of any reactor operating license to dispose of existing commercial SNF originating in such reactor and generated up to that time. The Commission also found reasonable assurance that SNF will be managed in a safe manner until sufficient repository capacity is available to assure the safe disposal of all SNF. 49 Fed. Reg. 34658 (Aug. 31, 1984). After making these findings, NRC amended its regulations to say that the environmental impacts of onsite SNF storage are not properly part of a relicensing proceeding. (10 C.F.R. § 51.23(a)).

Yucca Mountain did not open by 2007. As long ago as 1990, NRC amended the Waste Confidence Rule findings to reflect later dates of availability of the national repository. The NRC added that it found "reasonable assurance that at least one geologic repository will be available within the first quarter of the twenty-first century, and sufficient repository capacity will be available within 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license)…." 55 Fed. Reg. 38474 (Sept. 18, 1990). NRC also amended the Rule to read: "The Commission finds reasonable assurance that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin, or at either onsite or offsite [dry cask storage facilities]." *Id.* *See* 55 Fed. Reg. 38472 (Sept. 18, 1990).

NRC is currently seeking to amend the Rule to give itself more time. NRC claims that it finds reasonable assurance to expect that sufficient mined geologic repository capacity can be available within 50-60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of any reactor to dispose of the commercial high-level nuclear waste and spent fuel originating in such reactor and generated up to that time. 73 Fed. Reg. at 59551. The Commission also seeks to amend the Rule also to read that "The Commission finds

reasonable assurance that, if necessary, spent fuel generated in any reactor can be stored safely without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent fuel storage basin and either onsite or offsite independent spent fuel storage installations. 73 Fed. Reg. at 59551.

The NRC has also published a separate alternative proposed rule which would amend 10 C.F.R. § 51.23(a) to say that if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations. 73 Fed. Reg. 59547 (Oct. 9, 2008).

Therefore, NRC's position has been for decades that onsite spent fuel storage is a temporary situation and that the fuel must be relocated to a safe, secure federal facility. This point is, in fact, the basis for NRC's original Waste Confidence Rule which, in turn, is the basis for all of NRC's assumptions regarding SNF in the original GEIS of 1996 and the current Revised GEIS. Because the federal government has unequivocally terminated the Yucca Mountain project, there is no federal repository under consideration and no plan for an alternative. Spent fuel has nowhere to go and will accumulate indefinitely at the 100 plus nuclear power stations around the country. The NRC's fundamental SNF premise underlying all assumptions in the Revised GEIS is now demonstrably false. Consequently, the Revised GEIS is flawed from its inception and clearly violates NEPA.

In sum, no national repository is under construction; or even in planning. Thus NRC must assume that all SNF will accumulate at existing nuclear power stations and evaluate the environmental impacts of 20 years of additional amounting quantities of spent nuclear fuel − along with all of the existing fuel which is not going to Yucca Mountain or anywhere else − in the Revised GEIS. (CT AG-10-6)

Comment: Accumulation of At-Reactor Spent Nuclear Fuel: Twenty additional years of plant operation would generate additional nuclear wastes of all classes (low, medium and high-level wastes), which would result in additional impacts from waste· management, storage, transport and disposal. The long-term risk of at-reactor storage and accumulation of spent fuel on California's seismically active coastline should be reevaluated during license renewal reviews given the uncertainties regarding when a permanent repository or offsite interim storage facility will become available. The Obama Administration has ordered most activities to cease relating to the licensing of the Yucca Mountain Nuclear Waste Repository. The uncertainties surrounding U.S. nuclear waste disposal policies and the federal high-level waste management program means that nuclear reactor operators, including Pacific Gas and Electric Company (PG&E) and Southern California Edison (SCE), can no longer count on transferring spent fuel to

a federal nuclear waste repository in the near or medium-term future. As a result, the utilities must continue indefinitely to store spent nuclear fuel at the reactor sites. For California, this means that about 6,700 assemblies of spent fuel (approximately 2,600 metric tons of uranium) that are currently being stored at operating and decommissioned nuclear plants in-state, as well as the anticipated generation of spent fuel, will remain at these sites for the foreseeable future. The potential economic and environmental impacts from the long-term storage of nuclear wastes at reactors, including low, medium, and high-level wastes, should be evaluated as a Category 2 issue on a plant-by-plant basis. (CEC-9(1)-3)

Comment: Regarding global warming – nuclear waste cannot be helpful in solving the problem. As citizens of this country – what are we saying to future generations – leaving all this waste for them to deal with. We/you the NRC do not know the effects of the radiation 50, 100, 150…years from. No need to worry about it. Not our problem? Until we have a solution to nuclear waste we should not produce it. (Anon1-21-1)

Response: *The NRC is committed to ensuring that both spent nuclear fuel and low-level radioactive wastes are managed to prevent health impacts to the public. Spent nuclear fuel is currently stored at reactor sites in the spent fuel pools and/or in independent spent fuel storage installations (ISFSIs). This practice is expected to continue until DOE is ready to take possession of the spent nuclear fuel. At this time, it is uncertain when this will happen.*

Interim storage needs vary among plants, with older units having less available pool storage capacity than newer ones. However, given the uncertainty as to when a geologic repository will open and the lack of other options, it is likely that some sort of expanded spent fuel storage capacity beyond the original design capacity will be needed at all nuclear power plants.

On March 3, 2010, DOE submitted a motion to the Atomic Safety and Licensing Board to withdraw its application for a permanent geologic repository at Yucca Mountain, Nevada. In light of the uncertainty surrounding the use of Yucca Mountain, if another repository for spent nuclear fuel is proposed, an environmental impact statement would be prepared.

For spent nuclear fuel, the Waste Confidence Decision and Rule represented the Commission's generic determination that spent nuclear fuel can continue to be stored safely and without significant environmental impacts for a period of time after the end of the licensed life for operation of a nuclear power plant (after the permanent shutdown of the power reactor and expiration of the plant's operating license). This generic determination, codified in 10 CFR 51.23(a), meant that the NRC did not need to consider the storage of spent nuclear fuel after the end of a reactor's licensed life for operation in the National Environmental Policy Act (NEPA) documents that support its reactor and spent-fuel storage license application reviews.

On December 23, 2010, the Commission published a revision of the Waste Confidence Decision and Rule to reflect information gained based on experience in the storage of spent nuclear fuel and the increased uncertainty in the siting and construction of a permanent geologic repository for the disposal of spent nuclear fuel and high-level waste. In response to the 2010 Waste Confidence Decision and Rule, the states of New York, New Jersey, Connecticut, and Vermont, and several other parties challenged the Commission's NEPA analysis in the decision, which provided the regulatory basis for the rule. On June 8, 2012, the United States Court of Appeals, in New York v. NRC, 681 F.3d 471 (D.C. Cir. 2012), vacated the NRC's Waste Confidence Decision and Rule, after finding that it did not comply with NEPA.

In response to the court's ruling, the Commission issued CLI-12-16 on August 7, 2012, in which the Commission determined that it would not issue licenses that rely upon the Waste Confidence Decision and Rule until the issues identified in the court's decision are appropriately addressed by the Commission. CLI-12-16 provided, however, that the decision not to issue licenses only applied to final license issuance; all licensing reviews and proceedings should continue to move forward. In SRM-COMSECY-12-0016, dated September 6, 2012, the Commission directed the NRC staff to proceed with a rulemaking that includes the development of a generic EIS to support a revised Waste Confidence Decision and Rule and to publish both the EIS and the revised Waste Confidence Decision and Rule in the Federal Register within 24 months (by September 6, 2014). The Commission indicated that both the EIS and the revised Waste Confidence Decision and Rule should build on the information already documented in various NRC studies and reports, including the existing environmental assessment that the NRC developed as part of the 2010 Waste Confidence Decision and Rule. The Commission directed that any additional analyses should focus on the issues identified in the D.C. Circuit's decision. The Commission also directed that the NRC staff provide ample opportunity for public comment on both the draft EIS and the proposed Waste Confidence Decision and Rule.

In accordance with CLI-12-16, the NRC will not approve any site-specific license renewal applications until the deficiencies identified in the D.C. Circuit's decision have been resolved. Two license renewal issues that rely, wholly or in part, upon the Waste Confidence Decision and

Rule are the "onsite storage of spent nuclear fuel" and "offsite radiological impacts of spent nuclear fuel and high-level waste disposal." Both of these issues were classified as Category 1 in the 1996 GEIS and the 10 CFR Part 51 final rule that was promulgated in 1996 (61 FR 28467, June 5, 1996), which codified the findings of the 1996 GEIS into 10 CFR Part 51, Subpart A, Appendix B, Table B-1. The draft revised GEIS that was published for public comment in 2009 (74 FR 38239, July 31, 2009) and the concomitant proposed rule (74 FR 38117, July 31, 2009) continued the Category 1 classification for both of these issues. As part of the NRC's response to the New York v. NRC decision, the NRC has revised these two issues accordingly.

Specifically, the NRC has revised the Category 1 issue, "Onsite storage of spent nuclear fuel," to narrow the period of onsite storage to the license renewal term. In both the 1996 GEIS and rule and the 2009 draft revised GEIS and proposed rule, the NRC relied upon the Waste Confidence Decision and Rule to make a generic finding that spent nuclear fuel could be stored safely onsite with no more than a small environmental impact for the term of the extended license (from approval of the license renewal application to the expiration of the operating license) plus a 30 year period following the permanent shutdown of the power reactor and expiration of the operating license.

The Waste Confidence Decision and Rule provided the basis for the 30 year period following the permanent shutdown of the reactor and expiration of the operating license. The 2010 Waste Confidence Decision and Rule extended this post-reactor shutdown onsite storage period from 30 years to 60 years. Given the New York v. NRC decision, and pending the issuance of a generic EIS and revised Waste Confidence Decision and Rule (as directed by SRM-COMSECY-12-0016), the period of onsite storage of spent nuclear fuel following the permanent shutdown of the power reactor and expiration of the operating license is now excluded from this GEIS issue. This issue now only covers the onsite storage of spent fuel during the license renewal term.

Similarly, the NRC has revised the Category 1 issue, "Offsite radiological impacts of spent nuclear fuel and high-level waste disposal." This issue pertains to the long-term disposal of spent nuclear fuel and high-level waste, including possible disposal in a deep geologic repository. Although the Waste Confidence Decision and Rule did not assess the impacts associated with disposal of spent nuclear fuel and high-level waste in a repository, it did reflect the Commission's confidence, at the time, in the technical feasibility of a repository and when that repository could have been expected to become available. Without the analysis in the Waste Confidence Decision, the NRC cannot assess how long the spent fuel will need to be stored onsite. Therefore, the NRC has reclassified this issue from a Category 1 issue with no assigned impact level to an uncategorized issue with an impact level of uncertain.

Upon issuance of the revised Waste Confidence Decision and Rule and its supporting generic EIS, the NRC will make any necessary conforming amendments to its regulations in 10 CFR

Part 51 and supplement the GEIS as necessary. As referenced previously, the Commission will not approve any license renewal application for an operating nuclear power plant until the issues identified in the New York v. NRC court's decision are appropriately addressed by the Commission.

Comment: 2. Solid Waste Management [S-17]: NRC incorrectly assigns "small impact" and a Category 1 designation to solid waste management, low level waste storage and disposal and onsite storage of spent fuel.

b. Onsite Storage of Spent Fuel: NRC assigns a "small impact" and a Category 1 designation to onsite storage of spent nuclear fuel, Table 2.1-1.

(2) On-site storage of spent fuel is a Category 2 issue:

- The NRC has never performed an EIS that addresses the potential for, and impacts of, the onset of exothermic oxidation reactions in a spent fuel pool. NUREG 1437 § 6.4.6 simply states "Inadvertent criticality and acute occupational exposure are remote risks of dense-racking (DOEIRW-0220)." Yet, in a report published in October 2000 and issued in January 2001, the NRC Staff has conceded that if the water in any densely packed spent nuclear fuel pool is lost, even a year and longer after discharge, the fuel will heat up to the point where its zircoloy cladding will melt and then catch fire.[9] As stated previously, the resulting fire will not be able to be extinguished by water and has the potential of significantly contaminating hundreds of miles downwind. *Spent Fuel Heatup Following Loss of Water During Storage,* Allen Benjamin et al. (Sandia National Laboratory, *NUREG/CR* The risk of fire is increased because the spent fuel is densely packed NUREG/CR-0649, SAND77-1371, 1979), fig.14.

[[9] A technical study of spent fuel accident risk, performed for the NRC by Sandia Lab, clearly stated that a catastrophic meltdown in the spent fuel pool of a nuclear power plant could cause fatal, radiation-induced cancer in 25,000 people as far as 500 miles from the site. NUREG-1738 *Technical Study of Spent Fuel Accident Risk at Decommissioning Nuclear Power Plants (2001).*]

- In 2001, the NRC staff summarized the conclusions of its most recent analysis of the potential consequences of a loss-of-coolant accident in a spent fuel pool as follows:

> [I]t was not feasible, without numerous constraints, to establish a generic decay heat level (and therefore a decay time) beyond which a zirconium fire is physically impossible. Heat removal is very sensitive to...factors such as fuel assembly geometry and SFP (spent fuel pool) rack configuration…(which) are plant specific and...subject to unpredictable changes after an earthquake or cask drop that drains the pool. Therefore, since a non-negligible decay heat source lasts many years and since configurations ensuring sufficient air flow for cooling cannot be assured, the

possibility of reaching the zirconium ignition temperature *cannot be precluded on a generic basis. Id. at 18.* (Emphasis added)

- Reactors differ in design, layout and physical protection features affecting the safety of onsite storage in spent fuel pools. For example, GE Mark I reactor's spent fuel pool are located outside primary containment in the attic of the reactor. This is more susceptible to acts of malice than reactors designed with the pool separate from the main reactor building.

- The NRC has demonstrated that it considers terrorist attacks on nuclear plants are foreseeable threats that must be addressed; the Pilgrim spent fuel pool, for example, is particularly vulnerable to attack from the air.

- The use and probable effectiveness of mitigation varies from site to site − requiring site specific analysis.

- Reactor sites differ in topography and demography making the risk of onsite storage of spent fuel site specific. (PW-6-11)

Comment: Section 1.7.2 of the Revised GEIS expressly states that NRC "will not make a decision or any recommendation on the basis of the information presented in this GEIS regarding the disposition of" SNF. This section continues that the agency's rules "leave[] the onsite storage of spent nuclear fuel during the term of plant operation as the only option at the time of license renewal." *Id.* While acknowledging that the NWPA mandates that the federal government is responsible for high level nuclear waste, the Revised GEIS only states that the "NRC is confident that there will eventually be a licensed high-level waste repository." *Id.* The Revised GEIS thus concludes that SNF "will be safely stored either onsite or' at offsite interim storage facilities." *Id.*

This approach is inconsistent with NEPA. The purpose of an environmental review is to allow decision makers to know and understand the full range of potential impacts to public health and safety and the environment from a proposed action. This critical goal cannot be achieved if major impacts are ignored.

Specifically, the Revised GEIS states it documents the means used by the NRC "to evaluate the environmental consequences of renewing the licenses of commercial nuclear power plants and operating the plants for an additional 20 years…." Revised GEIS, S-3. The Revised GEIS then lists a series of important potential environmental impacts to land use, air quality, surface water, groundwater, and threatened and endangered species. Revised GEIS, pp. S-6 through S-11. Nowhere does the Revised GEIS describe the potential impact to these resources from a fire or other incident at a spent fuel pool. This failing alone is a violation of NEPA because the

Revised GEIS fully recognizes that relicensing will result in materially increased storage of SNF onsite at each nuclear power station, but fails to address the environmental consequences of that additional storage. (CT AG-10-5)

Response: *Impacts associated with potential severe accidents at spent fuel pools during the license renewal term are discussed in Section 4.9.1.2 and Appendix E of the GEIS. The impacts associated with onsite storage of spent nuclear fuel are discussed in Section 4.11.1.2 of the GEIS. The conclusion reached by the Commission is that the environmental impacts from accidents at spent fuel pools (SFPs) can be comparable to those from reactor accidents at full power. Subsequent analyses performed and mitigative measures employed since 2001 have further lowered the risk of this class of accidents. In addition, even the conservative estimates from NRC technical reports are much less than the impacts from full power reactor accidents, as estimated in the 1996 GEIS. Terrorism is outside the scope of the GEIS. However, the NRC believes that the consequences of terrorist-initiated events would be comparable to or bounded by the severe accidents considered in the GEIS.*

The issue of an accident involving, or a terrorist attack upon, the spent fuel pool was specifically addressed by the NRC in two Petitions for Rulemaking (PRM): PRM-51-10 and PRM-51-12, submitted by the Attorney General of the Commonwealth of Massachusetts and the Attorney General of California, respectively. The details of the petitions and the NRC's evaluations of those petitions are available to the public through the ADAMS electronic reading room (at www.NRC.gov using ADAMS accession number ML081890124) and in the Federal e-Rulemaking Portal (http://www.regulations.gov, Docket ID [NRC-2006-0022] (PRM-51-10), and [NRC-2007-0019] (PRM-51-12); also at 73 FR 46204 (August 8, 2008). The Petitioners requested that the NRC initiate a rulemaking concerning the environmental impacts of the high-density storage of spent nuclear fuel in spent fuel pools (SFPs). The Petitioners asserted that "new and significant information" shows that the NRC incorrectly characterized the environmental impacts of high-density spent fuel storage as "insignificant" in the 1996 GEIS for the renewal of nuclear power plant licenses. Specifically, the Petitioners asserted that spent fuel stored in high-density SFPs is more vulnerable to a zirconium fire than the NRC concluded in its NEPA analysis.

In August 2008, the Commission denied the petitions,[z] stating:

> *Based upon its review of the petitions, the NRC has determined that the studies upon which the Petitioners rely do not constitute new and significant information. The NRC has further determined that its findings related to the storage of spent*

(z) The NRC decision to deny the two rulemaking petitions was upheld by the United States Court of Appeals for the Second Circuit. *New York v. the Nuclear Regulatory Commission*, 589 F.3d 551 (2nd Cir. 2009).

nuclear fuel in pools, as set forth in NUREG-1437 and in Table B-1, of Appendix B to Subpart A of 10 CFR Part 51, remain valid. Thus, the NRC has met and continues to meet its obligations under NEPA. For the reasons discussed previously, the Commission denies PRM-51-10 and PRM-51-12.

Based on the NRC's evaluation (see Section 4.11.1.2 of the GEIS), onsite storage of spent nuclear fuel is a Category 1 issue.

Based on the continued validity of conclusions from the 1996 GEIS, and as affirmed by the Commission in its denial of PRM-51-10 and PRM-51-12, the NRC concludes that the onsite storage of spent fuel is properly classified as Category 1.

No changes were made to the GEIS in response to these comments.

Comment: The following principles are based on the urgent need to protect the-public from the threats posed by the current vulnerable storage of commercial irradiated fuel. The United States does not currently have a national policy for the permanent storage of high-level nuclear waste. The Obama administration has determined that the Yucca Mountain site, which has been mired in bad science and mismanagement, is not an option for geologic storage of nuclear waste. Unfortunately, reprocessing proponents have used this opportunity to promote reprocessing as the solution for managing our nuclear waste. Contrary to their claims, however, reprocessing is extremely expensive, highly polluting, and a proliferation threat, and will actually complicate-the management of irradiated fuel. Nor will reprocessing obviate-the need for, or "save space" in, a geologic repository. The United States has a unique opportunity to re-evaluate our nuclear waste management plan. We can make wise decisions about safeguarding radioactive waste or go down the risky, costly, and proliferation prone path towards reprocessing.

The undersigned organizations' support for improving the protection of radioactive waste stored at reactor sites is a matter of security and is in no way an indication that we support nuclear power and the generation of more nuclear waste.

- Require a low-density, open-frame layout for fuel pools: Fuel pools were originally designed for temporary storage of a limited number of irradiated fuel assemblies in a low density, open frame, configuration. As the amount of waste generated has increased beyond the designed capacity, the pools :have been reorganized so that the concentration of fuel in the pools is nearly the same as that in operating reactor cores. If water is lost from a densely packed pool as the result of an attack or an accident, cooling by ambient air would likely be insufficient to prevent a fire, resulting in the release of large quantities of radioactivity to the environment. A low density, open-frame arrangement within fuel pools could allow enough air circulation to keep the fuel from

catching fire. In order to achieve and maintain this arrangement within the pools, irradiated, fuel must be transferred from the pools to dry storage within five years of being discharged from the reactor.

- Establish hardened on-site storage (HOSS): Irradiated fuel must be stored as safely as possible as close to the. site-of generation as possible. Waste moved from fuel pools must be safeguarded in hardened, on-site storage (HOSS) facilities. Transporting waste to interim away-from-reactor storage should not be done unless the reactor site is unsuitable for a HOSS facility and the move increases the safety and security of the waste. HOSS facilities must not be regarded as a permanent waste solution, and thus should not be constructed deep underground. The waste, must be retrievable, and real-time radiation and heat monitoring at the HOSS facility must be implemented for early detection of radiation releases and overheating. The overall objective of HOSS should be that the amount of releases projected in even severe attacks should be low enough that the storage system would be unattractive as a terrorist target. Design criteria that would correspond to the overall objective must include:

  - Resistance to severe attacks such as a direct hit by high-explosive or deeply penetrating weapons and munitions or a direct hit by a large aircraft loaded with fuel or a small aircraft loaded with fuel and/or explosives, without major releases.

  - Placement of individual canisters that makes detection difficult 'from outside the site boundary.

- Protect fuel pools: Irradiated fuel must be kept in pools for several years before it can be stored in a dry facility. The pools must -be protected to withstand an attack by air, land, or water from a force at least equal in size and coordination to-the 9/11 attacks. The security improvements must be approved by-a panel of experts independent of the nuclear industry and the Nuclear Regulatory Commission.

- Require periodic review of HOSS, facilities and fuel pools: An annual report consisting of the review of each HOSS facility and fuel pool should be prepared with meaningful participation from public stakeholders, regulators, and utility managers at each site The report must be made publicly available and may include recommendations for actions to be taken.

- Dedicate funding to local and state governments to independently monitor the sites: Funding for monitoring the HOSS facilities at each site must be provided to affected local and state governments. The affected public must have the right to fully participate.

- Prohibit reprocessing: The-reprocessing of irradiated fuel has not-solved the nuclear waste problem in any country, and actually exacerbates it by creating numerous additional waste streams that must-be managed. In-addition to-being expensive and polluting, reprocessing also increases nuclear weapons proliferation threats. (Schumann-27-1)

Response: *As discussed in Sections 4.11.1 and 4.9.1.2 of the GEIS, the NRC has evaluated the impacts associated with onsite storage of spent fuel, including the impacts of potential severe accidents in spent fuel pools. The conclusions reached by the Commission are that such storage could be accomplished safely and without significant environmental impact. Onsite storage of spent nuclear fuel during the license renewal term is a Category 1 issue.*

The impacts associated with transportation and disposal of spent nuclear fuel are discussed in Sections 4.12.1.1 and 4.11.1, respectively. The impacts associated with transportation are considered to be SMALL and are designated as a Category 1 issue

If the NRC were to receive an application to build and operate a reprocessing facility in the United States, the NRC would conduct the appropriate safety and environmental reviews and would make sure that the facility would be built and operated in accordance with established rules and regulations.

No changes were made to the GEIS in response to this comment.

Comment: Page 1−9 to 1–12: Decisions outside the regulatory scope of license renewal that cannot be made on the basis of the final GEIS analysis. These decisions include the following five issues:
1. Changes to Plant Cooling Systems (EPA and state of California decisions)
2. Disposition of Spent Nuclear Fuel − The NRC will not make a decision or any recommendations on the basis of the information presented in this GEIS regarding the disposition of spent nuclear fuel at nuclear power plants. The NRC's Waste Confidence Rule (10 CFR 51.23) leaves the onsite storage of spent nuclear fuel during the term of plant operation as the only option at the time of license renewal. Within the context of a license renewal environmental review, the NRC concluded that the storage of spent nuclear fuel can be accomplished safely and without significant environmental impacts.

If the ultimate disposition of spent nuclear fuel are ongoing and outside the regulatory scope of this GEIS, will this issue be allowed to be reviewed as a Category 2 site-specific issue? If the resolution of this issue is being decided in another NRC forum, will NGO, county and/or state oversight be allowed to review this resolution and reopen license renewal proceedings if they believe the economy or reliability of state energy generation will be challenged?

As California's reactors are located on seismically active and/or eroding coastal zones, A4NR seeks assurance this issue will be heavily weighed in an open and transparent proceeding. It is one thing to "grandfather in" the "temporary" storage of radioactive waste generated during the original licensed period of operation of the reactors; no such "grandfathering" can escape updated and separate review for a license period for which the NRC and the Federal government had predicted and guaranteed off-site storage of the waste. If such assurance cannot be guaranteed, then A4NR recommends that any California utilities applications for license renewal be stayed, until the same conditions requiring the permanent disposition of high-level radioactive waste as outlined in California Public Resource Code section 25524 are met. (A4NR-11-5)

Comment: The U.S. Senate defunded the Yucca Mountain project in the 2009 Energy Budget, and the project fairs no better under the position of the current administration-as reported by the Bloomberg news (February 26, 2009):

Obama and Energy Secretary Steven Chu "have been emphatic that nuclear waste storage at Yucca Mountain is not an option, period," said department spokeswoman Stephanie Mueller. The federal budget plan Obama released today "clearly reflects that commitment," she said.

Therefore, the public questions any NRC approvals of license renewals if storage of high-level waste is to remain on site indefinitely. The criteria for siting a permanent high-level radioactive waste facility should also be applied to "temporary" onsite storage. The utilities, the state, and the public never anticipated onsite storage, nor were contentions allowed to address the criteria for waste storage based on the NRC's high-level radioactive permanent waste storage rules and regulations. Instead the NRC assured the public that the onsite dry cask storage would be "temporary". No definition for "temporary" exists in the record of these proceedings. However, A4NR believes that the *up to* a *hundred year* timeframe oft mentioned by the industry must meet the same criteria for a permanent site and should therefore be investigated.

The NRC is confident that there will eventually be a licensed high-level waste repository. If the site near Yucca Mountain is eventually found to be unsuitable, alternative sites will be considered. Until a permanent high-level waste repository is operational. the spent nuclear fuel will be safely stored either onsite or at offsite interim storage facilities (NRC 2006).

As the public and the state have waited over four decades for a permanent high-level radioactive waste repository and in 2010 we appear to be back at square one, on what does the NRC base its confidence in the eventuality of a licensed high-level radioactive waste repository? Please be specific. (A4NR-11-6)

Response: *The impacts associated with onsite storage of spent nuclear fuel, waste management, and pollution prevention activities at nuclear power plant sites are discussed in*

Section 4.11.1 of the GEIS. The waste types considered include low-level radioactive waste, spent nuclear fuel, mixed waste, and nonradiological waste. All of the issues considered with respect to onsite storage and handling of these waste types during the license renewal term are considered to be Category 1 issues.

The Commission is aware that the Yucca Mountain repository may not be available. As an alternative, the Commission has considered the storage of spent nuclear fuel on reactor sites where it is generated.

The NRC is committed to ensuring that both spent nuclear fuel and low-level radioactive wastes are managed to prevent health impacts to the public. Spent nuclear fuel is currently stored at reactor sites in the spent fuel pools and/or in independent spent fuel storage installations (ISFSIs). This practice is expected to continue until DOE is ready to take possession of the spent nuclear fuel. At this time, it is uncertain when this will happen.

Interim storage needs vary among plants, with older units having less available pool storage capacity than newer ones. However, given the uncertainty as to when a geologic repository will open and lack of other options, it is likely that some sort of expanded spent fuel storage capacity beyond the original design capacity will be needed at all nuclear power plants.

On March 3, 2010, DOE submitted a motion to the Atomic Safety and Licensing Board to withdraw its application for a permanent geologic repository at Yucca Mountain, Nevada. In light of the uncertainty surrounding the use of Yucca Mountain, if another repository for spent nuclear fuel is proposed, an environmental impact statement would be prepared.

For spent nuclear fuel, the Waste Confidence Decision and Rule represented the Commission's generic determination that spent nuclear fuel can continue to be stored safely and without significant environmental impacts for a period of time after the end of the licensed life for operation of a nuclear power plant (after the permanent shutdown of the power reactor and expiration of the plant's operating license). This generic determination, codified in 10 CFR 51.23(a), meant that the NRC did not need to consider the storage of spent nuclear fuel after the end of a reactor's licensed life for operation in the National Environmental Policy Act (NEPA) documents that support its reactor and spent-fuel storage license application reviews.

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Appeals, in New York v. NRC, 681 F.3d 471 (D.C. Cir. 2012), vacated the NRC's Waste Confidence Decision and Rule, after finding that it did not comply with NEPA.

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In accordance with CLI-12-16, the NRC will not approve any site-specific license renewal applications until the deficiencies identified in the D.C. Circuit's decision have been resolved. Two license renewal issues that rely, wholly or in part, upon the Waste Confidence Decision and Rule are the "onsite storage of spent nuclear fuel" and "offsite radiological impacts of spent nuclear fuel and high-level waste disposal." Both of these issues were classified as Category 1 in the 1996 GEIS and the 10 CFR Part 51 final rule that was promulgated in 1996 (61 FR 28467, June 5, 1996), which codified the findings of the 1996 GEIS into 10 CFR Part 51, Subpart A, Appendix B, Table B-1. The draft revised GEIS that was published for public comment in 2009 (74 FR 38239, July 31, 2009) and the concomitant proposed rule (74 FR 38117, July 31, 2009) continued the Category 1 classification for both of these issues. As part of the NRC's response to the New York v. NRC decision, the NRC has revised these two issues accordingly.

Specifically, the NRC has revised the Category 1 issue, "Onsite storage of spent nuclear fuel," to narrow the period of onsite storage to the license renewal term. In both the 1996 GEIS and rule and the 2009 draft revised GEIS and proposed rule, the NRC relied upon the Waste Confidence Decision and Rule to make a generic finding that spent nuclear fuel could be stored safely onsite with no more than a small environmental impact for the term of the extended license (from approval of the license renewal application to the expiration of the operating

license) plus a 30 year period following the permanent shutdown of the power reactor and expiration of the operating license.

The Waste Confidence Decision and Rule provided the basis for the 30 year period following the permanent shutdown of the reactor and expiration of the operating license. The 2010 Waste Confidence Decision and Rule extended this post-reactor shutdown onsite storage period from 30 years to 60 years. Given the New York v. NRC decision, and pending the issuance of a generic EIS and revised Waste Confidence Decision and Rule (as directed by SRM-COMSECY-12-0016), the period of onsite storage of spent nuclear fuel following the permanent shutdown of the power reactor and expiration of the operating license is now excluded from this GEIS issue. This issue now only covers the onsite storage of spent fuel during the license renewal term.

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Upon issuance of the revised Waste Confidence Decision and Rule and its supporting generic EIS, the NRC will make any necessary conforming amendments to its regulations in 10 CFR Part 51 and supplement the GEIS as necessary. As referenced previously, the Commission will not approve any license renewal application for an operating nuclear power plant until the issues identified in the New York v. NRC court's decision are appropriately addressed by the Commission.

Comment: As California has learned that at least one new major-active fault now exists 1800 feet from Diablo Canyon and that the coastline at San Onofre beach is eroding at increased rates within the last year, it is the *state* and not the NRC who should determine if continued production of highly radioactive waste during a license renewal ─ and for an indefinite and undefined period of storage ─ will impact the state's economy and its grid reliability. (A4NR-11-7)

Response: *The Atomic Energy Act of 1954 (as amended) gives NRC the authority to issue licenses for commercial power reactors. The license is based on adherence of the licensee to operate the plant in accordance with the NRC regulations contained in the Code of Federal Regulations, Title 10. The NRC regulations allow the renewal of these licenses for up to an*

additional 20 years depending on the outcome of NRC's assessment to determine whether the nuclear facility can continue to operate safely during the 20-year period of extended operation. Issues related to seismicity and coastline erosion are considered as part of the safety evaluation NRC conducts for license renewals. Issues related to the State's economy and its grid reliability are not within NRC jurisdictional authority.

No changes were made to the GEIS in response to this comment.

Comment: Scenarios for transport of nuclear waste include trucks on our major highways, trains, and barges. Seven million Californians live within one mile of proposed routes, and none of these modes can be protected from terrorist strikes or accidents. In California alone there were 1,880 tractor-trailer accidents between 1994 and 2000 and 4,264 train wrecks from 1990 to 2001. These statistics represent a fraction of the accidents across our nation, and the tragedy of just one accident involving nuclear waste would be devastating.

As recently as July 8, 2003, California requested a halt to medium-waste shipments of nuclear materials. This action was taken to protect California residents and "first responders" from the inherent dangers of nuclear waste spills arising from accidents and/or sabotage − and supported by California's Senator Feinstein.[5] Nuclear power plant license renewals increase the necessity of a greater number of shipments and thus the odds of such a lethal accident.

[[5] AP]

To quote from the Los Angeles scenario of the Environmental Working Group: "Given the unanimous agreement that train or truck accidents are inevitable during the tens of thousands of radioactive waste shipment to Yucca Mountain, we believe people have a right to know what would happen if one of those accidents led to a release of radioactive materials in their town. ...The number of people exposed to unsafe doses of radiation is entirely dependent on the timing and location of the accident or attack."[6]

[[6] What if...A nuclear waste accident scenario in Los Angeles, Ca Richard Wiles, James R. Cox, June 27, 2002 www.mapscience.org]

The NRC must consider the full consequences of high-level radioactive waste transportation before it can determine the GEIS of nuclear power plant license renewals.

While the 2009 draft GEIS mentions transport issues in several sections, it does not address the eventual transport of additional "spent" fuel that will be produced during the license renewal period. It is clear this issue cannot be discussed until there is a permanent repository accepting radioactive waste. And yet, a recent notice by the NRC of the transport of spent fuel from the Pilgrim Plant, Massachusetts, to the GE Vallecitos plant in California creates questions that

must be discussed in any future license renewal cases.[7] Where will current radioactive material be stored and where does the NRC and the utility anticipate storing radioactive waste produced during the renewal period?

[[7] Enclosure 1 Page 1 of 3 OFFICE OF NUCLEAR SECURITY AND INCIDENT RESPONSE DIVISION OF SECURITY POLICY DECEMBER 2009 IRRADIATED REACTOR FUEL ROUTE SUMMARY **(233)** PILGRIM NUCLEAR POWER PLANT, PLYMOUTH, MA TO GE ALLECITOS, SUNOL, CA]

Until a permanent storage facility is in operation and transport routes have been resolved no license renewals should be approved by the NRC. In addition, no license renewal applications should be allowed to be filed by the state of California until the economic impacts of transport routes are addressed and resolved in a public forum. (A4NR-11-28)

Response: *The impacts associated with transporting fresh fuel and spent fuel and radioactive waste from a light water reactor are contained in Table S-4 in 10 CFR Part 51.52. Every environmental report prepared for the construction permit stage of a commercial nuclear power plant must contain a statement concerning the transport of fuel and radioactive waste to and from the reactor. Table S-4 forms the basis for such a statement. A discussion of the values in Table S-4 and how they may change during the license renewal term was included in Section 6.3 of the 1996 GEIS.*

In 1999, the NRC issued an addendum to the 1996 GEIS in which the agency evaluated the applicability of Table S-4 to future license renewal proceedings. In the addendum, the NRC evaluated the impacts of shipping more highly enriched fresh fuel and higher-burnup spent fuel. The NRC concluded that the values in Table S-4 would be bounding. At this time, the conditions evaluated in the addendum have not changed, and no new conditions have been introduced that would alter the conclusions in the addendum. Accordingly, the NRC has determined that the transportation of nuclear fuel is generic to all nuclear power plants and is a Category 1 issue.

Additionally, the impacts of transporting spent nuclear fuel from reactor sites to the proposed repository at Yucca Mountain are addressed in U.S. Department of Energy's (DOE's) Final and Supplemental Environmental Impact Statements for a "Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada" (DOE 2002, 2008). The Yucca Mountain FEIS (DOE 2002) and Repository SEIS (DOE 2008) provide estimates of State-specific transportation impacts and representative transportation routes for 44 States and the District of Columbia. DOE identified representative highway routes in accordance with U.S. Department of Transportation routing regulations (49 CFR Part 397, Subpart D), which require the use of preferred routes (Interstate System highway, beltway or bypass, or State or Tribal designated alternate) that reduce time in transit. Since it will be many years before shipments could begin, DOE cannot determine the exact

routes that would be used for shipments to Yucca Mountain. Construction and modification of highways may require changes to preferred routes, and States and Tribes may designate alternate preferred highway routes in the interim.

However, on March 3, 2010, DOE submitted a motion to the Atomic Safety and Licensing Board to withdraw its application for a permanent geologic repository at Yucca Mountain, Nevada. In light of the uncertainty surrounding the use of Yucca Mountain, if another repository for spent nuclear fuel is proposed, an environmental impact statement would be prepared.

The NRC has conducted several studies to evaluate the risks associated with the transportation of radioactive material. The NRC issued the Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes, NUREG-0170 (NRC 1977), which was published in 1977 to support the 10 CFR Part 71, "Packaging and Transportation of Radioactive Material" rulemaking. Based on the NRC staff's recommendations in NUREG-0170, the Commission concluded that the transportation regulations are adequate to protect the public from the risks associated with the transportation of radioactive materials, including spent nuclear fuel. The NRC sponsored another study in the 1980s titled Shipping Container Response to Severe Highway and Railway Accident Conditions, NUREG/CR-4829 (Fischer et al. 1987), also known as the "Modal Study." Based on the results of NUREG/CR-4829, the NRC concluded that NUREG-0170 overestimated spent fuel accident risks by about a factor of three. In the 1990s, the NRC initiated a spent fuel study titled Reexamination of Spent Fuel Shipment Risk Estimates, NUREG/CR-6672, which was published in 2000 (Sprung et al. 2000). NUREG/CR-6672 focused on the risks of a modern spent fuel transport campaign from reactor sites to possible interim storage sites and/or permanent geologic repositories. This study concluded that accident risks were much less than those estimated in NUREG-0170 and that more than 99.99 percent of transportation accidents are not severe enough to cause a release of radioactive material from a NRC-certified spent fuel cask. While very severe accidents could cause cask damage, the studies show that releases of material would be small and pose little risk to the local population/public. The most severe accidents might cause greater releases, but their likelihood is so remote that the NRC considers the risk to public health to be low.

The NRC has also sponsored studies to analyze the consequences of specific accident scenarios on rail and truck transportation casks carrying spent fuel. For example, the NRC undertook an investigation of a July 2001 accident that involved a freight train carrying hazardous materials that derailed and caught fire while passing through the Howard Street railroad tunnel in downtown Baltimore, Maryland, to determine the possible regulatory implications of this particular event for the transportation of spent fuel by railroad. The NRC assembled a team of experts from the National Institute of Standards (PNNL) to determine the thermal conditions that existed in the Howard Street tunnel fire and to analyze the effects of this fire on various spent fuel transportation cask designs. The NRC concluded that the spent fuel transportation casks analyzed would withstand a fire with thermal conditions similar to those that

existed in the Baltimore tunnel fire event. No release of radioactive materials would result from exposure of the casks analyzed to such an event.

The NRC has already considered and addressed the issue of transportation of spent nuclear fuel in the revised GEIS and the comments do not present any significant new information that would warrant a change to the final revised GEIS.

Comment: Of the issues identified in the DGEIS as "small", DOS recommends that the following should be elevated to the moderate or large category and be required to be addressed in detail in a site-specific SEIS.

Offsite radiological impacts: Aging infrastructure may exacerbate offsite impacts attributable to radiological influences. Differing physical characteristics of nuclear facility sites warrant consideration of offsite radiological impacts in a SEIS. (NY DOS-18-9)

Response: *The radiological impacts from nuclear fuel cycle facilities are discussed in Sections 4.11.1 and 4.12.1.1 of GEIS*

In its evaluation, the NRC considered typical facilities and made conservative assumptions to account for the differing age and condition of various facilities that make up the nuclear fuel cycle.

The comment raises aging infrastructure as a factor in potentially exacerbating offsite radiological impacts. The aging management of plant systems, structures, and components is considered during the license renewal safety review, which is governed by 10 CFR Part 54. As such, it is outside the scope of the environmental review for license renewal.

No changes were made to the GEIS in response to this comment.

Comment: Table S-3 is Grossly Outdated and Inadequate to Support License Renewal Decisions: In the License Renewal GEIS, the NRC proposes to continue to rely on a generic determination, codified in Table S-3, that the human health impacts of disposing of the radioactive waste generated by that plant are insignificant. Table S-3 is now over 30 years old, and has become grossly outdated. *See* attached *Comments* of *the Institute for Energy and Environmental Research (IEER) on the U.S. Nuclear Regulatory Commission's Proposed Waste Confidence Rule Update and Proposed Rule Regarding Environmental Impacts* of *Temporary Spent Fuel Storage* (February 6, 2009).

(Attachment 4). As discussed in IEER's comments, the findings of Table S-3 are severely outdated, and the table significantly underestimates the human health impacts of the uranium fuel cycle, including the impacts of disposing of spent fuel, greater than Class C waste, and low level radioactive waste.

For example, the assumptions on which Table S-3 depends include the assumption that spent fuel will be disposed of in a bedded salt repository. But in its Proposed Waste Confidence Decision, the NRC itself states that salt repositories are now considered suitable only for reprocessed high-level waste and not for spent fuel disposal. 73 Fed. Reg. 59547, 59555 (October 9, 2008). As discussed in IEER's Comments, all other repository types are now considered likely to have radioactive releases after the repository has been sealed. The hypothesis that releases from spent fuel disposal could be zero has therefore been discredited. Indeed, there are plausible circumstances in which releases could exceed the requirements of safe disposal as defined by radiation protection standards. In order to ensure that its licensing decisions for nuclear power plants comply with NEPA by fully addressing the environmental impacts of the radioactive waste they will generate, the NRC must completely overhaul Table S-3 and integrate it with a more comprehensive analysis of all of the environmental impacts and costs of the licensing of nuclear power plants, including the impacts and costs of the plants themselves and the wastes they will generate. *See* IEER Comments.

Table S-3 also erroneously concludes that it is conservative to assume gaseous releases of certain radionuclides, notably I-129, from reprocessing prior to sealing of a repository rather than to assume their release into water after disposal of spent fuel. *See* IEER Comments.

Finally, Table S-3 contains no discussion of the environmental impacts of the disposal of depleted uranium tails, which are potentially significant. *See* attached Institute for Energy and Environmental Research, *Comments on the Nuclear Regulatory Commission's Rulemaking Regarding the "Safe Disposal* of *Unique Waste Streams Including Significant Quantities* of *Depleted Uranium* (October 30, 2009). (SLOMFP-13-6)

Response: *Environmental impacts associated with the uranium fuel cycle as they apply to license renewal are discussed in Section 4.12.1 of the GEIS. The discussion encompasses the applicability and adequacy of Table S-3 in 10 CFR Part 51.51. Among the issues discussed are the impacts associated with the management and disposal of depleted uranium hexafluoride (UF_6) tails. The conclusion is that Table S-3 is still applicable and the impacts discussed therein are bounding for the purposes of discussing the impacts associated with the uranium fuel cycle as they apply to license renewal. No changes were made to the GEIS in response to this comment.*

A.2.1.11 Comments Concerning Cumulative Impacts

Comment: Finally, the cumulative impacts. I learned tonight that cumulative impacts are being classified as a category 2 impact. In other words, that the cumulative impacts will be looked at on a case-by-case basis in each relicensing. In some degree, that's reassuring, but I think it needs to at least be acknowledged that there's a difference between the impact of relicensing one nuclear power plant and the cumulative impact of hundreds of nuclear power plants.

We have certain individuals in Congress right now who are proposing that we build what I at least think of as a hundred new targets of opportunity for terrorists throughout our country as an energy plan. Anyone of those doesn't present the same potential as the cumulative impact of all of them and so, I think it needs to be clearly stated that cumulative impacts will be considered in each relicensing process. (DPCA-Nader-22)

Response: *For plant-specific supplements to the GEIS, the cumulative impacts analysis would evaluate the cumulative effects of actions, including the continued operation of the nuclear power plant over the license renewal term, within a defined region of influence near the plant. Given the distance between most operating plants that would be considered for license renewal, it is unlikely that the impacts of these plants would affect the same resources and therefore result in cumulative effects. An area where cumulative effects may be possible relate to the uranium fuel cycle. Impacts related to the collective effects of the uranium fuel cycle (e.g., offsite radiological and transportation impacts) are evaluated in Section 4.12.1 of the GEIS (see also Section 3.9 for a discussion of collective and occupational doses for U.S. commercial nuclear power plants). It should also be noted that environmental monitoring programs at individual power plants are performed in accordance with 10 CFR Parts 20 and 50 to ensure that radiological doses to the public and sensitive resources remain within applicable regulatory limits. These monitoring programs measure total dose and therefore account for any cumulative dose resulting from power plants that are in relatively close proximity to each other. With regard to the issue of security, risk from terrorist acts against nuclear power plants, and emergency preparedness, these issues are considered outside of the regulatory scope of license renewal environmental reviews, but are considered by the NRC under different programs. Cumulative effects are discussed in more detail in Section 4.13 of the GEIS.*

No changes were made to the GEIS as a result of this comment.

Comment: I'm actually employed by Exelon Generation Company but I am here this evening speaking on behalf of the Nuclear Energy Institute which is also known as NEI.

NEI is a policy organization of the Nuclear Energy & Technologies Industry, and participates in both national and global policy making process. In July of 2009, NEI constituted an ad hoc task force consisting of representatives from 14 of its member organizations to review and prepare comments on NRC's draft updated GEIS and the accompanying proposed rule making draft regulatory guide and standard review plan. It is as a member of NEI's task force that I am here now.

Now, moving to my comments of which there are basically two, these are directed to the draft updated GEIS only since other representatives on the NEI task force have already addressed at other public meetings the proposed rule making as well as additional comments on the GEIS. First, the draft updated GEIS observes that during the period of extended operation for a nuclear plant, certain issues could contribute to cumulative impacts, and that such issues would require plant-specific analysis as part of the license renewal review.

Industry is concerned about the methods and the scope NRC intends to apply in implementing site-specific cumulative impacts assessments. For example, in some currently ongoing reviews of license renewal applications, NRC appears to be pursuing assessments of cumulative impacts on aquatic resources that duplicate the environmental reviews conducted by other regulatory agencies under authority of the Clean Water Act. Industry believes this approach is inappropriate and would noticeably increase the length of license renewal reports and the burden of preparing them without improving the efficiency of the regulatory process.

Accordingly, industry encourages NRC to adopt an approach for implementing site specific cumulative assessments for renewal of nuclear plant operating licenses that avoids duplicating environmental reviews performed by other agencies under federal legal authority. We suggest that the GEIS and site-specific GEIS's acknowledge that the outcomes of environmental reviews performed by other regulatory agencies under federal legal authority will be protective of the environment and focus on whether license renewal applicants are complying with the technical process requirements of the other agencies. (OBIL-NEI-7)

Response: *In the cumulative impact assessments presented in plant-specific supplements to the GEIS, the NRC would rely on best available information with regard to the past, present, and reasonably foreseeable impacts of other actions on the environment. In performing the assessment, the NRC would rely on the findings of environmental reviews conducted by other regulatory agencies to the extent practicable. As stated in the introduction to Section 4.13 of the GEIS, for some resource areas (e.g., water and aquatic resources), the contributions of ongoing*

actions within a region on cumulative impacts are regulated and monitored through a permitting process (e.g., NPDES) under State or Federal authority. In these cases, it may be assumed that cumulative impacts are managed as long as these actions (facilities) are in compliance with their respective permits. However, as required by NEPA and the NRC's own regulations,[(aa)] the NRC is obligated to perform its own assessment of the impacts of the proposed action, including any cumulative impacts. If the NRC determines that license renewal would result in a change in impact level (i.e., from SMALL to MODERATE, or MODERATE to LARGE), the NRC may recommend mitigation measures to ensure that such impacts are avoided, minimized, or compensated. No changes were made to the GEIS in response to this comment.

Comment: [H]ave there been site specific studies of already health damage linked to radiation, such as at the Pilgrim Nuclear Power Plant? [See identifier NMA-PW-10 for the prior, related comment.] That would be relevant to making it a category two issue. And you talk about cumulative effects. Well, to my mind, that's a back door in because we know there is a synergistic effect between radiation and other toxins, each enhancing one another's mischief, if you will. So if you happen to have the misfortune of being near a nuke, near a chemical plant, near maybe a coal plant, probably your odds are greater for coming, for being effected, your health being affected, than if you are by a nuclear power plant in the middle of a corn field someplace.

Now that's just not my speculation, there's a mountain of research on the synergistic effects of various toxins and, hence, that would make it a site specific issue. And so to call it a category one, one can only do that if you are ignoring or just cherry picking and say this is what we want to believe because it's good really for our industry, but it's not honest and I think the public knows that. There have been cases of it being brought up in adjudication hearings going forward. (NMA-PW-11)

Response: *As stated in Section 4.13 of the GEIS, cumulative impacts are considered a Category 2 issue that requires a plant-specific review of the effects of license renewal. As a result, human health issues related to exposures to radiological and chemical hazards, referred to by the commenter, would be evaluated on a plant-specific basis. Section 4.13.11 addresses these types of impacts. No changes were made to the GEIS in response to this comment.*

Comment: Actually, this is a question regarding cumulative impacts. My best thinking is in the shower and this morning, while thinking about this, I came up with a good one. Is this an opportunity or did you intend it for an opportunity, watch NEI run, to consider this as a mouse hole for health impacts? That we know, for example, that the radiations effects are cumulative, right? So the more you've been nailed by a few millirem, it adds up, right? And we know there

(aa) See 10 CFR 51.71(d).

is a synergistic effect of radiation and other toxins, so this is all a cumulative impact which would seem to fit neatly into that category.

The genius thought this morning, in my small mind, by myself, nobody else thought it was genius because I hadn't shared it yet, was the impact of global climate change. So this is really looking at it from another direction, but then it swings back around again, that there would be a cumulative impact. I mean Al Gore, everybody is, true, everybody is talking about climate change, it's no longer a fantasy of Texans' imagination, right? So what are the potential consequences on a coastal environment, reactors that are on a coast?

Well I've been thinking about that because we noticed that the tides are far greater where we are and we noticed that the coastlines are eroding. We noticed that there's an increased salinity in the ocean and I was fixated on buried pipes and corrosion because of this endless adjudication process and so therefore what would be the impact, for example, on increased salinity of buried pipes that were built originally not to be under water that we can project may be under water, on corrosion and then more leaking out into the environment would be an example.

Also, we have been told and we have seen the increased frequency and violence of storms, Northeast storms, etcetera, that's another impact to be considered, not for the storms that were analyzed 40 years ago or are seen today but for what is projected in the future. Then you look at reactors that are on lakes, well we know some, it was some in Georgia, they couldn't operate because the lakes went dry and who were dependent upon once through cooling mechanisms, what is that impact?

But reverse it, the impact on the environment, that then the reactor that's located on the lake, okay, in an area that's subject more to droughts, etcetera, which we see in our country, and has once through cooling, is now the water pig taking water that is already in scarce demand for the community's needs, so that would be an environmental impact caused from the cumulative effects of global warming. This was a very clever shower I had this morning. But is this what you had in mind for the cumulative impacts? (NMA-PW-21)

Comment: A commenter submitted a Sierra Club newspaper article that briefly discusses the the amounts of fossil fuel energy needed to produce the nuclear energy fuel cycle for one 1000 megawatt nuclear reactor. The article concludes by saying that to cope with global warming, we must forgo building nuclear power plants and shift to conservation and alternative, renewable energies sources (e.g., wind, solar, and hydroelectric power). (Anon2-23-9)

Response: *Like other Federal agencies, the NRC is developing guidance to evaluate the effects of greenhouse gas emissions and global climate change in the environmental review for new reactors and license renewal. Changes in climate have the potential to affect air and water*

resources, ecological resources, and human health, and should be taken into account when evaluating cumulative impacts over the license renewal term. A new section summarizing the potential cumulative impacts of global climate change has been added to Section 4.13 of the GEIS (climate change is also discussed in Section 4.12.3.2). It should be noted that the effects of climate change on the safe design and operation of a nuclear power plant would be evaluated as part of NRC's safety review of license renewals, rather than as part of the environmental review.

Comment: Page 2-16, Table 2.1-1 (Cumulative Impacts): In the Table 2.1-1 column labeled "Impact," the entry for the "Cumulative Impacts" issue reads as follows:

(Category 2). Cumulative impacts of license renewal must be considered on a plant-specific basis. Impacts would depend on regional resource characteristics, the resource-specific impacts of license renewal, and the cumulative significance of other factors affecting the resource.

An applicant for license renewal of a nuclear power plant would not have access to all information necessary about other projects (over which the applicant has no control) in the vicinity to support an assessment of cumulative impacts of license renewal. Accordingly, the NRC is encouraged to change the scope described in Table 2.1-1 of the "Cumulative Impacts" issue such that any assessment of cumulative impacts in the license renewal environmental report would be limited to projects that are within the applicant's control (e.g., new nuclear generating units to be owned by the same applicant and placed on or near the site of the unit[s] for which license renewal is being sought). (NEI1-7(4)-10)

Comment: Page 4-220, line 6 to page 4-227, line 14: Text from page 4-220, line 6 through page 4-227, line 14 explains the requirement for analysis of cumulative impacts by a federal agency under NEPA, and discusses influences that would affect the magnitude of cumulative impacts for each environmental resource.

Industry understands that NEPA requires federal agencies to assess cumulative impacts from their actions in combination with other past, present, and foreseeable future actions. Notwithstanding, an applicant for license renewal of a nuclear power plant would not have access to all information necessary about other projects (over which the applicant has no control) in the vicinity to support an assessment of cumulative impacts of license renewal. Accordingly, the NRC is encouraged to limit the scope described in section 4.13 (Cumulative Impacts) in the draft updated GEIS of the cumulative impacts issue such that any assessment of cumulative impacts in a license renewal environmental report would be limited to projects that are within the applicant's control (e.g., new nuclear generating units to be owned by the same applicant and placed on or near the site of the unit[s] for which license renewal is being sought).

Clarification is also needed on the definition of “reasonably foreseeable future actions” related to cumulative impacts. Cumulative impact evaluation should have limits. The discussions on cumulative impact evaluations throughout the draft updated GEIS should clarify that such evaluations need not consider impacts caused by any of the following future events, whether or not they are reasonably foreseeable:

1. Potential alterations due to climate change or global warming – e.g., drought, flooding, or other as yet unpredictable weather related phenomena; or acts of God; (in these cases, the use of the resource during the extended license period by the plant is not the instigator of the stress on the resource, and potential impacts would occur regardless of license renewal)

2. acts of war or terrorism,

3. indiscriminate use of a resource – e.g., an assumption of uncontrolled or unregulated use of a resource. Example: a plant with no demonstrable existing impact on an existing resource should not be required to evaluate cumulative impacts under the assumption that future unregulated use of the resource could cause adverse impact to the resource.

4. If the resource is controlled by local, state, or federal, or tribal resource regulations, and no demonstrable impact to an existing resource exists, no further cumulative impacts should be required.

5. If local, state, federal or tribal regulations do not apply to the resource:
   a. if the <u>existing</u> cumulative impacts do not destabilize the resource, no further cumulative impact evaluation should be required
   b. if there are no known plans to utilize the resource that would cause demonstrable adverse impacts that would destabilize the resource, no further evaluation of cumulative impacts should be required
   c. if there are known future plans to utilize the resource that are likely to cause demonstrable adverse impacts that would destabilize the resource, and NRC denial of a renewed license would have little impact to restore the resource, no further cumulative impact should be required

6. If there are known future plans to utilize the resource that are likely to cause demonstrable adverse impacts that would destabilize the resource, and the adverse impact is directly or indirectly attributable to local, state, federal or tribal regulation, no further cumulative impact should be required (e.g., EPA 316(b) regulations or similar state or tribal regulations that would require retrofit of cooling towers that causes increased consumption of water from a small river or other water body). In this case, the NEPA evaluation of the agencies rulemaking should bear the responsibility for evaluating the environmental and

health and safety and other impacts on the resource(s) subject to the regulation. (NEI1-7(4)-28)

Response: *Cumulative impact is, by definition, the impact on the environment resulting from the incremental impact of a proposed Federal action in combination with other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR Part 1508.7). The cumulative impacts assessment, therefore, must consider relevant past, present, and future actions, including those outside of the applicant's or NRC's control. Relevant past and present actions are those with identifiable present effects, and relevant future actions are those that are reasonably foreseeable (e.g., planned) occurring within the defined regions of influence and time frame of the proposed action.*

As described in the introduction to Section 4.13 of the GEIS, reasonably foreseeable future actions to be considered as part of the cumulative impacts analysis should include actions that are ongoing (and will continue into the future); are funded for future implementation; are included in firm, near-term plans and within the region of influence; or generally have a high probability of being implemented. Neither Council on Environmental Quality (CEQ) nor NRC regulations require a catalogue or exhaustive list and analysis of all actions within the region of influence. The NRC does not seek to impose an unwarranted burden on applicants and does not intend that applicants' cumulative impacts analyses be exhaustive and/or that they cover speculative actions of which the applicant could not be expected to have knowledge. The NRC is not adopting the express list of items set forth in the comment to define what is or what is not a reasonably foreseeable future action. The NRC, in determining what action constitutes a reasonably foreseeable action, will be governed by the standard described above. The NRC agrees with the commenter, however, to the extent that acts of war or terrorism should not be considered reasonably foreseeable events in the context of the license renewal environmental review.

The NRC continues to be responsible for evaluating cumulative impacts in its SEISs for license renewal, and already requests that applicants for license renewal provide information on past, present, and reasonably foreseeable actions in the vicinity of their nuclear power plants, to the extent it is known by applicants. This requirement has not changed. However, the NRC also believes that applicants would be best equipped to identify projects and proposals and would be most knowledgeable of information pertaining to past, present, and future activities in the immediate vicinity of their nuclear plants. Trends such as global climate change should be considered, since these changes have the potential to affect air and water resources, ecological resources, and human health over the license renewal term. The NRC has and will also continue to include within each SEIS a plant-specific analysis of any impacts caused by greenhouse gas (GHG) emissions over the course of the license renewal term, as well as any

impacts caused by potential climate change upon the affected resources during the license renewal term.

No changes were made to the revised GEIS as a result of these comments.

Comment: Vol. 1, Page 4-221, lines 24 to 27: Text in lines 24 to 27 0n page 4-221 reads as follows:

> Several recent environmental analyses for license renewal applications have found that overall cumulative impacts in the region of influence of the power plant were significant (e.g., the Oyster Creek plant in New Jersey and the Susquehanna plant in Pennsylvania).

Exelon questions the NRC's characterization of the overall cumulative impacts of the Oyster Creek Nuclear Generating Station as "significant," which is undefined terminology. In Section 4.8.6 of the *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants Supplement 28: Regarding Oyster Creek Nuclear Generating Station* (NRC2007b), the NRC concludes that overall cumulative impacts ranged from SMALL to MODERATE for the Oyster Creek Nuclear Generating Station. Accordingly, Exelon suggests that it would be clearer and more consistent with NRC's approach to impact characterization in NEPA documents if the above-quoted sentence in lines 24 to 27 on page 4-221 in the draft GEIS were changed to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Several recent environmental analyses for license renewal application found that overall cumulative impacts in the region of influence of the power plant ~~were significant~~ *ranged from SMALL to MODERATE* (e.g., the Oyster Creek plant in New Jersey and the Susquehanna plant in Pennsylvania). (Exelon-17-12)

Response: *The NRC agrees that the use of the term "significant" does not provide the proper context for previous findings. The discussion in the draft revised GEIS stated that license renewal could cause "a significant contribution to cumulative impacts..." Generally, there would be no contributory effect from the continued operation of the nuclear power plant during the license renewal term on environmental conditions in the region beyond what is currently being experienced. Therefore, the only cumulative contributory effects would come from the other planned activities in the region independent of continued reactor operations. As discussed in Section 4.13 of the revised GEIS, the NRC has determined that cumulative impacts is a Category 2 issue requiring a plant-specific review. In response to this comment, Section 4.13 of the revised GEIS provides further clarification as to why cumulative impacts is a Category 2 issue.*

Comment: Cumulative Impacts Must be Addressed: SLOMFP agrees with the License Renewal GEIS Section 4.13 that the issue of cumulative impacts is a vital one, classified as Category 2, and it must be examined in and across all resource areas. SLOMFP is particularly concerned with the consequences of cumulative impacts on the degraded marine environment, human health, and waste management. (SLOMFP-13-13)

Response: *The comment expresses concern regarding the consequences of cumulative impacts. As discussed in Section 4.13 of the GEIS, the NRC has identified cumulative impacts as a Category 2 issue, which will require a plant-specific review. No changes were made to the GEIS in response to this comment.*

Comment: Cumulative Impacts: The cumulative impacts section of the draft GEIS, 4.13.12, does not discuss the obligation of an agency, in this case the NRC, to evaluate the cumulative impacts of the many individual environmental impacts on a low-income or minority population. The NRC is required to consider the overall cumulative impacts that can be expected if the individual impacts are allowed to accumulate. *See* Fritiofson v. Alexander, 772 F.2d 1225 (5th Cir. 1985). In the environmental justice context, the NRC must analyze the cumulative impact of the many impacts identified in a Supplemental EIS on an individual license renewal application on the low-income or minority populations.

The draft GEIS identifies many categories of impacts as Category 1. However, there is no discussion of what is required if a Category 1 issue is implicated by a Category 2 issue. For example, if it can be shown that endangered avian endangered species (Category 2) are being killed by transmission lines or cooling towers (Category 1), than the assumption should be that these types of Category 2 impacts must be evaluated on a site-specific basis. If health effects from radiation (Category 1) can be shown to pose a special impact on a minority or low-income population (Category 2), than those impacts must be evaluated on a site-specific basis. In other words, the Category 2 issue overrides the Category 1 designation. (PIIC-8-4)

Response: *The introduction to Section 4.13 of the GEIS provides a definition of cumulative impacts and the goal of a cumulative impacts analysis. This text clearly states that the analysis takes into account all actions, however minor, and whether or not those actions are under the jurisdiction of the action agency (in this case, the NRC). It is the intent of the GEIS to present an overview analysis of cumulative impacts for the full range of potential impact areas including environmental justice (discussed in Section 4.13.12). As described in the GEIS (Table 2.1-1 and Section 4.13), cumulative impacts are considered a Category 2 issue, and would require a site-specific analysis. The commenter is correct in the assertion that Category 2 issues, such as threatened and endangered species and environmental justice, require evaluation of all factors affecting that issue, including those that might normally be considered as Category 1 issues (e.g., human health effects or transmission lines). No changes were made to the GEIS in response to this comment.*

Comment: Please carefully examine the implications for public health and safety (and how it would impact risk assessment safety margins) of doing such major reconstruction (some varieties of which have never been done before as at San Onofre) during the current license, and then have at least one more major reconstruction if the facility is to achieve the ridiculous time frame foreseen by consideration of a multiple decade operating license extension. Another point to factor in when doing site-specific or any cumulative effects analysis is the combination of differing kinds of facilities, aging impacts on the facilities, technical glitches and human error, all combined with the major component replacement and reconstruction at the facilities. Such examinations clearly must take place under Category 2 in future NRC documents. (Campbell-31-20)

Response: *Section 4.13.11 addresses the cumulative impacts on public health in terms of exposures to radiological, chemical, and microbiological hazards as a result of environmental accumulations of constituents released by various facilities within the region of influence. Because the impacts of such exposures are considered Category 2 issues under the GEIS, they would be evaluated on a plant-specific basis (as stated in the introduction to Section 4.13 of the GEIS). Safety issues such as those related to the aging of plant facilities, however, would be evaluated as part of the NRC's safety review process. No changes were made to the GEIS in response to this comment.*

A.2.1.12 Comments Concerning Alternatives to Nuclear Power

Comment: I'm an environmentalist. I'm a naturalist. I believe that there should be more approaches to more environmentally friendly means to produce electricity. Of course, I'm not going to reinvent the wheel and I'm sure very few people care about how the direction of our production of electricity is going to be in the future. (DPCA-Costa-16)

Comment: I'm a little mixed on really what is the science. Is it more helpful to have a nuclear power plant to produce electricity versus a coal plant versus I like the hydro. I'm not sure how to say it. The one at -- I think it's Hoover Dam.

So, I think we have the means to produce electricity in different fashions. So, I would like to personally see if it's a great environmental concern to shut down the majority of them. But, we've already had too much chemicals in our atmosphere as is it. (DPCA-Costa-18)

Comment: Taking a quick look at this book, I'm sure we've all read it since it came out a few hours ago. When we go over to the renewable energy section and I don't know where these guys get off acting like experts. That's what really bothers me in that section.

Let's see. Large dams diminished due to increased public concerns over flooding, habitat alteration and loss. Okay. Well, there's public concerns about nuclear power, too, but that

hasn't had any affect. It says large dam -- hydroelectric facilities can provide 10,000 megawatts. That's ten nuclear reactors worth of energy, but you might have to divert because fish and so, therefore, let's go with the reactors.

Okay. Geothermal. Geothermal can provide 23,000 megawatts according to current technology. However, it's located far away and we'd have to build transmission lines and we're building transmission lines to get to Palo Verde just so that San Onofre has a backup nuclear reactor. I think we can build transmission lines if we need to.

Let's talk about wind turbines. They have visual resource degradation. They're ugly. San Onofre isn't, but they are. Okay. Yes, it's bird collisions, shipping lane interference, noise. You know, it's too bad nuclear reactor radiation doesn't make a little sound when it decays. It does on a Geiger counter, but too bad it's doesn't actually make that sound because then we'd be hearing it constantly and maybe we'd start to fear it.

Let's see. Photovoltaic systems aren't going to work because they've only been used in small appliances in homes and remote locations. Not a chance. Okay.

It says here that according to California there's no significant health effects from solar. Although you've managed to list the hazardous chemicals including arsine, phosphine, saline. I can't pronounce all of these. Sulfur hexafluoride. Moliptinam hexafluoride. Tungsten hexafluoride and you know what? I bet you can't find all the chemicals that are used to make nuclear fuel listed in here, but all the ones used to make solar and how bad they are, that's listed.

Okay. And ocean wave technology is in its infancy. So, therefore, it can't work. Well, they said that once about nuclear power and it wasn't all that long ago and guess what? It still doesn't work. So that’s not a reason not to give it a chance. Okay. (DPCA-AHoffman-26)

Comment: Now, the fact is we can have many comments about issues that we find deficient with the revised GEIS. They could range from, as was brought up in San Luis Obispo yesterday as well, inadequacy of thorough evaluation of alternative forms of energy which is glossed over very haphazardly. This has been noted. (DPCA-A4NR2-38)

Comment: We wish to bring to your attention several statements from the alternatives analysis in the Generic EIS:

"Presently, energy extracted from wind cannot be stored." And: "To serve as a source of commercial power, photovoltaic systems and concentrating solar power systems would need to work in conjunction with energy storage systems such as batteries."

Both of these assertions need to be revised and corrected in light of current technology.

The Generic EIS should note:

- In April of this year, as part of the American Recovery and Reinvestment Act, the Vice President outlined plans for the Dept of Energy to distribute more than $3.3 billion in smart grid technology development grants and an additional $615 million for smart grid storage.
- Xcel Energy has begun testing battery-storage technology that captures wind energy and moves it to the grid when needed. S&C Electric Company has developed a Smart Grid Storage Management System, an automatic controller that provides the ability to store energy in a battery storage system, and to control the discharge of power when required.
- Grid Storage Technologies has developed a utility scale zinc/air battery technology with a rated power capacity of I MW and 6 hours of energy storage with low maintenance cost.
- Grid support energy storage is currently a $2.4 billion market, growing at a rate of more than 3% per year. (Sierra-4-1)

Comment: I'm the director of the San Luis Obispo chapter of the Sierra Club, representing the Sierra Club's members in San Luis Obispo County. I would like to thank them, and all the other activists, residents, and the NRC for relocating these meetings in California reactor communities.

We noted, with interest, several statements from the alternatives analysis in the generic EIS.

Quote. "Presently, energy extracted from wind cannot be stored." End quote. And quote. "To serve as a source of commercial power, photovoltaic systems and concentrating solar power systems would need to work in conjunction with energy storage systems such as batteries," end quote, implying that this is an insurmountable barrier to be addressed in a distant misty future.

This is the wrong frame in which to analyze a decision on whether to permit an action that will have ramifications in a 20 year timeframe. The generic EIS should note the following. Excel Energy has begun testing battery storage technology that captures wind energy and moves it to the grid, when needed.

SNC Electric Company's SmartGrid Storage Management System provides the ability to store energy in a battery storage system, and control the discharge of power, when required.

Grid Storage Technologies has developed a utility scale zinc-air battery technology with a rated power capacity of 1 megawatt with six hours of energy storage, with low maintenance cost.

In April, as part of the American Recovery and Reinvestment Act, the vice personal representative outlined plans for the Department of Energy to distribute more than $3.3 billion in

smart grid technology development grants, and then an additional $615 million for smart grid storage.

Grid support energy storage, as an industry is currently a $2.4 billion market and is growing at more than 3 percent per year.

We also note this statement in your analysis of alternative energy sources.

Quote. "Historically, photovoltaic systems have not been used for commercial power generation but have been used in power appliance -- or rather -- used to power appliances in homes in remote locations that cannot be easily connected to the transmission grid." End quote.

We direct the NRC's attention to the nation of Germany, which is number one in the world in solar PV power generation because it has a feed-in tariff for renewable electricity, which requires utilities to pay consumers a guaranteed right for solar power they feed into the grid, which resulted in Germans installing about 1300 megawatts of new PV capacity in 2007, up from 850 megawatts in 2006. Market analysts expect solar power to supply 25 percent of Germany's electricity demand by 2050.

Closer to home, on October 11th, Governor Schwarzenegger signed two bills into law, one requiring California utilities to buy power from a larger pool of small solar generators for above-market prices, increasing market access for small-scale producers of solar power, and the other requiring utilities to pay homeowners for excess energy they generate from their wind turbines or solar panels over the course of a year.

California homeowners previously received a credit for extra energy they sent back to the grid, i.e., watching your meter spin backwards.

We are surprised to find that the NRC apparently has not heard about any of this. We wish to assure you that neither California nor Germany consists primarily of homes in remote locations that cannot be easily connected to the transmission grid.

Your version of photovoltaic solar power appears to be about 25 years out of date, in view of which we concur with the Alliance For Nuclear Responsibility, the Department of Energy, not the NRC, should be tasked with the analysis of renewable energy sources and future options, when evaluating alternatives to the relicensing of nuclear power plants and their environmental impacts. Thank you. (PBCA-Sierra-35)

Comment: We also note the following statement from your analysis of alternative energy sources:

> "Historically, photovoltaic systems have not been used for commercial power generation, but have been used to power appliances and homes in remote locations that cannot be easily connected to the transmission grid."

And here we note the use of the past-tense. "Historically," all fuel was derived from the burning of wood. In the present, we direct the NRC's attention to the nation of Germany, the world's premier market for PV solar power generation, because it has a feed-in tariff for renewable electricity, requiring utilities to pay customers a guaranteed rate for solar power they feed into the grid, a policy which resulted in Germans installing about 1,300 megawatts of new PV capacity in 2007, up from 850 megawatts in 2006. In 2008, Spain added 2,500 megawatts of PV to its installed base of solar power. As capacity has risen, installed PV system costs have been cut in half. Market analysts expect solar power to supply 25 percent of Germany's electricity demand by 2050.

On October 11th, 2009, California Governor Arnold Schwarzenegger signed two bills into law − one that increases market access for small-scale solar power producers, and one that requires utilities to pay for the excess power that owners of rooftop solar panels and backyard wind turbines feed back into the grid. California homeowners with solar panels currently receive a credit for extra energy sent to the grid. This legislation is likely to result in a significant increase in solar PV in California in the next few years.

We are surprised to find that the NRC is evidently unaware of all of the above. We assure you that neither California nor Germany consists primarily of "homes in remote locations that cannot be easily connected to the transmission grid." The GEIS's version of wind and solar power and renewable energy storage technology is cursory, severely out of date or wholly lacking, and of no use in an alternatives analysis that should evaluate the viability of nuclear power plants over a 20-year period that will be marked by increasing costs and scarcity of nuclear fuel and increasing costs of plant maintenance and repair, simultaneously with smart grid and renewable energy storage technologies coming on line as the price of solar and wind power continues to drop, all pointing toward the potential commercial obsolescence of nuclear power within the relicensed period.

For the above reasons, we strongly suggest that the Department of Energy, not the NRC, be tasked with the analysis of renewable energy sources as alternatives to the relicensing of nuclear power plants. (Sierra-4-2)

Comment: Page S-2: A full range of power generation alternatives are evaluated in the GEIS, including fossil fuel, new nuclear, and renewable energy sources. Conservation and power purchasing are also considered as alternatives to license renewal, because they represent other options for electric system planners.

As previously noted by A4NR, with regard to the NRC's inaccurate evaluation of Compressed Air Energy Storage (as one example) the NRC's information on renewable energy is out of date and incomplete.

A4NR, et al, recommend that data and statistics on the use and availability of alternative and renewable energy by evaluated by the DOE. (A4NR-11-30)

Comment: Page 2−17 Alternative Energy Sources: The NRC evaluated the environmental impacts of energy sources that may serve as alternatives to license renewal. Alternative energy sources included a variety of fossil fuel, new nuclear, renewable energy, and other alternatives such as conservation and energy efficiency as well as purchased power.

Where in the NRC's mandate is the expertise to evaluate the environmental impacts of alternative sources granted? One example is found on page 2-22 where the NRC writes: "Presently, energy extracted from wind cannot be stored." Presently, there are two Compressed Air Energy Storage systems operating in the world, one in Alabama and the other in Huntorf, Germany. In addition, PG&E-operators of Diablo Canyon-are currently applying to the Department of Energy for a $25 million Smart Grid stimulus funding grant, under the American Recovery and Reinvestment Act, for a large compressed air energy storage (CAES) project.

Given these lapses in the NRC's understanding of current alternative energy technologies, it seems that the analysis of alternatives should solely be under Department of Energy and state jurisdiction.

The NRC should request up-to-date information from the DOE and states as to amount of new MW's created by all energy sources in past decade. The NRC should also include the cost per kWh of all new energy sources (year by year) in the past decade and estimates for new MW that will generate electricity in the next decade. Finally, the NRC should also request up-to-date information from the DOE relating to the reduction in energy use and increase in efficiency programs that have reduced energy use. (A4NR-11-20)

Response: *Under NEPA, the NRC has the obligation to consider reasonable alternatives to the proposed action of renewing the license for a nuclear reactor. As stated in the comments, there are many ways to produce electricity, and the nation's energy security is best ensured with an energy portfolio that is made up of many different generating technologies. Alternatives that are capable of meeting the purpose of the proposed action, for example, future system generating needs, as such needs may be determined by State, utility, system, and, where authorized, Federal (other than NRC) decisionmakers, are considered. However, many circumstantial factors must be considered and evaluated before the NRC can conclude that a particular electricity generation technology would be a reasonable alternative to license renewal.*

Capacity, reliability, and location of the alternative technology relative to the load centers that are currently being served by the reactor, as well as the configuration and uncommitted capacity of the existing transmission infrastructure between that alternative technology and those load centers are principal considerations. To be considered a reasonable alternative, a technology must be commercially viable on a utility scale and operational prior to the expiration of the reactor's operating license or expected to become commercially viable on a utility scale and operational prior to the expiration of the reactor's operating license. Included in the technologies that are evaluated are energy technologies that are considered by most to be "environmentally friendly," including renewable energy technologies. For renewable energy technologies, additional considerations regarding the existence, quality, constancy, accessibility, capacity, and reliability of the renewable resource are equally important considerations, in addition to the condition of the interconnecting transmission systems. For example, concentrated solar power (CSP) facilities may be a feasible alternative for a nuclear reactor located close to the high-value solar resource zones in the desert Southwest, but those same facilities would not be feasible replacements for a nuclear reactor located on the East Coast. Once those evaluations are completed, the environmental impacts of technically feasible alternatives are evaluated to determine if any are environmentally superior to license renewal.

In developing its alternatives analysis, the NRC relied on published reports on each of the alternative energy technologies being considered. Importantly, the NRC's analysis of alternative energy technologies must remain focused on the purpose of the proposed action: to meet future system generating needs, as such needs may be determined by State, utility, system, and, where authorized, Federal (other than NRC) decisionmakers. The descriptions of energy technologies contained in the published draft revised GEIS were accurate representations of the commercially available technologies at the time the draft revised GEIS was published. The NRC acknowledges that, especially for rapidly evolving renewable energy technologies and energy storage technologies, the descriptions contained in the GEIS can go quickly out of date. Therefore, the NRC is taking the opportunity to update the revised GEIS prior to final publication. However, because energy technologies continue to evolve, the analyses presented here are simply a starting point for NRC's site-specific analysis of alternatives, which are presented in plant-specific SEISs. In the SEISs, alternative technologies will be evaluated on a site-specific basis for reliability (as a baseload power source), availability, resource requirements, environmental impact, and existing transmission infrastructure that would connect that alternative with the load centers being served by the reactor. Only after all such factors are considered can conclusions be made regarding acceptable alternatives. The GEIS facilitates that alternative analysis by providing future NRC review teams with empirical evidence of the performance, environmental impacts, and resource demands and impacts of those potential energy alternatives current as of the time the updated GEIS was prepared. Since an alternatives analysis is required under NEPA, a site-specific analysis of alternatives will be performed, taking into account any new and significant information that has developed since the preparation of the revised GEIS.

Where the comments suggest that the DOE should play a role in the NRC's alternatives analysis, it is important to note that the DOE's mission is to direct and fund energy technology research and promote its development and incorporation into energy portfolios; however, the NRC's mission is fundamentally different, as described above.

While all of the examples offered by the commenters offer possibilities for energy production in the future, their schedules for commercialization cannot be determined with any certainty at this time. In addition, ongoing tests may in some cases reveal significant limitations to their eventual wholesale implementation. Because technology initiatives of the type suggested by the commenters are evolving rapidly, it is not possible for the GEIS to represent NRC's final position on their value and applicability as alternatives to license renewal. The GEIS identifies the principal energy technologies currently under development and relies on the NRC review team conducting the alternatives analysis for future site-specific license renewal reviews to incorporate those technologies into their alternative analyses, taking into account their current state and schedule of development as well as other circumstantial factors that would impact their implementation.

Many people are concerned about how their electricity is produced, and that concern is reflected in State and regional energy policies that encourage and incentivize the development of renewable energy technologies that are less environmentally intrusive than conventional means of baseload power generation. The expected growth in solar energy generation in California reflects California's energy policy, just as Germany's investment in photovoltaics is a reflection of that country's energy policy. The NRC has no authority to set energy policy on a national or State level, or to impose energy tariffs or the energy priorities of other countries, but it does have an obligation to incorporate considerations of existing regulations and policies into its evaluation of energy alternatives. However, that incorporation is more appropriately made in the context of individual license renewal reviews, rather than in the generic baseline evaluations contained in the GEIS. As with the renewable energy technologies themselves, energy policies are evolving rapidly. While the NRC acknowledges that legislation, technological advancements, and public policy can underlie a fundamental paradigm shift in energy portfolio development and maintenance, the NRC cannot place a high degree of reliance on the anticipated changes. Instead, the NRC tasks its review teams to evaluate the status of energy technologies during future plant-specific reviews, and to reflect their assessments of those local conditions in future site-specific SEISs. NRC's responsibility under NEPA is to objectively evaluate those alternatives within the context of those newly formulated energy policies in order to determine whether any alternative is environmentally superior to the proposed action of license renewal.

Section 2.3.4 of the revised GEIS was revised to include updated information relevant to renewable energy alternatives, including an expanded discussion on energy storage technologies.

Comment: And I have a couple of thoughts to put forward. One thought to the NRC is our company just recently got the only -- were granted the only patent for the permanent elimination of nuclear waste and it would not require any storage outside in ponds or anything like that and I'd like the Nuclear Regulatory Commission to really consider this when they go over this.

Secondly, there's a lot of misconception by a lot of people about how dangerous living near a nuclear plant is and yes, it's got radiation, but what's interesting was a plant back in, and I can't remember the name of it, back in I believe Pennsylvania. People got a little uptight about nuclear power and so, they said we want to go back to a coal - fired plant.

So, while they were building the coal-fired plant, they still operated the nuke because they still needed the power and as they started testing the coal-fired plant, now this is 30 miles away from the nuke, the radiation alarms, the emergency level of radiation alarms started going off in the nuke and it drove the inspectors crazy looking for the leaks until they found out it was coming from the coal-fired plant.

Coal when it's burnt emits 4.5 parts per million radio-nuclides from coal, normal coal. Clean coal, that's a misnomer, 1.8 parts per million and oil, like we have out here, 1.39 parts per million; natural gas .18 parts per million and there are even trace elements from wind power and solar power which is interesting and nuclear emits nothing because it is a reaction. It's not a burning. Anything that burns emits trace elements of radiation and this goes on 24 hours a day, seven days a week. So, it's really something you have to consider. (DPCA-PRWS-1)

Response: *The environmental impacts of coal-fired electricity generation, including the release of criteria and hazardous air pollutants and radioactive species, are discussed in the resource-specific assessments presented in Chapter 4 of the GEIS. To provide a quantification of the air quality impacts, the GEIS analyzed the coal burning technology most likely to be selected in the future, a pulverized coal boiler generating supercritical steam and equipped with pollution control devices expected to be required to meet national air pollution requirements. To complete this analysis, the NRC also specified a coal source and analyzed the impacts of this representative coal-fired facility with and without carbon capture and sequestration capabilities that may be required by future regulations. However, each of the engineering specifications on which the NRC analysis is based is subject to change based on the existence of a more likely and more readily available coal source in the geographic area under consideration, advancements in coal cleaning and coal burning technologies occurring after publication of the GEIS, as well as the existence of State or local air pollution regulations and State energy policies. The introduction of those unique site-specific factors are the responsibility of the NRC review team conducting the alternatives analysis for future site-specific license renewal reviews.*

No changes were made to the GEIS as a result of this comment.

Comment: Evaluation of Energy Alternatives: The draft GEIS states, "alternatives for replacement power are generally the same from plant to plant. Applications to date have indicated that the environmental impacts of license renewal are small and less than the environmental impacts of alternatives for replacement power" (GEIS, p. A-38). However, the types of replacement power available and environmental impacts differ substantially from region to region. The environmental impacts included in GEIS analyses are incomplete in that they have not considered the full lifecycle impacts of power production options. (For example, nuclear power lifecycle impacts include impacts from uranium mining, fuel enrichment, plant operation, plant decommissioning and nuclear waste storage, transportation and disposal.) The lifecycle impacts for different energy alternatives in comparison to nuclear power production should be included in the revised draft GEIS.

The draft GEIS should be revised to require regional or site-specific lifecycle evaluations of nuclear power and alternative electricity sources, including wind, solar, biomass, geothermal, and energy efficiency. For example, the American Council for an Energy-Efficient Economy estimates that a comprehensive energy efficiency program could reduce energy demand by 18% in 2010 and 33% in 2020. In addition, in some regions base load renewable resources or a combination of intermittent renewable resources and gas-fired generation or energy storage could replace large quantities of nuclear power. Evaluations of the environmental impacts of these power options should include "cradle-to-grave" or lifecycle environmental impacts.

A share of the nuclear energy generation in California could be more or less easily replaced with alternative resources, depending upon the location. For example, geothermal reserves located in Nevada and the Coachella and Imperial Valleys in California could be tapped to yield base load energy currently provided by the Palo Verde Nuclear Generating Station, and augmented by solar resources. A portion of the energy generated from Diablo Canyon could be replaced by renewable resources located across the breadth of Central California, augmented by dispatchable gas-fired and continuous renewable, such as geothermal and biomass resources. The latter, capable of cycling up and down, unlike Diablo Canyon, would facilitate the integration of the intermittent resources that are expected to largely contribute to meeting the state's renewable energy goals. (CEC-9(1)-8)

Response: *The site- or region-specific evaluation of alternative energy sources advocated by the commenter is the responsibility of the NRC review team conducting an environmental assessment of each license renewal request and would be presented in the site-specific SEIS. Indeed, regional differences exist with respect to the value, availability, feasibility, and cost-effectiveness of alternative sources of power. State legislative actions, adopted energy policies, and regulations introduce additional priorities for consideration of alternative sources of baseload power. However, beyond acknowledgement of the existence of these differing circumstantial factors, the GEIS is intended to provide a reference condition for each alternative to license renewal that can be reasonably expected to satisfy the objective behind license*

renewal, specifically the provision of baseload power in an amount equivalent to the capacity of the reactor(s) under review for license renewal. It is then incumbent on each NRC review team considering a license renewal application to evaluate each potentially available alternative technology in the appropriate State or regional context, factoring in all relevant factors that enhance the selection of some technologies while discouraging or even preempting the application of other alternatives. The objective of the GEIS is to provide a baseline of environmental impacts known to be associated with each potential energy alternative, regardless of where they are installed, and to alert the NRC review teams of the need to adequately consider the rapidly occurring technological advancements and political circumstances surrounding some alternative energy technologies in their reviews. In doing so, the GEIS provides the NRC review teams for future license renewal applications with a basis from which to pursue an evaluation of alternatives such as suggested by the commenter.

While Section 2.3.4 of the GEIS has been updated to clearly describe the above approach, the fundamental approach to providing information for use by NRC review teams has not been changed.

Comment: Page 4-10, lines 9 to 14: Text in lines 9 to 14 on page 4-10 is labeled "*Construction – …*"

Although the text in lines 9 to 14 on page 4-10 of the draft updated GEIS is labeled "*Construction – …*" it appears to address both construction and operations impacts. Consider creating a separate paragraph labeled "*Operations – …"* Also, consider mentioning coal storage, in addition to coal delivery and waste storage, as an activity that would consume more land at a coal plant than at a gas-fired plant. Finally, consider mentioning the visual effects of coal storage piles as a significant difference between coal-fired and gas-fired plants. This is also a significant difference between coal-fired plants and nuclear plants. (NEI1-7(4)-83)

Response: *Changes were made to Section 4.2.2.1 to clearly indicate that impacts from both construction and operation would be occurring for fossil fuel alternatives. Section 4.2.2.1 should be read in combination with the introductory paragraphs provided above in Section 4.2.2 for a more detailed discussion of expected impacted from both construction and operation phases of any alternative technology.*

Comment: Page 4-114, lines 9 to 34: Text in lines 9 to 34 on page 4-114 introduces the discussion in section 4.6.2 of the environmental consequences for terrestrial and aquatic ecology of alternatives to license renewal of nuclear power plants. Subsequent subsections 4.6.2.1 and 4.6.2.2 discuss specific impacts of alternatives to nuclear plant license renewal that involve fossil energy and renewable energy technologies, respectively.

For consistency with other sections in Chapter 4, consider adding introductory text in Section 4.6.2 (lines 9 to 34 on page 4-114) explaining why impacts on terrestrial and aquatic ecology are not evaluated for the new nuclear plant alternative to the proposed action. Alternatively, consider adding a new subsection to address the impacts of a new nuclear plant alternative. (NEI1-7(4)-105)

Response: *Section 4.6.2 has been revised. Construction-related impacts are presumed to be qualitatively the same for all power plant technologies and are therefore discussed only in the opening paragraphs of Section 4.6.2. Subsections that follow concentrate on operation-related impacts unique to those alternative energy technologies and especially make comparisons to a nuclear plant. A new subsection, Section 4.6.2.2, has been added to Section 4.6.2 of the GEIS that discusses the impacts to ecology of a new nuclear plant alternative.*

Comment: D. The Draft Generic EIS Fails to Adequately Assess Aquatic Impacts in Specific Key Areas: Numerous specific statements in the draft revised Generic EIS need to be addressed by the NRC. These include the NRC's portrayal of the Clean Water Act section 316(b) Phase III rules, the viability of acoustic deterrent systems at plants in Belgium and New York, the role of the consultation process under the federal Endangered Species Act, and the environmental consequences, of alternatives to license renewal.

5. Environmental Consequences of Alternatives to the Proposed Action:

The NRC's Statement: In Section 4.6.2, the NRC states that any alternative to license renewal of an existing facility would likely have a greater environmental impact than simply renewing the license of an existing facility. Draft Generic EIS, p. 4-114.

The NYSDEC's Response: The basis for this NRC conclusion is not explained. Indeed, it is contradicted by other sections of the draft revised Generic EIS. For example, in Section 4.6.1.2, the NRC states that the operation of a cooling water intake system may cause moderate to large impacts on aquatic organisms: [T]he NRC concludes that the impingement and entrainment of aquatic organisms over the license renewal term at nuclear plants with once through cooling or cooling ponds could be small, *moderate, or large* and is considered a Category 2 issue. Draft Generic EIS, p. 4-86. *Emphasis added.*

The NRC fails to discuss, assess, or analyze potential benefits to aquatic resources by known and readily identifiable alternatives to the extension of licenses for existing nuclear generating facilities. By not renewing the license of a facility that uses a once-through cooling system, entrainment and impingement would no longer occur at that facility, which means that this impact would be significantly lessened. Similarly, such impacts would be significantly lessened if, by not renewing the license of an existing facility, a new power plant must be constructed with a closed-cycle cooling system, which the NRC has determined would be a Category 1 issue

(closed-cycle cooling systems result in a small impact to aquatic resources). Moreover, impingement and entrainment impacts are not exclusively Clean Water Act Section 316(b) issues. The NRC can consider other alternatives than simply not renewing an operating license, such as requiring closed-cycle cooling or other mitigative technologies to minimize Endangered Species Act and Essential Fish Habitat impacts.

In 1991, New York State made the following comment to the NRC on the 1996 Draft Generic EIS: [T]he NRC [should] include consideration of current standards of mitigative technologies in the GEIS in that if nuclear plants are to be operating for an additional 20 years, then these license-extended plants should have their intake and discharge configuration reviewed as if they were a new facility. [S]ince many licensed and operating nuclear power plants received their condenser cooling system approval prior to the advent of new technologies...the best available technology...may be different given the additional 20 years of plant life. Thus, system retrofits may be appropriate for mitigation of the [moderate to large] impacts.

The point raised by New York State in 1991 is just as valid as the points NYSDEC is raising in these comments in 2010. In conclusion, the NRC analysis presents a false choice. The result is that a viable and well-identified option − closed cycle cooling − is summarily dismissed instead of being discussed as part of a license renewal option. This approach does not meet NEPA requirements to adequately assess environmental impacts in the Generic EIS. (NYS DEC-12-10)

Response: *NRC's authority does not extend to requiring operating nuclear plants to replace or modify their cooling systems to reduce impacts. That authority is held by the State or the EPA in their implementation of the provisions of the Clean Water Act (CWA). Contrary to the assertion made in the comment, Section 4.6.2 does not state that any alternative to license renewal of an existing facility would likely have a greater environmental impact than simply renewing the license of an existing facility. Rather, Section 4.6.2 states that there are potential ecological impacts of alternatives to the proposed action without specifying whether those impacts would be greater or less than the proposed action. The relative magnitude of impacts of generation alternatives to nuclear power generation would be dependent on the type and location of a specific proposed facility, the technologies to be employed by a facility, the size of the area that would be affected by development and operations, and the specific ecological characteristics of the area being considered for development. Text has been added to the section to clarify that the potential impacts of alternatives to the proposed action could be greater or less than renewing the license for an existing facility, depending on these factors.*

Comment: Page 4-114, lines 37 to 40: Text in lines 37 to 40 on page 4-114 reads as follows:

Operations – Operational impacts include acid precipitation. EPA estimates acid emission rates from coal-fired power plants could range from: IGCC, 0.004 to 0.30 lb/MWh; subcritical PC 0.018 to 0.088 lb/MWh; supercritical PC, 0.017 to 0.082 lb/MWh; ultra-supercritical PC, 0.015 to 0.074 lb/MWh.

The NRC is encouraged to add information to this section indicating that operations at a fossil energy facility would have essentially the same or greater potential impact on ecological resources as operation of a nuclear facility. Furthermore, the above-quoted estimates of acid rain emissions from various types of fossil energy facilities are not themselves impacts. The NRC is encouraged to add a discussion of the impacts of such acid rain emissions. (NEI1-7(4)-21)

Response: *Section 4.6.2.1 has been expanded to address other activities that are likely to occur at coal-fired plants. However, EPA estimates of emission rates for criteria pollutants have been removed. Because the emissions of criteria pollutants would be dependent on myriad factors, including fuel type, firing conditions, and pollution control equipment of the fossil fuel alternative, any estimates in the GEIS of acid rain–related impacts would be speculative, and references to that potential impact have been removed. It remains for the NRC review team to estimate the likely parameters of emissions and dispersion factors for a fossil fuel alternative being considered in a license renewal analysis and, from that, provide estimates of possible impact.*

Comment: Page 4-128, lines 3 and 4: Text in lines 3 and 4 on page 4-128 reads as follows:

Operation – The existence of the nuclear power plant could have a negative effect on recreation and tourism.

Because, without a supporting reference citation, characterizing the nature of the effects of a nuclear power plant on recreation and tourism is speculative, consider changing the text in lines 3 and 4 on page 4-128 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Operation - The existence of the nuclear power plant could *potentially affect* ~~have an negative effect on~~ recreation and tourism. (NEI1-7(4)-106)

Response: *The discussion in Section 4.8.2.2 of the GEIS was expanded to note that impacts to recreation would occur. The effect was not characterized, but instead is expected to be dependent on the perceptions individuals have regarding nuclear energy.*

A.2.1.13 Comments Concerning Postulated Accidents

Comment: 6. Affected Environment (S 4): 3.3.1 Meteorology and Climatology (3-30 TO 3-31): NRC's Draft discusses the importance of meteorology. In the Draft they say that the NRC requires that basic meteorological information be available for use in assessing (1) the environmental effects of radiological and non-radiological emissions and effluents resulting the construction or operation of a nuclear power plant and (2) the benefits of design alternatives.

Plume Modeling Misrepresented − Implications: The Draft makes clear that NRC does not have an accurate understanding of plume modeling and as a result the Draft incorrectly assigns significance levels to certain issues (examples: health effects, emergency planning, SAMA) and incorrectly determined whether some issues are generic, Category 1 or site specific, Category 2 − all contrary to their own definitions of significance levels and criteria for category designation.

The Draft says that, "The most recent update to NRC Regulatory Guide 1.23, which covers meteorological monitoring programs for nuclear power plants, provides new guidance for onsite meteorological measurements at stationary licensed power reactors. The guidance covers the siting of instruments to provide representative measures at plant sites, the accuracy and range of specified measured parameters, and special considerations for plants located near influences of complex terrain (e.g., coastal areas, hills of significant grade or valleys), among other criteria and specifications."

This "positive spin" is misleading. What they fail to provide is an analysis of improvements that must be required to provide accurate plume modeling.

Onsite fixed Meteorological Towers: The Draft says that, "Onsite meteorological conditions at commercial nuclear power plants are monitored at primary fixed meteorological towers with instrumentation at two levels (e.g., 10 and 60 m), and, if necessary, one additional higher level on the tower to better represent dispersion of elevated releases from stacks. A secondary onsite tower is typical at many installations as a backup if primary tower measures fail."

What NRC does not tell you is that the onsite tower is insufficient. It tells where the plume is going onsite but not what may happen to it once it goes offsite. The simple fact is that measurements from a single 220' high anemometer will not provide sufficient information to project how an accidental release of a hazardous material would travel. For example: For cases at sites located adjacent to large bodies of water when the sea breeze is just developing and for cases when the onshore component winds do not reach entirely from the ground to the anemometer height, the occurrence of a sea breeze would not be identified. The anemometer would likely indicate an offshore wind indication. Further as PW demonstrated in Pilgrim's License Renewal process that basing wind direction on the single on-site meteorological tower

data ignores shifting wind patterns away from the Pilgrim Plant including temporary stagnations, re-circulations, and wind flow reversals that produce a different plume trajectory.

Variability of Weather Conditions: The Draft says that, "Weather conditions at each of the plants can be quite variable depending on the year, season, time of day, and site-specific conditions, such as whether the site is near coastal zones or located in or near terrain with complex features (e.g., steep slopes, ravines, valleys)."

However NRC then fails to do anything with it.

No mention is made of the importance of requiring the use of advanced variable trajectory plume models (instead of straight-line Gaussian plume models) and requiring real-time data from properly placed met towers offsite in surrounding communities. Instead the Draft goes off on an irrelevant tangent about "climate zones and historical tornado events," complete with maps. There is no tie to plume modeling, location of meteorological towers, computational modeling − MACCS2 or WINMAC that incorporates ATMOS.

The Meteorological references provide, at 3.12, are paltry and show that NRC has not done due diligence in their review. It fails to include for example references to NRC, DOE, EPA, NAS − see references provided in Appendix A. (PW-6-17)

Comment: As previously discussed, NRC's NEPA regulations now require facilities, such as Indian Point, to conduct a severe accident mitigation alternatives analysis if NRC Staff has not previously considered such an analysis. 10 C.F.R. § 51. 53(c)(3)(ii)(L). Given the importance of such an analysis to the citizens residing near the facility, it is critical that this SAMA analysis be accurate and transparent. The State of New York has concerns that the typical SAMA analysis does not account for the various site specific characteristics at Indian Point, such as the site's population distribution, meteorology patterns, and complex topography.

The proposed GEIS contains a new section entitled "Meteorology and Climatology" which sets forth NRC's requirement that "basic meteorological information" be available to "determine dispersion conditions in the vicinity of the plant for assessment of safety and environmental factors." Proposed GEIS at 3-30. As the NRC explains, "these data are used with air dispersion models to protect public health, safety and property during plant operations." *Id.*

The Proposed GEIS further explains that the NRC has recently updated its Regulatory Guide 1.23 for onsite meteorological monitoring − a guide that covers instrument siting, accuracy and range of specified measured parameters, and *"special considerations for plants located near influences of complex terrain (e.g. coastal areas, hills of significant grade or valleys)."* (emphasis added) *Id.* at 3-30 −31.

The State of New York agrees that nuclear power plants located in complex terrain, such as Indian Point, should perform on site meteorological monitoring that will measure the effects of complex terrain on wind direction, velocity and other factors relevant to the dispersion of a radioactive plume during an accident.

However, the collection of such "complex terrain" meteorological measurements is only relevant if these data are then used in an air dispersion model which itself is capable of incorporating the effects of complex terrain in its projection of the dispersion and concentration of a radioactive plume. Accurate air dispersion modeling is critical to an accurate SAMA analysis for Indian Point because it is sited in an area in which the population density within the 10 and 50 mile EPZs varies substantially, from sparsely populated semi-rural areas to the densely populated environs of New York City. Therefore, different directional dispersions of a radioactive plume can cause substantially different human exposures.

Unfortunately, in its air dispersion modeling in the NEPA process and elsewhere, NRC has consistently used a simple straight-line Gaussian plume model, which the scientific community, the Environmental Protection Agency staff, and even NRC staff have acknowledged is not appropriate for air dispersion modeling for reactors in complex terrain *(e.g.,* hilly, mountainous, or otherwise non-uniform terrain) such as the terrain surrounding Indian Point, which has many peaks and valleys. *See* NUREG-1437, Vol. 1, Supp. 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3 (Dec. 2008) at 2-2.1 for a description of the terrain surrounding Indian Point. In the Indian Point license renewal proceeding, the State challenged the NRC's acceptance of Entergy's use of a straight line Gaussian plume model known as ATMOS in its SAMA analysis and that contention was admitted by the Licensing Board. Attached hereto are two declarations of Bruce A. Egan, executed November 27, 2007 (Ex. B)(ML092610911) and August 28, 2009 (Ex. C) ("Egan 2009 Decl.")(ML092610916),[2] submitted by the State of New York in support of its contention, which explain the inadequacy of such straight line Gaussian models in complex terrain and set forth the similar conclusion of the U.S. Environmental Protection Agency, the U.S. Department of Energy and the NRC (in contexts other than the SAMA analysis required for license renewal). *See, e.g.,* Egan 2009 Decl. at ¶¶ 54-57, 59.[3]

[[2] Because of their length and size, the attachments to the Declaration of Bruce Egan are not attached but are incorporated herein. They can be found at ML092610910, ML092610912, ML092640223, ML092640221, ML091050257, ML092640169, ML092640173, ML092640170, ML092640171, ML092640172, ML092640174, ML092640175, ML092640177, and ML092640178.]

[[3] Dr. Egan has a Master of Science Degree in Engineering in Applied Physics, and a Master of Science and a Doctorate in Environmental Health Sciences, all from Harvard University. He has over 30 years experience as a manager and environmental scientist on projects involving the development and application of atmospheric dispersion models to complex topographies.]

As Dr. Egan explains, there are several effects of the terrain at Indian Point on air flow, which cannot be accounted for by the ATMOS air dispersion model, a module within the MACCS2 accident consequence code. In the case of high terrain features across the river from Indian Point, air flow from the east will either turn and pass along the side of the mountain or rise over the mountain, depending upon atmospheric stability conditions. Egan 2009 Decl. at ¶ 39. Therefore, a radioactive plume released from Indian Point and embedded in the air flow will not take the straight line trajectory across the river valley that would be predicted by the ATMOS model. *Id.* Under the more stable atmospheric conditions associated with greater ground level impacts, the plume is likely to be turned down the overall river valley as it cannot pass through the terrain. *Id.*

A second effect of mountainous terrain on sources located in river valleys, such as Indian Point, is the creation of drainage flows by the presence of the valley side walls. Egan 2009 Decl. at ¶ 40. For example, at night when the earth's surface cools by radiating its heat upward, the air in contact with the surface cools. Because it is heavier than other air at that elevation, it flows, under the forces of gravity down the valley slopes toward the base of the valley. *Id.* In the absence of other influences, the pooling of the heavier air at the low point of the valley cross-section causes that air to tend to flow downriver, following the valley contours. *Id.*

Meteorological models that incorporate the effects of topography will simulate the phenomenon of valley sidewalls tending to channel air within the confines of the valley flows to follow the valley contours. Egan 2009 Decl. ¶ 41. Nighttime drainage flows in river valleys will tend to stay in river valleys and flow in the same direction as the river itself. *Id.*

A straight line Gaussian plume model cannot account for these phenomena, which could cause a night time radionuclide release to travel downriver toward the most populous areas in the fifty mile radius around Indian Point, including New York City and its surrounding suburbs. *See* Egan 2009 Decl. ¶¶ 39-42. The reasons that the straight line Gaussian model does not accurately predict air dispersion in complex terrain are fundamentally related to these multiple effects that the presence of high terrain has on altering the air flow.

Virtually all competent independent experts, including federal agencies that rely upon air dispersion modeling results to carry out their functions, acknowledge that the Gaussian plume model is unsuitable for measuring air dispersion at sites that have complex terrain. *See* Egan 2009 Decl., ¶¶ 48-57. These agencies and experts advocate for the use of alternate, more appropriate plume models such as CalPUFF or Calmet. *See* Egan 2009 Decl., ¶ 30.

Notwithstanding this overwhelming consensus of scientific opinion, the NRC continues to rely on an outmoded straight-line Gaussian plume model to conduct the SAMA analysis which may underestimate the costs of an accident to which the cost of a mitigation measure will be compared. For example, Entergy is only required to consider measures to mitigate the

likelihood or severity of a severe accident, if the costs of the accident outweigh the cost of the mitigation measure. NEI 05-01 Rev. A, *Severe Accident Mitigation Alternatives Analysis − Guidance Document* at pages 1-3.[4] Human exposure to radiation is one cost of a severe accident, and is computed based on a cost of $2,000 per person rem of exposure. *Id.* at 16. For the human exposure cost to be accurately estimated, the air dispersion model must be able to account for the complex terrain features surrounding the plant so that the numbers of people exposed can be accurately projected. ATMOS, the air dispersion model embedded in the MACCS2 accident consequence code, is a simple straight-line Gaussian plume model which cannot accurately predict the path of a radioactive plume emitted during a severe accident.

[[4] This guidance document from the Nuclear Energy Institute was endorsed by NRC Staff in LR-ISG -2006 - 03 at pages 1-3.]

In sum, although the State agrees with the NRC that on-site meteorological measurements should contain "special considerations for plants located near influences of complex terrain *(e.g.,* coastal areas, hills of significant grade or valleys)," those measurements are only meaningful if the NRC uses them in more sophisticated air dispersion models that can incorporate the effects of complex terrain on the dispersion of a radioactive plume released during a severe accident at Indian Point. The State of New York thus seeks a modification of the draft GEIS to require the use of more sophisticated air dispersion models that can accurately account for the cost of human exposure to radiation in cases where the local terrain warrants use of such sophisticated models. (NYS AG-14-7)

Comment: Appendix A: NRC, DOE, EPA, The National Research Council of the National Academies, State Officials, Nuclear Trade Groups, & Air Dispersion Modeling Community Agree That Straight Line Gaussian Plume Models Cannot Account For the Effects of Complex Terrain on the Dispersion of Pollutants from A Source.

NRC: Since the 1970s, the USNRC has historically documented advanced modeling technique concepts and potential need for multiple meteorological towers appropriately located in offsite communities, especially in coastal site regions. But ignored implementing its' own advice.

In 2009, the NRC made a presentation to the National Radiological Emergency Planning Conference[22] concluded that the straight-line Gaussian plume models cannot accurately predict dispersion in a complex terrain and are therefore scientifically defective for that purpose [ADAMS − ML091050226, ML091050257, and ML091050269 (page references used here refer to the portion attached, Part 2, ML091050257).]

[[22] Ibid]

Most reactors, if not all, are located in complex terrains. In the presentation, NRC said that the "most limiting aspect" of the basic Gaussian Model, is its "inability to evaluate spatial and temporal differences in model inputs" [Slide 28]. Spatial refers to the ability to represent impacts on the plume after releases from the site e.g., plume bending to follow a river valley or sea breeze circulation. Temporal refers to the ability of the model to reflect data changes over time, e.g., change in release rate and meteorology [Slide 4].

Because the basic Gaussian model is non-spatial, it cannot account for the effect of terrain on the trajectory of the plume − that is, the plume is assumed to travel in a straight line regardless of the surrounding terrain. Therefore, it cannot, for .example, "'curve' a plume around mountains or follow a river valley." NRC 2009 Presentation, Slide 33. However, many reactors are located near mountains or along river valleys. Further it cannot account for transport and diffusion in coastal sites subject to the sea breeze. Sea breeze also applies to any other large bodies of water. The sea breeze causes the plume to change direction caused by differences in temperature of the air above the water versus that above the land after sunrise. If the regional wind flow is light, a circulation will be established between the two air masses. At night, the land cools faster, and a reverse circulation (weak) may occur [Slide 43]. Turbulence causes the plume to be drawn to ground level [Slide 44].

The presentation goes on to say that, "Additional meteorological towers may be necessary to adequately model sea breeze sites" [Slide 40].

Significantly, the NRC 2009 Presentation then discussed the methods of more advanced models that *can* address terrain impact on plume transport, including models in which emissions from a source are released as a series of puffs, each of which can be carried separately by the wind, (NRC 2009 Presentation Slides 35, 36). This modeling method is similar to CALPUFF. Licensees are not required, however, to use these models in order to more accurately predict where the plume will travel to base protective action recommendations.

The NRC recognized as early as 1977 that complex terrain presented special problems that a model must address if the air dispersion analysis is to be accurate.[23] For example: NRC, Regulatory Guide 1.111, *Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors* (July 1977) (Draft for Comment) says that, "Geographic features such as hills, valleys, and large bodies of water *greatly* influence dispersion and airflow patterns. Surface roughness, including vegetative cover, affects the degree of turbulent mixing." (Emphasis added).

[[23] Ibid]

<u>This is not new information; knowledge of the inappropriateness of straight-line Gaussian plume in at complex sites goes back a long way within NRC. For example:</u>

1972: NRC Regulatory Guide 123 (Safety Guide 23) On Site Meteorological Programs 1972, states that, "at some sites, due to complex flow patterns in non-uniform terrain, additional wind and temperature instrumentation and more comprehensive programs may be necessary."

1977: NRC began to question the feasibility of using straight line Gaussian plume models for complex terrain. *See* U.S.NRC, 1977, Draft for Comment Reg. Guide 1.111 at 1c (pages 1.111-9 to 1.111-10)

1983: In January 1983, NRC Guidance [NUREG-0737, Supplement 1 "Clarification of TMI Action Plan Requirements," January 1983 Regulatory Guide 1.97- Application to Emergency Response Facilities; 6.1 Requirements], suggested that changes in on-site meteorological monitoring systems would be warranted if they have not provided a reliable indication of monitoring conditions that are representative within the 10-mile plume exposure EPZ.

1996: The NRC acknowledged the inadequacy of simple straight-line Gaussian plume models to predict air transport and dispersion of a pollutant released from a source in a complex terrain when it issued RTM-*96*, *Response Technical Manual,* which contains simple methods for estimating possible consequences of various radiological accidents. In the glossary of that document, the NRC's definition of "Gaussian plume dispersion model" states that such models have important limitations, including the inability to "deal well with complex terrain." NUREG/BR-0150, Vol. 1 Rev.4, Section Q; ADAMS Accession Number ML062560259.

2004: A NRC research paper, *Comparison of Average Transport and Dispersion Among a Gaussian, A Two- Dimensional and a Three-Dimensional Model,* Lawrence Livermore National Laboratory, October, 2004 at 2. ("Livermore Report") had an important caveat added to the Report's summary about the scientific reliability of the use of a straight-line Gaussian model in complex terrains: "...[T]his study was performed in an area with smooth or favorable terrain and persistent winds although with structure in the form of low-level nocturnal jets and severe storms. In regions with *complex terrain,* particularly if the surface wind direction changes with height, *caution should be used.* **Livermore Report** at 72. (emphasis added)

2005: In December, 2005, as part of a cooperative program between the governments of the United States and Russia to improve the safety of nuclear power plants designed and built by the former Soviet Union, the NRC issued a Procedures Guide for a Probabilistic Risk, related to a Russian Nuclear Power Station. The Guide, prepared by the Brookhaven National Laboratory and NRC staff, explained that atmospheric transport of released material is carried out assuming Gaussian plume dispersion, which is "generally valid for flat terrain." However, the Guide the caveat that in "specific cases of plant location, such as, for example, a mountainous

area or a valley, more detailed dispersion models may have to be considered." *Kalinin VVER-1OOO Nuclear power Station Unit 1 PRA, Procedures Guide for a Probabilistic Risk Assessment,* NUREG/CR- 6572, Rev. 1 at 3-114; excerpt attached as Exhibit 8, full report available at http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6572.

2007: NRC revised their Regulatory Guide 1.23, Meteorological Monitoring Programs for Nuclear Power Plants. On page 11, the section entitled *Special Considerations for Complex Terrain Sites* says that:

At some sites, because of complex flow patterns in nonuniform terrain, additional wind and temperature instrumentation and more comprehensive programs may be necessary. For example, the representation of circulation for a hill-valley complex or a site near a large body of water may need additional measuring points to determine airflow patterns and spatial variations of atmospheric stability. Occasionally, the unique diffusion characteristics of a particular site may also warrant the use of special meteorological instrumentation and/or studies. The plant's operational meteorological monitoring program should provide an adequate basis for atmospheric transport and diffusion estimates within the plume exposure emergency planning zone [i.e., within approximately 16 kilometers (10 miles)].[24]

[[24] For example, if the comparison of the primary and supplemental meteorological systems indicates convergence in a lake breeze setting, then a "keyhole" protective action recommendation (e.g., evacuating a 2-mile radius)]

These excerpts from Regulatory Guide 1.23 demonstrate that the NRC recognizes there are certain sites, such as those located along river valleys (like Indian Point and Vermont Yankee) and those located in coastal areas (like Pilgrim and Seabrook) that multiple meteorological data input sources are needed for appropriate air dispersion modeling. Not simply one or two meteorological towers onsite. Since, for the reasons discussed above, the straight-line Gaussian plume model is incapable of handling complex flow patterns and meteorological data input from multiple locations, Regulatory Guide 1.23 demonstrates NRC's recognition that it should not be used at any site with complex terrain. (PW-6(1)-1)

Comment: Appendix A: NRC, DOE, EPA, The National Research Council of the National Academies, State Officials, Nuclear Trade Groups, & Air Dispersion Modeling Community Agree That Straight Line Gaussian Plume Models Cannot Account For the Effects of Complex Terrain on the Dispersion of Pollutants from A Source.

EPA: Likewise, EPA recognized the need for complex models. For example: EPA's 2005 Guideline on Air Quality Models says in Section 7.2.8 *Inhomogenous Local Winds* that:
In very rugged hilly or mountainous terrain, along coastlines, or near large land use variations, the characterization of the winds is a balance of various forces, such that the assumptions of

steady-state straight line transport both in time and space are inappropriate. (Fed. Reg., 1/09/05).

EPA goes on to say that, "In special cases described, refined trajectory air quality models can be applied in a case-by-case basis for air quality estimates for such complex non-steady-state meteorological conditions." This EPA Guideline also references an EPA 2000 report, *Meteorological Monitoring Guidance for Regulatory Model Applications,* EPA-454/R-99-005, February 2000. Section 3.4 of this Guidance for coastal Locations, discusses the need for multiple inland meteorological monitoring sites, with the monitored parameters dictated by the data input needs of particular air quality models. EPA concludes that a report prepared for NRC[25] provides a detailed discussion of considerations for conducting meteorological measurement programs at coastal sites, reactors on large bodies of water. Most important, EPA's November 2005 Modeling Guideline (Appendix A to Appendix W) lists EPA's "preferred models" and the use of straight line Gaussian plume model, called ATMOS, is not listed. Sections 6.1 and 6.2.3 discuss that the Gaussian model is not capable of modeling beyond 50 km (32 miles) and the basis for EPA to recommend CALPUFF, a non − straight line model.[26]

[[25] Raynor, G.S.P. Michael, and S. SetnuRaman, 1979, *Recommendations for Meteorological Measurement Programs and Atmospheric Diffusion Prediction Methods for Use at Coastal Nuclear Reactor Sites.* NUREG/CR-0936. U.S. Nuclear Regulatory Commission, Washington, DC.]
[[26] http://www.epa.gov/scram001/lguidance/guide/appw_05.pdf]
(PW-6(1)-2)

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DOE: DOE, too, recognizes the limitations of the straight-line Gaussian plume model. They say for example that Gaussian models are inherently flat-earth models, and perform best over regions of transport where there is minimal variation in terrain. Because of this, there is inherent conservatism (and simplicity) if the environs have a significant nearby buildings, tall vegetation, or grade variations not taken into account in the dispersion parameterization.[27]

[[27] the MACCS2 Guidance Report June 2004 Final Report, page 3-8:3.2 Phenomenological Regimes of Applicability]
(PW-6(1)-3)

Comment: Appendix A: NRC, DOE, EPA, The National Research Council of the National Academies, State Officials, Nuclear Trade Groups, & Air Dispersion Modeling Community Agree That Straight Line Gaussian Plume Models Cannot Account For the Effects of Complex Terrain on the Dispersion of Pollutants from A Source.

National Research Council: Tracking and Predicting The Atmospheric Dispersion of Hazardous Material Releases Implications for Homeland Security, Committee on the Atmospheric Dispersion of Hazardous Material Releases Board on Atmospheric Sciences and Climate Division on Earth and Life Studies, National Research Council of the National Academies, 2003.

This report provides the recent history of dispersion model development. It summarizes the findings of the National Academies workshop by the same title that had the purpose of examining "how meteorological observations and dispersion models can be used by emergency managers in the context of an atmospheric release of hazardous chemical, biological or nuclear *(C/B/N)* agents". The workshop participants included atmospheric scientists from academia, government laboratories and the private sector as well as emergency management officials and first responders, and experts in related fields.

The report discusses how the analytical Gaussian models were used in the 1960s and tested against limited field experiments in flat terrain areas performed in earlier decades.

In the 1970s the US passed the Clean Air Act which required the use of dispersion models to estimate the air quality impacts of emissions sources for comparison to regulatory limits. This resulted in the development and testing of advanced models for applications in complex terrain settings such as in mountainous or coastal areas. In the 1980s, further advances were made with Lagrangian puff models and with Eulerian grid models. Gaussian models moved beyond the simple use of sets of dispersion coefficients to incorporate Monin-Obukhov and other boundary layer similarity measures which are the basis of contemporary EPA models used for both short range and long range transport applications. Helped enormously by advances in computer technologies, in the 1990s, significant advances were made in numerical weather prediction models and also further improve dispersion models through the incorporation of field experiment results and improved boundary layer parameterization. The decade starting with the year 2000 has seen improved resolution of meteorological models such as MM5 and the routine linkage of meteorological models with transport and dispersion models as exemplified by the real time forecasts of detailed fine grid weather conditions available to the public at Olympic events. Computational Fluid Dynamics (CFD) models which involve very fine grid numerical simulations of turbulence and fluid flow began to see applications in atmospheric dispersion studies. The next decade will see routine application of CFD techniques to complex flows associated with emergency response needs.

The nuclear industry does not show evidence of keeping up with these technological advances. For use in modeling air quality concentrations, the NRC uses straight-line Gaussian dispersion algorithms that date back to the 1960s. Complex flow situations such as those associated with flow around high terrain features or that would incorporate sea breeze circulations are not simulated. For emergency response applications, the NRC does not seem to require any advanced modeling to be installed at nuclear power plants. The agency research groups have

access to advanced simulation models but how these might be used for training purposes or for real time emergency response purposes is not apparent in the literature.

According to the report:
Emergency responders have a number of observational and modeling needs that are not well satisfied by existing services. Although it may never be possible to provide a "perfect" atmospheric dispersion prediction for any hazardous release, the committee believes that with more effective application of available tools and development of new technologies and capabilities, the atmospheric science community could play a larger role in addressing this critical national security concern.

A copy of the Executive Summary and selected sections are attached (Appendix A).
(PW-6(1)-4)

Comment: Appendix A: NRC, DOE, EPA, The National Research Council of the National Academies, State Officials, Nuclear Trade Groups, & Air Dispersion Modeling Community Agree That Straight Line Gaussian Plume Models Cannot Account For the Effects of Complex Terrain on the Dispersion of Pollutants from A Source.

Nuclear Utility Groups: Nuclear utility Meteorological Data Users Group (NUMUG): At the 1994 American Nuclear Society Topical Meeting Environmental Transport and Dosimetry Aug 31-Sept 3, 1993, Charleston, SC, a paper' titled *An Atmospheric Dispersion Model for Emergency Response, K. Jerry Allwine (Pacific Northwest Laboratory, Richland, Washington) NUMUG* 1994 said in its introduction that:

Predicting the dispersion of accidental releases of material to the atmosphere in regions of nonuniform terrain can be very challenging. Wind patterns can be highly variable in time and space, because of the synoptic influences, the influences of nonhomogenous surfaces (sea breeze, heat inland), and terrain-induced processes such as slope flows, channeling, blocking, mountain-valley winds, stagnations, layered flows. During the nighttime terrain effects can dominate the atmospheric motion, especially near the surface. Consequently, an important component of any emergency response model is the wind model which must reasonably represent the winds in complex terrain using a limited number of input wind observations that are generally not of sufficient coverage to completely define the winds in the modeling domain.
(PW-6(1)-5)

Comment: Then you can get, for example, to SAMA. We read here that mitigation has to be considered. No problem, but where are you going to address the fact or are we going to have to do it through the adjudication, then go to the district courts, of, hey, using the [MACCS] or the [MACCS] as to the computer code is not okay, licensees. DOE has recognized that, that the [MACCS2], which is the current computer code that is used in these SAMA analyses and

license applications, underestimates consequence and, hence, DOE insisted that it revised to Sand, whatever David Jann called it, Sand, whatever it was, Sandia, whatever, the numbers are there. I can't remember them. There was a nine in it, but it it's my petition for review, for example, and it's also in the New York Attorney General's, what have you.

So if they are allowed to use a computer code that is knowingly underestimates, according to DOE, according to the user guide, etcetera, etcetera, it's David Shannon who wrote this thing, something is wrong. Also, it is wrong, what is embedded, what is the plume model that's embedded in the [MACCS] and the [MACCS2]? It's [ATMOS], the straight line Gaussian plume model. And so if the NRC persists in kowtowing to the industry and allowing these, this to go on, how can we be, how can the public, how can the state governments have any confidence? I don't think they can. (NMA-PW-13)

Response: *Questions regarding the adequacy of straight-line, or Gaussian, atmospheric dispersion models have been studied in detail. This included a detailed code comparison completed in 2004 with the objective of determining if the average atmospheric transport and dispersion results from codes such as MACCS2 are sufficiently accurate that more complex models are not required. In that study, documented in NUREG/CR-6853, "Comparison of Average Transport and Dispersion Among a Gaussian, a Two-Dimensional, and a Three-Dimensional Model," results from the MACCS2 code were directly compared to those from the LODI (Lagrangian Operational Dispersion Integrator) code.*

LODI is a state-of-the-art, three-dimensional (3D) advection dispersion code that uses a Lagrangian stochastic Monte Carlo method. LODI is coupled to ADAPT (Atmospheric Data Assimilation and Parameterization Technique), which provides time-varying, 3D fields of mean winds, turbulence, pressure, temperature, and precipitation based on observed meteorology. LODI is an element of the National Atmospheric Release Advisory Center (NARAC) emergency response modeling system at Lawrence Livermore National Laboratory (LLNL), which is a national support and resource center for planning, real-time assessment, emergency response, and detailed studies of incidents involving the spread of hazardous material accidentally or intentionally released into the atmosphere.

As discussed in NUREG/CR-6853, this comparison shows that MACCS2 provides results consistent with those from the more complex plume models at distances up to 100 miles (161 kilometers). This is well beyond the 50-mile (80-kilometer) radius considered in the SAMA analysis. The MACCS2 predictions for average, time-integrated, ground-level air concentrations (which directly relate to inhalation and cloudshine doses), and for average deposition (which directly relates to groundshine and ingestion pathway doses) were very comparable (i.e., less than a factor of two) to predictions made by the state-of-the-art NARAC codes, ADAPT/LODI, at all distances. The direct comparison to the state-of-the-art NARAC codes demonstrates that straight-line air dispersion modeling is well within its range of validity when used to perform SAMA analyses.

Regarding whether Gaussian plume modeling is appropriate for air dispersion modeling for reactors in complex terrain, the Gaussian plume model provides further conservatism under variable terrain conditions. Specifically, when variable terrain features such as river embankments or mountains intervene between a source and an observation point, these features would tend to disperse and dilute the plume as it is forced to move around obstacles. The plume model conservatively estimates that the plume travels in a straight line over or through the obstacles, thereby resulting in larger accumulated radiological doses and higher estimates of economic consequences in areas farther from the plant.

No change will be made to the GEIS based on these comments.

Comment: Solid Waste Management [S-17]: NRC incorrectly assigns "small impact" and a Category 1 designation to solid waste management, low level waste storage and disposal and onsite storage of spent fuel.

b. Onsite Storage of Spent Fuel: NRC assigns a "small impact" and a Category 1 designation to onsite storage of spent nuclear fuel, Table 2.1-1. We disagree and reference the filings on record submitted by Pilgrim Watch, the Massachusetts Attorney General's Office and New York State in the License Renewal Applications of Entergy in Pilgrim, Vermont Yankees and Indian Point's adjudications respectively; and the filings on record as comments to NRC's. Proposed Waste Confidence Decision by Pilgrim Watch; Texans For A Sound Energy Policy; Attorney Generals of New York, Vermont and Massachusetts[7].

[[7] Texans For A Sound Energy Policy And Commenters On Proposed Waste Confidence Decision Update And Proposed Rule Regarding Consideration Of Environmental Impacts Of Temporary Storage Of Reactor Operations Prepared By Ms, Diane Curran, Esq; New York Attorney General's Office, 02,06,09, comment 26; and Comment of The Offices of the Attorneys General of the States of New York and Vermont and the Commonwealth of Massachusetts on Waste Confidence Decision Update and Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation 2009/02/06, Comment (21) (2) Reactors vary − GE mark I BWR's for example are considerably more vulnerable to acts of malice.]

(1) Impact Potentially Large Under Severe Accident Situations: The Draft incorrectly determined that the impact was small. There would be nothing small about the potential impact on the environment from a spent fuel pool fire in a densely packed spent fuel pool. For example: The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene With Respect to Entergy Nuclear Operations Inc.'s Application for Renewal of. the Pilgrim Nuclear Power Plants License Renewal Application (May 2006) estimated the costs of latent cancers following the release of one isotope, C-137, from Pilgrim's pool. It said that,

Estimates of Costs and Latent Cancers Following Releases of Cesium-137
From Pilgrim's Spent-Fuel Pool'

	10% release C-137	100% release C-137
Cost (billions)	$105-$175 billion	$342-$488 Billion
Latent Cancers	8,000	24,000

[[8] The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene With respect to Entergy Nuclear Operations Inc.'s Application for Renewal of the Pilgrim Nuclear Power Plants Operating License and Petition for Backfit Order Requiring New Design features to Protect Against Spent Fuel Pool Accidents. Docket No, 50-293, May 26, 2006 includes a Report to The Massachusetts Attorney General On The Potential Consequences Of A Spent Fuel Pool Fire At The Pilgrim Or Vermont Yankee Nuclear Plant, Jan Beyea, PhD., May 25, 2006.]

It is sobering for a comparison to look at the impact of the Chernobyl accident, 1986, to help understand the potential impact from an accident from a spent fuel pool fire. Sheep remain contaminated in Wales; reindeer are still contaminated in Lapland from an accident that occurred more than 20 years ago. Chernobyl was bad, no doubt, but certainly not worst case. The 1986 Chernobyl accident released 2,403,000 curies of C-137; whereas Pilgrim's core, for example, during license extension will have 5,130,000 curies of C-137 [Beyea Declaration, Chernobyl; and LR, Pilgrim CS-137 figures]; and at Pilgrim the inventory of long-lived radionuclides, such as Cesium-137, in the spent fuel pool is eight times that in the reactor core.

Therefore, [t]he Draft's Table 4.9.1.2-1 Conclusions, *Consideration of Spent Fuel Pool Accidents* (Section E.3.7) are foolish. It says that, "...it is concluded that the environmental impacts from accidents at spent fuel pools (SFPs) (as quantified in NUREG-1738) can be comparable to those from reactor accidents at full power (as estimated in NUREG-1150). Subsequent analyses performed, and mitigative measures employed since 2001 have further lowered the risk of this class of accidents. In addition, even the conservative estimates from NUREG-1738 are much less than the impacts from full power reactor accidents as estimated in the 1996 GEIS."

The NRC Draft misleads once again by totally avoiding an important fact brought forward in NUREG-*1738, Technical Study a/Spent Fuel Accident Risk at Decommissioning Nuclear Power Plants* (2001), of spent fuel pool accident risk, performed for NRC by Sandia. It clearly stated that a catastrophic meltdown in the spent fuel pool of a nuclear plant could cause 25,000 fatal radiation induced cancers as far out as 500 miles from the site. An especially important fact is that in Sandia's Millstone analysis, they assumed that 95% of the population around Millstone 1 evacuated in a timely fashion.

Spent Fuel Pool Fire Accompanied by a Reactor Accident

Also ignored in the Draft's analysis is a spent fuel pool fire accompanied by a reactor accident – credible "reasonably foreseeable" events that have "catastrophic consequences." At typical US nuclear power plants the spent-fuel pool may be located outside but immediately adjacent to the reactor's containment and share some essential support systems with the reactor; or the pool may be inside the main reactor building and again share some essential support systems with the reactor. Thus, it is important to consider potential interactions between the pool and the reactor in the context of accidents. There could be at least three types of interaction. First, a pool fire and a core-damage accident could occur together, with a common cause. For example, a severe earthquake could cause leakage of water from the pool, while also damaging the reactor and its supporting systems to such an extent that a core-damage accident occurs. Second, the high radiation field produced by a pool fire could initiate or exacerbate an accident at the reactor by precluding the presence and functioning of operating personnel. Third, the high radiation field produced by a core-damage accident could initiate or exacerbate a pool fire, again by precluding the presence and functioning of operating personnel. Many core-damage sequences would involve the interruption of cooling to the pool, which would call for the presence of personnel to provide makeup water or spray cooling of exposed fuel. The third type of interaction was considered in a license amendment proceeding in regard to expansion of spent-fuel-pool capacity at the Harris nuclear power plant.

Environmental impacts that must be considered in an EIS include those which are "reasonably foreseeable" and have "catastrophic consequences, even if their probability of occurrence is low." 40 CFR §1502.22(b)(1). Spent fuel pool fires as explained in Pilgrim Watch's and the Massachusetts and New York Attorney General's Motions to Intervene and subsequent appeals and referenced comments to, NRC's Waste Confidence Rule Update are "reasonably foreseeable" and have "catastrophic consequences." (PW-6-8)

Comment: I also take offense, I mean, calling a small environmental impact. A pool fire or breach of a cask are not small environmental impacts. In fact, some of the NRC's own studies identify a pool fire as potentially having comparable consequences to reactor meltdown.

The NAS, the Academy report, finds that a pool fire is possible and that such a fire could result in releasing large amounts of radiation to the environment is hardly a small impact.

Moreover, the NRC -- the Academy report suggests a host of possible mitigation measures, depending on site by site evaluations. Such measures could include lower pool density, reconfiguration of assemblies in the pool racking, additional sprinkler system, and so on, all depending on different conditions at each plant. That's the Academy report finding 3-D, page six. (PBCA-Schumann-11)

Comment: I believe that there was not an effort to get a range of studies and perspectives in regard to reactor accident consequence scenarios. Does the NRC consider the Sandia Labs 1982 reactor accident consequence study, including the worst-case reactor consequences which were hidden from public view until released by Representative Markey? Has there been as thorough an assessment of U.S. nuclear reactors and potential accident consequences since this 1982 study? If so, which studies are they, and have they been peer-reviewed? If not, why ignore this very basic information mentioned in the Sandia study -- unless it is too disturbing and might interfere with the NRC's promotion of the nuclear power industry?

It seems apparent that the accident probability figures in this document are, shall we say, wishful thinking. Seeing that lawyer-types are reminding writers that of course we have to act like we are abiding by pertinent regulations, yet real-life on-the-ground experience indicates that we are not living in a fail-safe world, while every year in the USA more than a thousand incidents or violations of safety requirements are reported to the NRC. Aging of whatever living being or whatever piece of equipment can have serious consequences which are not addressed in the least in the GEIS. (Campbell-31-17)

Comment: 3. Postulated Accidents: The NRC staff incorrectly has concluded that the environmental impacts of design-basis accidents are of small significance for all plants and are designated Category 1. Severe accidents absurdly are designated "Small impact" also that includes the probability-weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.

a. Small Impact: The impact of postulated accidents incorrectly is categorized as "small." The Draft arrives at this absurd conclusion as a result of the following:

(1) NRC allowing Applicant's to use computational codes that minimize impact – MACCS/ MACCS2 or WinMACCS. All three incorporate ATMOS, an inappropriate plume distribution model for complex sites (sites located on coastal areas, river valleys, hilly or mountain terrain). ATMOS incorrectly assumes the plume will travel in a straight line and thereby narrows the true area of true impact.

(2) NRC and Applicants assume a best case scenario; underestimate release; and base dose response on outdated science.

(3) NRC and Applicants minimize or ignore a host of costs in their calculations from evacuation time estimates, clean-up costs (discussed for example in SAND96-0957, Appendix E at 11 and from lessons learned from Chernobyl), health costs, to economic costs. David Chanin author of the code said, "If you want to discuss economic costs...the 'cost model' of MACCS2 is not worth

anyone's time. My sincere advice is to not waste anyone's time (and money) in trying to make any sense of it." (and) "I have spent many hours pondering how MACCS2 could be used to calculate economic costs and concluded it was impossible.[10]"

[[10] www.chaninconsulting.com]

(4) NRC and Applicants ignore spent fuel fires; and ignore the spread of an accident from/ between the spent fuel pool and reactor. See Pilgrim Watch's filings regarding SAMA, Contention 3, in Pilgrim's License Renewal Application and New York State's filings regarding SAMA in Indian Point's License Renewal Application.

Examples:

(a) Computer Code & Meteorological Model: NRC and Applicants use the MELCOR Accident Consequence Code System (MACCS), MACCS2 or most recent WinMACCS computer code in SAMAs.

- Meteorological Model in the computer code − ATMOS inappropriate: The codes incorporate ATMOS, the straight-line Gaussian Plume model − both the computer code and ATMOS underestimate consequence. Severe Accident Mitigation Analysis is required for license renewal and licensing of new reactors; they must be required to use site appropriate computer codes and plume distribution models. DOE recognized the deficiencies in the MACCS/ MACCS2 model and updated with SAND96-0957; NRC refused to do likewise.

  Variable trajectory plume distribution models are appropriate for complex sites such as in coastal locations and sites along river valleys and in hilly terrain. Current computer technology and capability make using these models practical. NRC, DOE, EPA, The National Research Council of the National Academies, State Officials, nuclear trade groups, & air dispersion modeling community agree that the straight line Gaussian plume model cannot account for the effects of complex terrain on the dispersion of pollutants from a source; therefore NRC must require that variable models, not straight-line Gaussian models, are used in performing SAMA analyses so that consequences are not distorted and minimized. (See attachment A).

- Computer Codes used were designed as research codes not licensing codes: MACCS2 calculations are used by NRC as a basis of recent commercial reactor license-renewal decisions involving SAMA cost/benefit analysis of severe accident risks. However as explained by David Chanin, the author of the code in a paper written for the Energy Facilities Contractor Operating Group Safety Analysis Working Group Annual

Workshop, April 29-May 5, 2005, Santa Fe,. NM, *The Development of MACCS2: Lessons Learned,*[11]

[[11] Chanin, D.I. (2005), "The Development of MACCS2: Lessons Learned," [written for:] *EFCOG Safety Analysis Annual Workshop Proceedings,* Santa Fe, NM, April 29−May 5, 2005. Full text available on http://chaninconsulting.com/index.php?resume]

MACCS2 was never intended or advertised as appropriate for use as a licensing code; instead it was developed as a research code. MACCS (and its successor MACCS2) were not developed according to the very strict 18-point QA requirements of NQA-113 as is required for SARs... Rather, both MACCS and MACCS2 were developed following the less rigorous research-focused QA guidelines of ANSI/ANS 10.4

On p. 1-7 of the MACCS2 User's Guide, there is a strong warning for analysts who choose to use it for such purposes: When MACCS2 is used for authorization basis studies, it is very important to carefully review the code's phenomenological models and input parameter values to ensure that they conform to applicable guidance and are appropriate for the accident scenario being modeled. The identification of deficiencies in these areas could bring into question the safety basis of the facility. If errors are later found in authorization basis calculations, an Unreviewed Safety Question (USQ) could be raised, and continued operation of the facility would then require a demonstration that the facility's safety basis was adequate.

Because license renewal is in fact a licensing decision as licensing code should be required − even if it necessitates NRC funding the development of such a code.

(b) Assumption "best case" scenario & ignoring onsite storage spent fuel: Potential Impact Far From Small: As said in the forgoing, it is sobering for a comparison to look at the impact of the Chernobyl accident, 1986, to help understand the potential impact from postulated accidents. Sheep remain contaminated in Wales and reindeer are still contaminated in Lapland from an accident 20 years ago. Chernobyl was bad, no doubt, but certainly not worst case. The 1986 Chernobyl accident released 2,403,000 curies of C-137; whereas Pilgrim's core, for example, during license extension will have 5,130,000 curies of C-137 [Beyea Decl, Chernobyl; and LR, Pilgrim CS-137 figures]; and at Pilgrim the inventory of long-lived radionuclides, such as Cesium-137, in the spent fuel pool is eight times that in the reactor core. (PW-6-12)

Comment: Page 2-33, Table 2.43, column labeled “Proposed Action: Describes the impacts of postulated accidents associated with the proposed action as follows:

Postulated accidents associated with continued operations under the license renewal term include design-basis accident and severe accidents. The impacts presented take into

consideration the low probability of an accident occurring. Design-basis accidents have a small impact. Severe accidents could have moderate or large consequences.

The last sentence in the above-quoted text (i.e., “Severe accidents could have moderate or large consequences”) is not consistent with Table 2.1-1 on page 2-14 (row titled “Severe accidents”), which summarizes the impacts from postulated severe accidents associated with the proposed action as follows:

Small impact (Category 2). The probability-weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.

The sentence stating that “Severe accidents could have moderate or large consequences” also is not consistent with the analyses of severe accident impacts as reported on page 4-154 (lines 10 to 12) in the draft updated GEIS and on page E-44 (lines 4 to 6) in Appendix E to the draft updated GEIS.

Based on the information provided above, consider modifying the sentence describing the impacts of severe accidents associated with the proposed action in Table 2.4.3 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

~~Severe accidents could have moderate or large *consequences*~~*The consequences from severe accidents would be small*. (NEI1-7(4)-32)

Comment: In 1989, the United Stated Court of Appeals for the Third Circuit rejected NRC's ad hoc policy of examining severe accidents and instead ordered NRC to carefully evaluate the environmental impacts that could result from severe accidents and the means to mitigate such impacts in order to comply with NEPA. *Limerick Ecology Action, Inc. v. NRC,* 869 F.2d 719 (3rd Cir. 1989). The Third Circuit noted that NRC did not find that risks from a severe accident were remote and speculative, and held that NRC's severe accident policy did not represent the requisite careful consideration of the environmental consequences required under NEPA. 869 F.2d at 723. As a result, NRC regulations now require applicants and NRC Staff to conduct a severe accident mitigation alternatives (SAMA) analysis. 10 C.F.R. §51.53(c)(3)(ii)(L).

Those regulations, however, limit the obligation to conduct a SAMA analysis to those plants where a SAMA analysis previously has not been considered for the plant during its initial licensing *(i.e.,* in the wake of the *Limerick* decision). In light of new analyses and insights about mitigation measures, changing population patterns, and economic variations over time, a SAMA analysis should be performed when a reactor applies for a renewed operating license, regardless of whether the facility went through a SAMA review twenty years before. It is

unrealistic to expect that a SAMA analysis performed, for example, in 1990 would suffice for a facility seeking a renewed operating license in 2010 or 2030. (NYS AG-14-6)

Comment: Follow-up from the NRC 2003 GEIS − the following additional comments were submitted by the one member of the public who attended the meeting in Anaheim, California − and remain unresolved.

RISK ASSESSMENTS

The NRC must improve its risk assessment guidelines for nuclear power plant renewals. An integral component of the GEIS for nuclear license renewal is the evaluation of consequences and correction of flaws in calculating accident probabilities. Nuclear plant risk assessments are not valuable because potential accident consequences are not evaluated. They merely examine accident *probabilities* − only half of the risk equation. Consequences are potentially so catastrophic that they must be considered.

Moreover, the accident probability calculations are seriously flawed. They rely on assumptions that contradict actual operating experience. The risk assessments assume nuclear plants always conform to safety requirements, yet each year more than a thousand violations are reported. Plants are assumed to have no design problems even though hundreds are reported every year. Aging is assumed to result in no damage, despite evidence to the contrary. Reactor pressure vessels are assumed to be fail-proof, even though embrittlement forced the Yankee Rowe nuclear plant to shut down. The risk assessments assume that plant workers are far less likely to make mistakes than actual operating experience demonstrates. The risk assessments consider only the threat from damage to the reactor core despite the fact that irradiated fuel in the spent fuel pools represents an equally serious health hazard. The results from these unrealistic calculations are, therefore, overly optimistic.

Risk assessment analyzes health impacts by calculating impacts from exposure to a healthy 30-year- old "reference man" weighing 179 pounds. However, there are no age, sex, and weight requirements to allow residences near a reactor. The very young, old, and disabled also live in the community and may be impacted. The results from these unrealistic calculations are overly optimistic.

Furthermore, the NRC requires plant owners to perform the calculations, but it fails to establish minimum standards for the accident probability calculations. Thus, the reported probabilities vary widely for virtually identical nuclear plant designs indicating that self-assessment is inaccurate.

Any risk assessment must also include human error and terrorism/sabotage in order to have any real-life validity. For example, a 1987 study found that human error contributed to 74% of all incidents at nuclear power plants.

The NRC did not mention "Risk Assessment" of nuclear reactors anywhere in the 2009 draft GEIS. This omission reinforces the public's opinion that their 2003 input was not valued and questions the NRC's commitment to incorporating public comment in the final revision of the GEIS for license renewal. (A4NR-11-27)

Comment: Spent Fuel Storage Should Be Classified as Category 2: In the License Renewal GEIS, the NRC admits for the first time that the environmental impacts of a spent fuel pool fire are comparable to the impacts of a severe reactor accident, *i.e.,* that they may be significant. *See* Vol. 1 page 4-156 ("it is concluded that the environmental impacts from accidents at spent fuel pools (SPFs) (as quantified in NUREG-1738) can be comparable to those from reactor accidents at power.") Yet, although the License Renewal GEIS treats severe accidents as Category 2 environmental impacts *(i.e.,* subject to review in individual license renewal proceedings), it continues to treat spent fuel pool fires as Class 1 impacts, as it did in the 1996 License Renewal GEIS.

In order to rationalize its Category 1 designation of pool fires, the NRC resorts to omitting relevant information, misrepresenting previous studies, and neglecting to establish procedures that would give interested members of the public a fair chance to test the validity of its assertions. The following are just a few examples of the NRC's distortions and lack of candor:

- The NRC distorts the impacts of a pool fire by restricting its impact analysis in Table E-18 on immediate and latent fatalities and ignoring the dominant environmental impact of a pool fire: land contamination. The principal impact of a pool fire – regardless of whether it is caused intentionally or by accident – is not death and illness through inhalation doses, but land contamination. *See* the attached report by Dr. Gordon R. Thompson, *Assessing Risks* of *Potential Malicious Actions at Commercial Facilities: The* Case of a *Proposed Independent Spent Fuel Storage Installation at the Diablo Canyon Site* at 15 (June 27, 2007) (Attachment 1).[3] A pool fire at a nuclear power plant could contaminate thousands of square miles of land, causing widespread illness and costing billions of dollars in clean-up costs. *Id.* See *also* Dr. Gordon R. Thompson, *Environmental Impacts* of *Storing Spent Nuclear Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique* of *NRC's Waste Confidence Decision and Environmental Impact Determination* (February 6, 2009) (Attachment 2).

  [[3] SLOMFP presented Dr. Thompson's report and supporting declaration to the NRC Commissioners in 2007, in San Luis Obispo Mothers for Peace's Contentions and Request for a Hearing Regarding Diablo Canyon Environmental Assessment Supplement (June 28, 2007).]

For the NRC to exclude contamination effects from an analysis of the significance of the impacts of a pool fire is absurd and shows a disturbing lack of scientific integrity.

- The NRC also distorts NUREG-1738 by claiming that its results are conservative when applied to operating plants, because a plant in its decommissioning phase has “fewer protective features." GEIS p. E-34. In fact, NUREG-1738 explicitly acknowledges that it is *not* conservative for operating plants, and that the study was limited to the question of whether emergency planning measures should be required for nuclear power plants that had entered their decommissioning phases. As the Staff discussed in the report:

  > The staff found that the event sequences important to risk at decommissioning plants are limited to large earthquakes and cask drops. For emergency planning (EP) assessments this is an important difference relative to operating plants *where typically* a *large number* of *different sequences make significant contributions to risk.*

  NUREG-1738 at ix (emphasis added). Thus, in characterizing NUREG-1738 as "conservative" with respect to operating plants, the NRC completely ignores the fact that a range of severe reactor accidents may contribute to the potential for a pool fire. *See also* the attached report by Dr. Gordon R. Thompson entitled *Risks and Risk- Reducing Options Associated with Pool Storage* of *Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants* at 19 (May 25, 2006) (Attachment 3) (severe reactor accident could initiate or exacerbate a pool-fire scenario).[4]

  [[4] Dr. Thompson's report and supporting declaration were submitted to the NRC by the Commonwealth of Massachusetts in May 2006 in support of its requests for hearings in the license renewal proceedings for the Pilgrim and Vermont Yankee nuclear power plants. The Commonwealth also submitted Dr. Thompson's report in support of its August 25, 2006, petition for rulemaking regarding the environmental impacts of spent fuel pool storage.]

- At page 4-156, the NRC states that analyses conducted and mitigative measures employed subsequent to NUREG-1738 (2001) have "lowered the risk" of spent fuel pool fires. But the NRC fails to mention that these analyses and mitigative measures were all *plant-specific.* NRC, Denial of Rulemaking Petition, 73 Fed. Reg. 46204, 46208, 46 212 (Aug. 8, 2008) Therefore, under the specific terms of the NRC's regulations for implementation of NEPA in license renewal cases, the NRC may not include spent fuel pool fires in Category 1. See 10 C.F.R. Part 51, Appendix B, Table B-1, footnote 2 paragraph 3 (an impact may be classified as Category 1 only if “[m]itigative of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.”

- The NRC also fails to acknowledge that the analyses and mitigative measures described above are discussed in classified and safeguards documents which must be provided to interested parties who satisfy the NRC's procedural requirements for safeguards access and/or security clearances. 42 U.S.C. § 2231 "[I]n the case of agency proceedings or actions which involve Restricted Data, defense information, safeguards information protected from disclosure under the authority of section 2167 of this title or information protected from dissemination under the authority of section 2168 of this title, the Commission shall provide by regulation for such parallel procedures as will effectively safeguard and prevent disclosure of Restricted Data, defense information, such safeguards information, or information protected from dissemination under the authority of section 2168 of this title to unauthorized persons with minimum impairment of the procedural rights which would be available if Restricted Data, defense information, such safeguards information, or information protected from dissemination under the authority of section 2168 of this title were not involved.") The NRC recently recognized this legal obligation in the hearing notice for the proposed issuance of a uranium enrichment license. Notice of Receipt of Application for License; Notice of Consideration of Issuance of License; Notice of Hearing and Commission Order and Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation; In the Matter of Areva Enrichment Services, LLC (Eagle Rock Enrichment Facility, 74 Fed. Reg. 38052 (July 30, 2009). Here, where the NRC relies heavily on classified and safeguards documents for its conclusion that the environmental impacts of spent fuel pool fires are insignificant, its failure to establish procedures for access by authorized parties to relevant information starkly violates Section 2231 of the Atomic Energy Act. (SLOMFP-13-5)

Comment: Inadequate Assessment of the Environmental Consequences of Severe Accidents:

Inadequate Consideration of Spent Fuel Pool Accidents: The Revised GEIS recognizes that severe accident analyses in the 1996 GEIS "were limited to consideration of reactor accidents caused by internal events."[65] Proclaiming an understanding that accident risk has naturally evolved since issuance of the 1996 GEIS, the Revised GEIS identifies new sources of postulated severe accidents, including an explicit recognition of spent fuel pool accidents.[66]

[[65] Revised GEIS at 4-153.]
[[66] *See id.* at 4-153 to 4-154; Revised GEIS Appendices at E-32 ("The 1996 GEIS did not include an explicit assessment of the environmental impacts of accidents at the spent fuel pools (SFPs) located at each reactor site. ").]

However, while this recognition is commendable, the Revised GEIS goes on to draw erroneous conclusions about the potential consequences of spent fuel pool accidents. After weighing new information said to decrease estimated environmental impact against new information (including spent fuel pool accidents) said to increase estimated impacts, the Revised GEIS concludes "that

the reduction in environmental impacts from the use of new information outweighs any increases resulting from new considerations. As a result, the findings in the 1996 GEIS remain valid."[67] In particular regard to spent fuel pool accidents, the Revised GEIS concludes that "the environmental impacts from accidents at spent fuel pools...can be comparable to those from reactor accidents at full power... Subsequent analyses performed, and mitigative measures employed since 2001 have further lowered the risk of this class of accidents."[68] Accordingly, the NRC continues to exclude spent fuel pool accidents from site-specific analysis, including Severe Accident Mitigation Alternatives (SAMAs) related to spent fuel pool accidents.[69]

[[67] Revised GEIS at 4-154.]
[[68] *Id.* at 4-156.]
[[69] *See id.* at 4-154 ("[T]he impacts from reactor accidents at full power (including internal and external events) should continue to be considered in assessing Sever Accident Mitigation Alternatives (SAMAs). The impacts of *all other new information* do not contribute sufficiently to the environmental impacts to warrant their inclusion in the SAMA analysis, since the likelihood of finding cost-effective plant improvements is small.") (emphasis added).]

The NRC's revised assessment here continues to ignore relevant information about the risk of spent fuel pool accidents, which undermines the NRC's continued conclusion that the impact of releases to the environment from severe accidents will always be "small."[70]

[[70] *See* Revised GEIS Appendices at B-33.]

While initially, it was assumed that stored spent fuel generally did not pose significant risks, with the introduction of high-density, closed-form storage racks into spent fuel pools beginning in the 1970s, this understanding is no longer valid.[71] The closed-form configuration of the high density racks can create a major problem if water is lost from a spent fuel pool, including disastrous pool fires.[72] Studies conducted after the issuance of the 1996 License Renewal GEIS contradict previous studies that had asserted that complete drainage of spent fuel pools was the most severe case and that aged fuel would not burn.[73] These later studies establish that if the water level in a fuel storage pool dropped to the point where the tops of the fuel assemblies are uncovered, the fuel would [burn] regardless of its age, and resulting fires can be catastrophic.[74]

[[71] *See* Thompson Report at 18-27.]
[[72] *Id.*]
[[73] *See* Waste Confidence Rule, 55 Fed. Reg. 38474, 38481 (Sept. 18, 1990).]
[[74] NUREG-1738, *Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants* (January 2001); 2006 NAS Study at 53-54. The Revised GEIS improperly attempts to underplay the findings of NUREG-1738 at various turns. *See, e.g.,* Revised GEIS Appendices at E-34 ("the impact analysis contained in NUREG-1738 is considered conservative"); *id.* at E-35 ("low ruthenium source term is...viewed as the more accurate representation. Therefore, the risk and environmental impact from fires in SFPs as analyzed in NUREG-1738 are expected to be comparable to or lower than those from reactor accidents and are bounded by the 1996 GEIS."); *id* at E-36 ("Based on the more rigorous accident progression analyses, the recent mitigation enhancements, and NRC site evaluations of every SFP in the United States, the risk of an SFP zirconium fire initiation is expected to be less than reported in NUREG-1738").]

Furthermore, the Revised GEIS acknowledges that mitigative measures have been taken to reduce the risk of spent fuel pool fires. However, the existence of such measures at particular nuclear power plant sites completely contradicts the NRC's end conclusion that spent fuel pool accidents do not warrant site-specific consideration.[75]

[[75] *See generally* Riverkeeper's IP DSEIS Comments at 26-33.]

Accordingly, the NRC conclusion that that all consequences from severe accidents, including those involving spent fuel pools, are "small for all plants," is without proper foundation. The impacts of severe accidents from spent fuel pool accidents should be addressed in a site-specific manner, with the appropriate potential range of impact being SMALL to LARGE.

In any event, it is crucial that NRC require consideration of spent fuel pool accidents in licensee and NRC Staff SAMA analyses. Failure to do so will lead to highly inaccurate results.[76] For example, in the Indian Point relicensing proceeding, in the first step of the SAMA analysis (establishing the baseline of severe accidents) neither Entergy nor the NRC Staff considered the contribution to severe accident costs by fire in either of the spent fuel pools at IP2 or IP3.[77] No SAMAs that would avoid or mitigate such costs were identified.[78] However, if the costs of pool fires were considered, the value of SAMAs would be significant. Even using unrealistically low probability estimates in NUREG-1353, *Regulatory Analysis for the Resolution of Generic Issue 82, Beyond Design Basis Accidents in Spent Fuel Pools* (1982), the offsite cost risk of a pool fire is substantially higher than the offsite cost risk of an Early High release from a core-damage accident.[79] The present value of cost risk for a conventional pool accident at Indian Point (i.e., an accident not caused by intentional attack), using the unrealistically low probability assumptions in NUREG-1353, is $27.7 million, a significant sum.[80] If more realistic assumptions about the likelihood of a pool fire were used, the cost would be considerably higher.[81] Moreover, the present value of cost risks ("PVCR") for a spent fuel pool fire would increase substantially (i.e., from $27.7 million to $38.7 million) if the discount rate were changed from 7% to 3%, a more appropriate rate for an analysis of the benefits of measures to prevent or mitigate radiological accidents that Entergy used to test the sensitivity of its SAMA analysis.[82] If the discount rate were dropped to zero, a rate that is justified in light of the catastrophic nature of the consequences involved, the PVCR for a spent fuel pool fire would be even higher -- $51.5 million.[83]

[[76] *See generally* Thompson Report.]
[[77] *See* Indian Point Draft Supplemental EIS § 5.2; Entergy's Environmental Report at § 4.21.]
[[78] Indian Point Draft Supplemental EIS § 5.2]
[[79] Thompson Report at 28]
[[80] *Id.* at 49 and Table 7-7.]
[[81] *Id.* at 51.]
[[82] *Id.* at 51-52.]
[[83] *Id.* at 52.]

Given the potential costs involved, it is essential that such risks are assessed in licensee SAMA analyses. (Riverkeeper-20-14)

Comment: Moreover, NRC has mitigated the risks from spent fuel pools on a site-specific basis - that is, mitigating them like Category 2 issues − despite classifying them as Category 1 and failing to disclose the impacts and thus subject the NRC's mitigation measures to public comment as required by NEPA.

In 2008, the NRC denied a petition for rulemaking brought by California and Massachusetts which sought a rulemaking revising the GEIS and regulations on the grounds that mitigation measures the NRC had implemented at every plant had minimized the risk of a radiation release from a spent fuel pool. *See* NRC Rulemaking Denial (Aug. 1, 2008), 73 Fed. Reg. 46204 (Aug. 8, 2008). NRC's decision relied on recently implemented "mitigation measures" that would decrease the risk of a spent-fuel pool fire, but the only specific mitigation measure it discussed was a "coolant makeup and spray capability system" that would cool spent fuel in the event of a drop in the water level of a pool. NRC Rulemaking Denial at 22. It also stated that, "in cases where [spent fuel pool] water levels cannot be maintained, leakage control strategies would be considered." *Id.* NRC indicated that it has issued license amendments and safety evaluations incorporating these strategies into all operating nuclear power plants, but the decision does not discuss the effectiveness of those measures or even the extent to which they are actually in use at plants.[9] *Id.* In fact, not all plants implemented the same mitigation measures, and some plants were not required to implement all of the recommended measures. *See* Safety Evaluation by The Office of Nuclear Reactor Regulation Related to Order No. Ea-02-026 Entergy Nuclear Operations, Inc. Indian Point Nuclear Generating Unit Nos. 2 and 3 Docket Nos. 50-247 and 50-286 (July 7, 2007) at pp. 1-4 (emphasis added) appended to a letter from NRC Staff to Entergy of the same date (ML071920020)(explaining that mitigating strategies related to the safety of the Indian Point Unit 2 spent fuel pool were not required due to being "screened out.").

[[9] Despite the evidence submitted by the States showing that increased dry-cask storage would allow lower-density racking in spent fuel pools and thereby reduce the risk of fires in pools, NRC's discussion of mitigation measures did not mention that measure. *See* Alvarez *et al.,* "Reducing the Hazards" at 27, 2006 Thompson Report at 32, NAS Report at 68-71.]

In 1996, NRC found that the environmental impacts of spent-fuel pools could be considered generically. The 1996 generic EIS, and the regulations based on that EIS, found that those impacts were not significant and designated them as Category 1 generic impacts on the ground that they did not require consideration of any plant-specific measures and would not be affected by any future mitigation measures. NUREG 1437 at 6-85 - 6-86. As a result, NRC does not consider those impacts in a plant-specific supplemental EIS when a plant's license is renewed. 10 C.F.R. § 51.53(c)(2).

But when the States asked NRC to reconsider its conclusion that the pools have no significant impacts, NRC relied on the existence of plant-specific measures. NRC cannot have it both ways: if, as NRC contends, measures that are plant-specific and were adopted since 1996 affect the environmental impacts of spent-fuel pools, then the impacts of spent-fuel pools should be treated as Category 2 plant-specific impacts and addressed in plant-specific EISs. NRC should remedy that inconsistency in this rulemaking.

NRC's administrative rulings confirm that it is treating the impacts of spent-fuel pools inconsistently. In *Massachusetts v. United States,* Massachusetts argued that NRC was required to consider new information regarding the environmental impacts of spent-fuel pools in proceedings to renew the licenses for the Pilgrim and Vermont Yankee nuclear power plants. 522 F.3d at 122-23. The First Circuit accepted NRC's claim that it was not required to consider that information in plant-specific license renewal proceedings, because the environmental impacts of spent-fuel pools are covered by NRC's 1996 generic EIS and regulations. *Id.* at 126-27. NRC argued, and the court agreed, that Massachusetts could challenge the generic EIS, and the regulations based on it, in a petition for a generic rule making. *Id.* at 127. But after avoiding a plant-specific environmental analysis of spent-fuel pools in the Pilgrim and Vermont Yankee licensing proceedings, NRC then relied on plant-specific security and mitigation measures to deny the States' request to modify the generic EIS and regulations. The security measures − *e.g.,* vehicle barriers, fences, and intrusion detection systems − and mitigation measures − coolant makeup and spray capability systems and leakage control strategies − on which NRC relied to deny the rulemaking petitions are necessarily plant-specific. Moreover, both NRC staff, in NUREG-1738, and the NAS found that the risk of a spent-fuel pool fire depends on plant-specific design factors, such as the configuration of the storage racks in a pool, and cannot be assessed on a generic basis. If, as NRC found in its decision here and NRC staff and the NAS have also found, plant-specific mitigation and security measures are relevant to the environmental impacts of spent-fuel pools, then those impacts are a Category 2 issue requiring analysis on a plant-specific basis when a plant's license is renewed. NRC's reliance on those plant-specific measures to deny the States' petitions is contrary to its own determination that the environmental impacts of spent-fuel pools are generic. It is also contrary to its determination in 1996 that those impacts would not be affected by any future mitigation measures.[10]

[[10] To the extent that security concerns underlie the NRC's decision not to disclose the impacts or mitigation measures required to be disclosed by NEPA, this reason is without merit; the provisions of 10 C.F.R. section 2.900 *et. seq.* allow for consideration of such information in a secure proceeding.]

Indeed, by taking into account plant-specific measures, NRC has effectively revised its regulations − without the rulemaking process required by the Administrative Procedure Act, 5 U.S.C. § 553 − and redesignated the impacts as Category 2. NRC's determination that it can continue to treat the environmental impacts of spent-fuel pools as generic even though it admits

that those impacts are affected by plant-specific issues precludes full consideration of those impacts, in violation of NEPA. For example, under NRC's reasoning, it will never have to consider the effectiveness of a particular plant's coolant makeup and spray capability system in preventing spent-fuel pool fires at that plant, even though NRC relied on that mitigation measure to make its generic no-impact determination. Where, as here, NRC's generic process does not resolve plant-specific concerns, NEPA requires it to consider those concerns in a plant-specific proceeding. *See Minnesota v. NRC,* 602 F.2d 412, 418 (D.C. Cir. 1979) ("The question is whether there has been an NRC disposition in generic proceedings that is adequate to dispose of the objections to the licensing amendments"). NRC's determination also prevents the public and other governmental bodies from receiving information about the plant-specific matters−design issues and security and mitigation measures − that affect the risk of fires in spent-fuel pools. That is contrary to NEPA's core purpose of ensuring that relevant information about the environmental consequences of an agency's action is made available to other governmental bodies and the public. *See Robertson v. Methow Valley Citizens Council,* 490 U.S. 332, 349 (1989); *see also Dep't of Transp. v. Pub. Citizen,* 541 U.S. 752, 768-69 (2004); *Balt. Gas* & *Elec. Co.,* 462 U.S. at 97. It also conflicts with NEPA's goal of giving other government agencies "adequate notice of the expected consequences [of an agency's action] and the opportunity to plan and implement corrective measures in a timely manner." *See Robertson,* 490 U.S. at 350. The one-sided process employed by NRC precludes the States − which NRC expects to play a large role in responding to the environmental impacts of a spent-fuel pool fire − from meaningful participation in identifying and exploring those impacts. And it denies the States and the public the right to a hearing on those matters when a plant's license is renewed, in violation of the Atomic Energy Act. 42 U.S.C. § 2239(a)(1)(A)

In short, in light of NRC's own recognition that the risk of spent-fuel fires is affected by plant-specific issues and by measures that it has taken since it issued its 1996 generic EIS, NRC should reconsider its 1996 generic determination that spent-fuel pools have no significant environmental impacts, and change spent-fuel pool impacts from a Category 1 to a Category 2 issue here. (NYS AG-14-13)

Comment: The Revised GEIS inexplicably and insupportably asserts that high density fuel storage pools pose no significant environmental risk. *See,* Revised GEIS, p. S-17. This claim is completely refuted by a report by the National Academy of Sciences, the NRC's own technical staff and independent experts. *See* Jan Beyea, Report to the Massachusetts Attorney General on the Potential Consequences of a Spent-fuel Pool Fire at the Pilgrim or Vermont Yankee Nuclear Plant (May 25, 2006). This report showed that fuel storage pools are susceptible to fire and radiological release from a wide range of conditions, including natural phenomena, operator error, equipment failure, or intentional attack. The environmental impacts of a fire in a spent fuel pool may be severe, extending over a geographic area larger than one state's boundaries and continuing for decades.

In the October, 2000, study referred to above, the NRC admitted that:

"the risk analysis in this study did not evaluate the potential consequences of a sabotage event that could directly cause off-site fission product dispersion, for example, a vehicle bomb driven into or otherwise significantly damaging the SFP [Spent Fuel Pool]… "[9]

Accordingly, the environmental evaluation must study the consequences to human health and safety and the environment from any incident, including an accident or attack on the accumulated stored fuel in a storage system, because those possibilities pose obvious risks that were not discussed in the original 1996 GEIS and have been explicitly excluded in the Revised GEIS. Until this evaluation is complete, the requirements of NEPA have not been met.

[[9] NRC Report February, 2001, NUREG -1738, at 4-15. This report is respectfully incorporated by reference.]
(CT AG-10-4)

Comment: Solid Waste Management [S-17]: NRC incorrectly assigns "small impact" and a Category 1 designation to solid waste management, low level waste storage and disposal and onsite storage of spent fuel.

b. Onsite Storage of Spent Fuel: NRC assigns a "small impact" and a Category 1 designation to onsite storage of spent nuclear fuel, Table 2.1-1.

(1) Impact Potentially Large Under Severe Accident Situations: The Draft incorrectly determined that the impact was small. There would be nothing small about the potential impact on the environment from a spent fuel pool fire in a densely packed spent fuel pool.

Last the Draft should look to the 1996 GEIS and appreciate that there is a big difference between onsite storage of spent fuel under normal operations (considered now in the GEIS, Section 6) and in severe accidents (GEIS, Section 5). GEIS, Section 5, deals specifically with severe accidents. A straightforward reading finds nothing in it to exclude spent fuel − pools currently have the largest inventory of radioactive material at reactor sites and hence the potential for the most severe consequences. Severe accidents are defined in Section 5 because of their severe consequences, and are "severe" regardless of whether they originate from the core or the spent fuel pool. This Draft document should be revised to say likewise.
(PW-6-10)

Comment: Although the proposed GEIS does add analysis of radionuclides released to groundwater as a Class 2 issue which the State of New York supports (see Point A above), it continues to classify the on-site storage of spent nuclear fuel during the license renewal term as a Class 1 issue. On-site storage of spent nuclear fuel during the license renewal term should be classified as a class 2 issue because (1) new information which came to light after the 1996

GEIS shows that the spent fuel stored in a pool can catch fire, either by accident or due to sabotage, and release significant amounts of radiation to the surrounding area resulting in site-specific impacts, and (2) NRC has mitigated the impacts of the risks of such storage on a site-specific basis.[7]

[[7] The Second Circuit recently addressed this issue in *State of New York v. United States Nuclear Reg. Comm'n,* 08-3903-ag(L), slip op. (2d Cir., Dec. 21, 2009). However, the NRC represented to the Second Circuit that the States would have an additional opportunity to raise their concerns regarding spent fuel pools during the comment period for the Proposed GEIS. *See* Brief of Federal Respondents, *State of New York v. United States Nuclear Reg. Comm'n,* 08-3903-ag(L) (Aug. 3, 2009), at 48.]

The commenter provided supporting information which in the commenter's opinion, "shows clearly that the risk of spent fuel pool fire is greater than contemplated in the 1996 GEIS and that it deserves site-specific analysis." (NYS AG-14-12)

Comment: The Nuclear Regulatory Commission's ("NRC") proposed revisions to the generic environmental impact statement for license renewal of nuclear power plants released July 31, 2009 ("Revised GEIS" or "Statement") are completely inadequate and unacceptable. This Statement is required to thoroughly consider environmental impacts common to all nuclear power stations that may be caused or threatened by extending the current licenses at operating nuclear plants for twenty additional years. The GEIS is required by law to identify and evaluate all reasonably foreseeable potential environmental impacts resulting from the proposed government action, but it fails to meet those basic legal requirements.

NRC − inexcusably - has completely and specifically ignored three significant environmental impacts of relicensing nuclear power plants: 1) the continued and increased storage of spent nuclear fuel onsite because the federal government no longer has any plan or proposal for the permanent storage of high level reactor waste; 2) the threat of terrorist attacks on nuclear facilities; and 3) emergency response and evacuation of the facilities and surrounding areas. As a result, NRC's environmental impact statement is so unrealistic that it is useless.

NRC must thoroughly and accurately reevaluate the impacts resulting from a fire, accident or attack on any relicensed facility, and especially on stored spent nuclear fuel on-site ("SNF"), as those risks will be profoundly increased by the continued operation of nuclear power stations and the permanent termination of the Yucca Mountain waste storage project. NRC must also consider the impact of any accident or attack at a relicensed nuclear power station in the context of realistic and effective evacuation plans. Finally, the revised generic environmental impact statement must clearly identify and acknowledge the potential impacts from a terrorist attack on natural resources and the environment. (CT AG-10-1)

Comment: The NRC has failed to provide a thorough and accurate analysis of all relevant potential impacts and has failed to take a "hard look" at the adverse impacts of this project.

Foremost among the critical risks are the problems resulting from an additional 20 years accumulation of spent nuclear fuel without any plans for a federal repository, the need to ensure practical and workable evacuation plans, and the failure to address the environmental consequences of a terrorist attack. The Revised GEIS is fundamentally incomplete and thus the NRC must provide the missing analyses regarding impacts to natural resources and evaluate the long-term impact to these resources from these identifiable risks. NRC must readdress these issues in a satisfactory environmental impact statement before proceeding. (CT AG-10-10)

Comment: Most of the accumulated spent fuel is still in water-filled storage pools located next to nuclear reactors but almost always *outside* the reactors' protective containment domes. The danger created by these high-density storage pools in the event of an accident or terrorist attack is obvious. The two operating reactors at the Indian Point nuclear power station, for example, are located in one of the most densely populated areas of the country, an area which includes not only New York City and much of southern New York and northern New Jersey, but also much of the State of Connecticut, within its potential exposure zone.

NRC has never properly evaluated the environmental consequences of an accident or attack at a spent fuel storage area and it must do so now in the Revised GEIS. Section 1.7.2 of the Revised GEIS, however, states that "[t]he NRC will not make a decision or any recommendation on the basis of the information presented in this GEIS regarding the disposition of" SNF.

The facts, as developed over the last several decades, clearly contradict NRC's assumption that SNF storage is safe. In fact, an accident or attack on a SNF pool could result in a loss of coolant and subsequent fire releasing deadly amounts of radiological material and toxic fumes. An NRC report issued in October 2000 described in detail what can occur if there is a loss of coolant in a fuel pool:

This reaction of zirconium and air, or zirconium and steam is exothermic (i.e., produces heat). The energy released from the reaction, combined with the fuel's decay energy, can cause the reaction to become self-sustaining and ignite the zirconium. The increase in heat from the oxidation reaction can also raise the temperature in adjacent fuel assemblies and propagate the oxidation reaction. The zirconium fire would result in a significant release of the spent fuel fission products which would be dispersed from the reactor site in the thermal plume from the zirconium fire. Consequence assessments have shown that a zirconium fire could have significant latent health effects and resulted (sic) in numbers of early fatalities.[5]

[[5] NRC Report October, 2000 at 3-1 (internal citation omitted).]

A Department of Energy report indicates that such a fire would release considerable amounts of cesium-137, an isotope that accounted for most of the offsite radiation exposure from the 1986

Chernobyl accident.[6] Another report, authored by NRC, concludes that, in the event of a pool fire, approximately 100 percent of the pool's inventory of cesium would be released to the atmosphere.[7]

[[6] *See* US Department of Energy, Health and Environmental Consequences of the Chernobyl Nuclear Power Plant Accident, DOE/ER-0332 (Washington. DC: DOE. June 1987).]
[[7] *See* V L Sailor et al. Severe Accidents in Spent Fuel Pools in Support of Generic Safety Issue 82. NUREG/CR-4982 (Washington, DC: NRC, July 1987).]

The emission of radioactive particles from a spent fuel pool accident would lead to horrific consequences. The NRC study stated that human fatalities within the first year of such an event "can be as large as for a severe reactor accident even if fuel has decayed several years."[8] The radioactive fallout from this type of release could also make uninhabitable (tens of thousands of acres of land.
[[8] *See* NRC Report October, 2000 at 3-34.] (CT AG-10-3)

Response: *The issues of spent fuel storage and the environmental impacts of a spent fuel pool accident are separate and distinct issues that are evaluated separately in the GEIS. The 1996 GEIS and the draft revised GEIS reflected a thorough evaluation of the environmental impacts associated with solid waste management, low-level radioactive waste storage, and onsite storage of spent nuclear fuel. Based on NRC's safety requirements in these areas and the low amounts of radiation exposure received by members of the public from the operation of power reactors and management of radioactive waste, including the onsite storage of spent nuclear fuel during the license renewal term, the revised GEIS confirms the 1996 GEIS's Category 1 classification and finding of SMALL impact. The NRC has concluded that the comprehensive regulatory controls (10 CFR Parts 20 and 50) that are in place will ensure continued compliance with NRC radiation protection standards, and that the resulting radiological impacts on the environment will remain small during the term of a renewed license.*

The NRC is committed to ensuring that both spent nuclear fuel and low-level radioactive wastes are managed to prevent health impacts to the public. Spent nuclear fuel is currently stored at reactor sites in the spent fuel pools and/or in independent spent fuel storage installations (ISFSIs). This practice is expected to continue until DOE is ready to take possession of the spent nuclear fuel. At this time, it is uncertain when this will happen.

Interim storage needs vary among plants, with older units having less available pool storage capacity than newer ones. However, given the uncertainty as to when a geologic repository will open and the lack of other options, it is likely that some sort of expanded spent fuel storage capacity beyond the original design capacity will be needed at all nuclear power plants.

On March 3, 2010, DOE submitted a motion to the Atomic Safety and Licensing Board to withdraw its application for a permanent geologic repository at Yucca Mountain, Nevada. In

light of the uncertainty surrounding the use of Yucca Mountain, if another repository for spent nuclear fuel is proposed, an environmental impact statement would be prepared.
For spent nuclear fuel, the Waste Confidence Decision and Rule represented the Commission's generic determination that spent nuclear fuel can continue to be stored safely and without significant environmental impacts for a period of time after the end of the licensed life for the operation of a nuclear power plant (after the permanent shutdown of the power reactor and expiration of the plant's operating license). This generic determination, codified in 10 CFR 51.23(a), meant that the NRC did not need to consider the storage of spent nuclear fuel after the end of a reactor's licensed life for operation in the National Environmental Policy Act (NEPA) documents that support its reactor and spent-fuel storage license application reviews.

On December 23, 2010, the Commission published a revision of the Waste Confidence Decision and Rule to reflect information gained based on experience in the storage of spent nuclear fuel and the increased uncertainty in the siting and construction of a permanent geologic repository for the disposal of spent nuclear fuel and high-level waste. In response to the 2010 Waste Confidence Decision and Rule, the states of New York, New Jersey, Connecticut, and Vermont, and several other parties challenged the Commission's NEPA analysis in the decision, which provided the regulatory basis for the rule. On June 8, 2012, the United States Court of Appeals, in New York v. NRC, 681 F.3d 471 (D.C. Cir. 2012), vacated the NRC's Waste Confidence Decision and Rule, after finding that it did not comply with NEPA.

In response to the court's ruling, the Commission issued CLI-12-16 on August 7, 2012, in which the Commission determined that it would not issue licenses that rely upon the Waste Confidence Decision and Rule until the issues identified in the court's decision are appropriately addressed by the Commission. CLI-12-16 provided, however, that the decision not to issue licenses only applied to final license issuance; all licensing reviews and proceedings should continue to move forward. In SRM-COMSECY-12-0016, dated September 6, 2012, the Commission directed the NRC staff to proceed with a rulemaking that includes the development of a generic EIS to support a revised Waste Confidence Decision and Rule and to publish both the EIS and the revised Waste Confidence Decision and Rule in the Federal Register within 24 months (by September 6, 2014). The Commission indicated that both the EIS and the revised Waste Confidence Decision and Rule should build on the information already documented in various NRC studies and reports, including the existing environmental assessment that the NRC developed as part of the 2010 Waste Confidence Decision and Rule. The Commission directed that any additional analyses should focus on the issues identified in the D.C. Circuit's decision. The Commission also directed that the NRC staff provide ample opportunity for public comment on both the draft EIS and the proposed Waste Confidence Decision and Rule.

In accordance with CLI-12-16, the NRC will not approve any site-specific license renewal applications until the deficiencies identified in the D.C. Circuit's decision have been resolved.

Two license renewal issues that rely, wholly or in part, upon the Waste Confidence Decision and Rule are the "onsite storage of spent nuclear fuel" and "offsite radiological impacts of spent nuclear fuel and high-level waste disposal." Both of these issues were classified as Category 1 in the 1996 GEIS and the 10 CFR Part 51 final rule that was promulgated in 1996 (61 FR 28467, June 5, 1996), which codified the findings of the 1996 GEIS into 10 CFR Part 51, Subpart A, Appendix B, Table B-1. The draft revised GEIS that was published for public comment in 2009 (74 FR 38239, July 31, 2009) and the concomitant proposed rule (74 FR 38117, July 31, 2009) continued the Category 1 classification for both of these issues. As part of the NRC's response to the New York v. NRC decision, the NRC has revised these two issues accordingly.

Specifically, the NRC has revised rule the Category 1 issue, "Onsite storage of spent nuclear fuel," to narrow the period of onsite storage to the license renewal term. In both the 1996 GEIS and rule and the 2009 draft revised GEIS and proposed rule, the NRC relied upon the Waste Confidence Decision and Rule to make a generic finding that spent nuclear fuel could be stored safely onsite with no more than a small environmental impact for the term of the extended license (from approval of the license renewal application to the expiration of the operating license) plus a 30 year period following the permanent shutdown of the power reactor and expiration of the operating license.

The Waste Confidence Decision and Rule provided the basis for the 30 year period following the permanent shutdown of the reactor and expiration of the operating license. The 2010 Waste Confidence Decision and Rule extended this post-reactor shutdown onsite storage period from 30 years to 60 years. Given the New York v. NRC decision, and pending the issuance of a generic EIS and revised Waste Confidence Decision and Rule (as directed by SRM-COMSECY-12-0016), the period of onsite storage of spent nuclear fuel following the permanent shutdown of the power reactor and expiration of the operating license is now excluded from this GEIS issue. As revised in the rule and GEIS, this issue now only covers the onsite storage of spent fuel during the license renewal term.

Similarly, theNRC has revised the Category 1 issue, "Offsite radiological impacts of spent nuclear fuel and high-level waste disposal." This issue pertains to the long-term disposal of spent nuclear fuel and high-level waste, including possible disposal in a deep geologic repository. Although the Waste Confidence Decision and Rule did not assess the impacts associated with disposal of spent nuclear fuel and high-level waste in a repository, it did reflect the Commission's confidence, at the time, in the technical feasibility of a repository and when that repository could have been expected to become available. Without the analysis in the Waste Confidence Decision, the NRC cannot assess how long the spent fuel will need to be stored onsite. Therefore, the NRC has reclassified this issue from a Category 1 issue with no assigned impact level to an uncategorized issue with an impact level of uncertain.

Upon issuance of the revised Waste Confidence Decision and Rule and its supporting generic EIS, the NRC will make any necessary conforming amendments to its regulations in 10 CFR Part 51 and supplement the GEIS as necessary. As referenced previously, the Commission will not approve any license renewal application for an operating nuclear power plant until the issues identified in the New York v. NRC court's decision are appropriately addressed by the Commission.

In addition, the issue of a spent fuel pool (SFP) fire was specifically addressed by the NRC in its denial of two Petitions for Rulemaking (PRM): PRM 51-10 and PRM 51-12, submitted by the Attorney General of the Commonwealth of Massachusetts and the Attorney General of California, respectively (73 FR 46204; August 8, 2008). The Petitioners requested that the NRC initiate a rulemaking concerning the environmental impacts of the high-density storage of spent nuclear fuel in SFPs. Specifically, the Petitioners challenged the Category 1, small level of impact finding of the 1996 GEIS regarding the onsite storage of spent fuel. The Petitioners asserted that ''new and significant information'' showed that the NRC incorrectly characterized the environmental impacts of high-density spent fuel storage. In particular, the Petitioners asserted that spent fuel stored in high-density SFPs is more vulnerable to a zirconium fire than the NRC concluded in the 1996 GEIS.

In evaluating the petitions, the Commission considered several studies, all of which showed that the risk of a spent fuel fire was low. The Commission also noted that it had ordered each plant to take certain physical security and mitigative measures to prevent SFP fires subsequent to the September 11, 2001 terrorist attacks. The Commission has ordered that these security and mitigative measures, which may vary from plant to plant, be put in place at all plants (thus, the basis of the generic Category 1 finding). In its denial of the rulemaking petitions, the Commission determined that the information presented by the Petitioners was not "new and significant information" and that the probability of a SFP fire was very low (73 FR at 46207-10). In conclusion, the Commission stated that:

> *"Based upon its review of the petitions, the NRC has determined that the studies upon which the Petitioners rely do not constitute new and significant information. The NRC has further determined that its findings related to the storage of spent nuclear fuel in pools, as set forth in NUREG-1437 and in Table B-1, of Appendix B to Subpart A of 10 CFR Part 51, remain valid. Thus, the NRC has met[,] and continues to meet[,] its obligations under NEPA. For the reasons discussed previously, the Commission denies PRM-51-10 and PRM-51-12" (73 FR at 46212).*

The Commission's denial of PRM-51-10 and PRM-51-12 was upheld by United States Court of Appeals for the Second Circuit. New York v. the Nuclear Regulatory Commission*, 589 F.3d 551 (2nd Cir. 2009).*

Design Basis Accidents

The environmental and health impacts of design basis accidents (DBAs), including those that involve spent fuel, are evaluated during the initial licensing process, and the ability of the plant to withstand these accidents is demonstrated to be acceptable before issuance of an operating license. The results of these evaluations are found in licensing documentation such as the applicant's final safety analysis report, the NRC's safety evaluation report, the final environmental statement (FES), and Section 5.1 of the plant-specific SEIS for license renewal.

The Commission has determined that the environmental impacts of DBAs are of SMALL significance for all plants because the plants were designed to successfully withstand these accidents. As part of the license renewal process, the NRC looks for any new and significant information during its independent review of the license renewal applicant's environmental report, during its site visit, the scoping process, and evaluation of other available information.

Severe Accident Mitigation Alternatives

Regarding severe accident mitigation alternatives (SAMA) reviews, the primary function of the review is to perform an assessment of the applicant's evaluation of alternatives to mitigate severe accidents. Severe nuclear accidents are those that are more severe than design basis accidents because they could result in substantial damage to the reactor core, regardless of offsite consequences. In the GEIS for license renewal, the NRC assessed the impacts of severe accidents using the results of existing analyses and site-specific information to conservatively predict the environmental impacts of severe accidents for each plant during the renewal period. Based on information in the GEIS, the Commission found the following:

> *The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.*

Therefore, the Commission has designated mitigation of severe accidents as a Category 2 issue in 10 CFR Part 51, Subpart A, Appendix B, Table B-1. Chapter 5 in each plant-specific SEIS presents the NRC's evaluation of the applicant's alternatives to mitigate severe accidents.

For each license renewal application where a SAMA analysis is performed by the applicant, the NRC reviews and evaluates the SAMA information to ensure that the range of changes (e.g., hardware modifications, changes to plant procedures, and changes to the training program) that could improve severe accident safety performance was identified and evaluated. While the SAMA evaluation contains population radiation dose information, the values are used

to show the relative percent of the dose resulting from the various containment failure modes that were evaluated. The purpose of the SAMA is not to evaluate the human health impacts, but rather to evaluate a range of mitigation actions that may reduce the risk of a severe accident and are cost-effective.

Emergency Preparedness/Terrorist Attacks

Emergency preparedness programs are required at all nuclear power plants and require specified levels of protection from each licensee regardless of plant design, construction, or license date. Requirements related to emergency planning are in the regulations at 10 CFR Part 50.47 and Appendix E to 10 CFR Part 50. These requirements apply to all operating licenses and will continue to apply to facilities with renewed licenses. The NRC has regulations in place to ensure that existing emergency preparedness plans are updated throughout the life of all plants. For example, nuclear power plant operators are required to update their evacuation time estimates after every U.S. Census, or when changes in population would increase the estimate by either 25 percent or 30 minutes, whichever is less. Additionally, the NRC assesses the capabilities of the nuclear power plant operator to protect the public by requiring the performance of a full-scale exercise—that includes the participation of various Federal, State, and local government agencies—at least once every two years. These exercises are performed in order to maintain the skills of the emergency responders and to identify and correct weaknesses. Therefore, the NRC, in 10 CFR Part 50.47, has determined that there is no need for a special review of emergency preparedness issues in the environmental review for license renewal or an evaluation of the issue in the GEIS.

The GEIS does not include an evaluation of the threat of terrorist attacks on nuclear facilities. Both security and emergency preparedness matters are outside the scope of the GEIS and are handled by the NRC on an ongoing basis, not just when the licensee applies to renew its operating license. In this regard, security measures are a part of the current operating license basis for every nuclear power plant licensed by the NRC. In addition, the NRC works with the U.S. Department of Homeland Security and other entities to ensure that security around nuclear power plants is well coordinated and that responders are prepared if a significant event occurs. While the GEIS does not contain an evaluation of the potential threat from terrorist attacks, the GEIS does discuss the issue in Appendix E to the GEIS as follows:

> *Although the threat of sabotage events cannot be accurately quantified, the Commission believes that acts of sabotage are not reasonably expected. Nonetheless, if such events were to occur, the Commission would expect that resultant core damage and radiological release would be no worse than those expected from internally initiated events.*

Further, the GEIS states:

> *As such, malevolent acts remain speculative and beyond the scope of a National Environmental Policy Act (NEPA) review. NEPA requires that there be a "reasonably close casual relationship" between the Federal agency action and the environmental consequences. The environmental impact of a terrorist attack is too far removed from the natural, or expected, consequences of a license renewal action to warrant consideration under NEPA. However, as noted above [in Appendix E], in the event of a terrorist attack, the consequences of such an attack would be no worse than a severe accident, which has already been analyzed.*

Gaussian Plume Modeling

Questions regarding the adequacy of straight-line, or Gaussian, atmospheric dispersion models have been studied in detail. This included a detailed code comparison completed in 2004 with the objective of determining if the average atmospheric transport and dispersion results from codes such as MACCS2 are sufficiently accurate that more complex models are not required. In that study, documented in NUREG/CR-6853, "Comparison of Average Transport and Dispersion Among a Gaussian, a Two-Dimensional, and a Three-Dimensional Model," results from the MACCS2 code were directly compared to those from the LODI (Lagrangian Operational Dispersion Integrator) code.

LODI is a state-of-the-art, three-dimensional (3D) advection dispersion code that uses a Lagrangian stochastic Monte Carlo method. LODI is coupled to ADAPT (Atmospheric Data Assimilation and Parameterization Technique), which provides time-varying, 3D fields of mean winds, turbulence, pressure, temperature, and precipitation based on observed meteorology. LODI is an element of the National Atmospheric Release Advisory Center (NARAC) emergency response modeling system at Lawrence Livermore National Laboratory (LLNL), which is a national support and resource center for planning, real-time assessment, emergency response, and detailed studies of incidents involving the spread of hazardous material accidentally or intentionally released into the atmosphere.

As discussed in NUREG/CR-6853, this comparison shows that MACCS2 provides results consistent with those from the more complex plume models at distances up to 100 miles (161 kilometers). This is well beyond the 50-mile (80-kilometer) radius considered in the SAMA analysis. The MACCS2 predictions for average, time-integrated, ground-level air concentrations (which directly relates to inhalation and cloudshine doses), and for average deposition (which directly relates to groundshine and ingestion pathway doses) were very comparable (i.e., less than a factor of two) to predictions made by the state-of-the-art NARAC codes, ADAPT/LODI, at all distances. The direct comparison to the state-of-the-art NARAC codes demonstrates that straight-line air dispersion modeling is well within its range of validity when used to perform SAMA analyses.

Regarding whether Gaussian plume modeling is appropriate for air dispersion modeling for reactors in complex terrain, the Gaussian plume model provides further conservatism under variable terrain conditions. Specifically, when variable terrain features such as river embankments or mountains intervene between a source and an observation point, these features would tend to disperse and dilute the plume as it is forced to move around obstacles. The plume model conservatively estimates that the plume travels in a straight line over or through the obstacle, thereby resulting in larger accumulated radiological doses and higher estimates of economic consequences in areas farther from the plant.

The NRC has already fully considered and addressed the issue of accidents in the GEIS and each plant-specific SEIS, and the comments do not present any significant new information or arguments that would warrant a change to the final GEIS.

A.2.1.14 Comments Concerning Decommissioning

Comment: Obviously, the nuclear industry wants a new generation of nuclear reactors funded with unlimited loan guarantees from the taxpayer, and want relicensing of current nuclear facilities far into the future before they ever consider decommissioning nuclear power facilities. There'll obviously be no funds to decommission when that comes around. (PBCA-Campbell-30)

Comment: Page S -19 Termination of Nuclear Power Plant Operations and Decommissioning: Termination of plant operations and decommissioning would occur eventually regardless of license renewal. The additional 20-year period of operation under the license renewal term would not affect the impacts of shutdown and decommissioning on any resource or at any plant. This is a Category 1 issue. July 2009 S-19 NUREG-1437, Revision 1

A4NR, et al, is concerned that the additional 20 year extension of operation could impact the decommissioning activities [at] the plant. Because of the unpredicted and unanticipated financial crisis, suppositions and expectations of the status and security of decommissioning funds have been sharply reduced. If inadequate funding is present at the decommissioning stage of plant life, then money needed for certain facets of restoration of the environment may not be available for mitigation, cleanup or remediation. If the activities needed involved potential cleanup of contaminated offsite groundwater, for example, the lack of funds to execute this action would be detrimental.

The following Associated Press story from January 5, 2010, which references the NRC, should provide enough of a cautionary warning to merit attention to this issue:

NEW ORLEANS (The Associated Press) − Jan 5 − By ALAN SAYRE AP Business Writer

Two Louisiana power utilities owned by Entergy Corp. are short $235.5 million for the projected costs of eventually closing two nuclear generating plants − and the power provider wants slight increases in customer rates to close the gap.

According to a Tuesday filing with the Louisiana Public Service Commission, Entergy Louisiana said it needs an additional $68.2 million to meet the federal Nuclear Regulatory Commission's demand for a $400.2 million decommissioning fund for the Waterford 3 plant at Taft.

Entergy Gulf States Louisiana said it needs an additional $167.3 million for an NRC required fund of $378.8 million for the eventual closing of the River Bend nuclear plant at St. Francisville. That utility owns 70 percent of River Bend.

The filing requests that Entergy Louisiana customers pay $10.3 million toward the Waterford fund annually, up from the current $2.2 million. Entergy Gulf States Louisiana customers, who don't currently contribute to the decommissioning fund, would pay $9.67 million a year.

Entergy spokesman Philip Allison said Tuesday that if the PSC agrees with the utilities, Entergy Gulf States' residential customers would pay an additional 84 cents per 1,000 kilowatt hours, while Entergy Louisiana's residential customers would pay an additional 41 cents per 1,000 kilowatt hours.

The NRC determines how much a utility needs for each eventual nuclear plant closure based on a complicated formula.

"This is to put us into federal compliance," Allison said. "It's not something we came up with." The PSC is expected to discuss the filing on Jan. 13.

The filing said the two funds are now short of what the NRC wants partially because of the fall in financial markets, where the money had been placed in hopes of growing the funds through investment returns.

A4NR, et al, therefore recommend that the financial status of each utility's decommissioning fund be examined on an individual basis under Category 2, and not assumed to be generic. Different utilities will have different levels of investment strategies for securing their decommissioning funds, and world financial markets are too volatile to assume that a "one size fits all" answer will apply to each and every nuclear utility. (A4NR-11-37)

Comment: 4. Termination of Nuclear Power Plant Operations and Decommissioning: The Draft wrongly argues that, "...termination of plant operations and decommissioning would occur eventually regardless of license renewal. The additional 20-year period of operation under the license renewal term would not affect the impacts of shutdown and decommissioning on any resource or at any plant." This is designated as "small impact" Category 1 issue.

a. Decommissioning Mischaracterized By NRC as Small Impact: As any plant ages, it is more likely to develop operating failures such as increasing the likelihood, magnitude and frequency of leaks into the ground water. There already have been a noticeable increase in leakage as plants approach 40 years old, and there are no signs that this trend will abate. Thus decommissioning costs are not static, are site specific, and are likely to increase dramatically with the increased probability of significant cleanup of groundwater radioactive plumes.

b. Decommissioning - Category 2 Issue, not Category 1: Decommissioning activities cannot be relegated to Category 1. Recent disclosures of inadequate capital in decommissioning funds at a large number of reactor sites, as well as wide fluctuations in the reported fiscal health of certain decommissioning funds should be fair game for Petitioners as a Category 2 issue. Failure of the licensee to possess adequate capital at the time of decommissioning could impact safety margins and place an undue burden on ratepayers or taxpayers. As currently argued in Vermont regarding ENVY, the decommissioning fund should be fully funded before the license renewal application is approved. (PW-6-13)

Comment: It appears that one key reason for the big push for relicensing of nuclear reactor operating licenses is that it would further delay the very expensive decommissioning process. Decommissioning should be a Category 2 issue because of the differing components of various "hotness" at different facilities, and also due to the often battered shape which a number of decommissioning funds find themselves since the economic collapse of two autumns ago. Seeing that a number of utilities decided to play the casino game of the stock market, thus the investors of those utilities (who would reap advantage from profitable investments) need to make up the funds lost by bad investments of those decommissioning funds! And one cannot assume that the federal government (with its massive debt) will be able to afford decommissioning scores of plants that the utilities just can't seem to afford to take apart and somewhat decontaminate, and a number of taxpayers don't have much extra to make up some of the gap in funding for decontamination. Plus, transportation routes to needing-to-be-identified facilities (for everything from spent fuel to mixed waste to low-level waste to other trash) must be clearly specified for each kind of radioactive or mixed waste. (Campbell-31-14)

Comment: With the increase in the recycling of radioactive metal in the past decade or decade and a half, the GEIS must indicate how many components of nuclear power facilities would be eligible to be recycled and thus allowed in zippers, fenceposts, bicycles, etc.

The GEIS should give us an update regarding technologies involved with decommissioning − for instance, is there still difficulty cutting reactor vessel steel? Is it easier to cut reactor vessel steel on embrittled reactors? What problems are associated with embrittled reactors in terms of safety during operation, and what challenges do embrittled reactors and reactor vessels pose during the decommissioning process?

I disagree with the contention that assured the reader of these documents that of course decommissioning of nuclear reactors will take place. Given the economic situation these days, and seeing that a number of companies pocket lots of funds on one hand while spinning off some company on the other hand that would likely be responsible for funding decommissioning of their reactors, how can one conclude there will be the funding, the will, the technology, and the expertise at a given point of time in the future to decommission nuclear power facilities? Thus, I conclude that decommissioning is not assured in the least unless it is done in the foreseeable fairly near future time frame with a stable and sufficient decommissioning fund from which the utility can draw funds to accomplish the decommissioning. (Campbell-31-15)

Comment: The impacts of decommissioning are described in the *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors,* NUREG-0586 (NRC 2002a).

Decommissioning activities cannot be relegated to Category 1. Recent disclosures of inadequate capital in decommissioning funds at a large number of reactor sites, as well as wide fluctuations in the reported fiscal health of certain decommissioning funds should be addressed in the GEIS. Failure of the utility to possess adequate capital at the time of decommissioning could impact safety margins of the process and the availability of funds for problem mitigations ─ both known and unknown. If not, then each SEIS should include a review of status of decommissioning funds and deny renewals until inadequate funds are brought up to an adequate level. In times of great fiscal uncertainty, there is no reason to put additional financial burdens on either ratepayers or taxpayers. (A4NR-11-17)

Comment: <u>Inadequate Assessment of Inadvertent Radioactive Releases to the Environment</u>: The Revised GEIS acknowledges the problem encountered at various nuclear power plants across the country over the past several years of unplanned releases of radionuclides to the environment. Given this ongoing issue, it is critical that the license renewal environmental review process address all relevant concerns posed by such releases. Unfortunately, the NRC's proposed revisions to the 1996 GEIS do not go far enough toward ensuring that the environmental impacts of such releases will be analyzed in a comprehensive manner.

Assessment of Decommissioning Impacts: The Revised GEIS proposes to make a generic Category 1 determination as to impacts of relicensing on decommissioning.[32] However, this appears to be inconsistent with the NRC's recognition of the problem of radioactive contamination. Based on the discussion above, past, current, and future inadvertent releases will undoubtedly have an impact on water quality, ecological resources, and aquatic resources at the time of decommissioning. Accordingly, it is necessary to require site-specific analysis of the impacts of any unplanned leaks in regard to this issue as well.

[[32] *See* Proposed Rule at 38128; Revised GEIS Appendices at B-40.] (Riverkeeper-20-8)

Response: *The generic environmental impacts of decommissioning are addressed in the "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Regarding the Decommissioning of Nuclear Power Reactors" (NUREG-0586). The GEIS for license renewal considers only the incremental environmental issues associated with decommissioning that would result from continued plant operation during the renewal term and are thus significantly more limited in scope. The revised GEIS reviewed the potential impacts from decommissioning to environmental issues such as land use, visual resources, air quality, noise, geology, hydrology, ecology, historic and cultural resources, human health, environmental justice, and waste management. Based on the evaluation of the issues, the revised GEIS concluded in Section 4.12.2 that decommissioning is a Category 1 issue with a SMALL impact.*

The commenter's concerns about recycling of decommissioned materials or technical difficulties in cutting reactor vessel steel are beyond the scope of the license renewal GEIS. The technical issues associated with decommissioning are addressed in NRC's technical document on decommissioning, NUREG-0586. An operational issue such as control of radioactive material is addressed in NRC radiation protections regulation, 10 CFR Part 20, and would be addressed by the NRC's inspection program. The NRC does not have a regulation that allows for the recycling of radioactive material into consumer products during routine plant operation or during decommissioning.

Several commenters expressed concerns about the ability of licensees to pay for decommissioning. NRC regulations in 10 CFR Part 50 require each power reactor licensee to provide reasonable assurance that funds will be available for decommissioning and prescribes acceptable methods for providing financial assurance and the minimum dollar amounts, adjusted annually, to demonstrate such reasonable assurance. See 10 CFR 50.33(k) and 50.75. Since the NRC's financial assurance regulations are current licensing issues applicable on a generic basis to power reactor licensees and are not unique to license renewal applicants, decommissioning funding is outside the regulatory scope of the license renewal environmental review. No change was made to the GEIS as a result of these comments.

Comment: Page 2-5, lines 1 to 4: Text in lines 1 to 4 on page 2-5 reads as follows:

The NRC has developed regulations and guidance for the decommissioning of nuclear facilities, including nuclear power plants. These regulations are found in Subpart E to 10 CFR Part 20 and the guidance document *Consolidated NMSS Decommissioning Guidance,* NUREG-1757 (NRC 2002b).

Certain aspects of the license termination process for nuclear power plants are governed by 10 CFR 50.82, which is not cited as a reference in lines 1 to 4 on page 2-5. The NRC is encouraged to add this reference to the text in lines 1 to 4 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

The NRC has developed regulations and guidance for the decommissioning of nuclear facilities, including nuclear power plants. These regulations are found in *10 CFR 50.82 (Termination of License),* Subpart E to 10 CFR Part 20 *(Radiological Criteria for License Termination),* and the guidance document *Consolidated NMSS Decommissioning Guidance*, NUREG-1757 (NRC 2002b). (NEI1-7(4)-8)

Comment: Page 2-5, lines 19 to 24: Text in lines 19 to 24 on page 2-5 describes the process by which the licensee completes decommissioning and the NRC terminates or amends the license, depending on the intended use of the site.

According to 10 CFR 50.82 (a)(3), the licensee may not take more than 60 years to complete decommissioning. Based on this, the NRC is encouraged to change the text in lines 19 and 20 on page 2-5 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

At the completion of decommissioning, *which may take up to 60 years to complete (10 CFR 50.82(a)(3)),* the licensee conducts a final status survey to demonstrate compliance with criteria established in the decommissioning plan. (NEI1-7(4)-9)

Response: *The NRC agrees with these comments, and Section 2.1.3 of the GEIS has been revised as suggested.*

Comment: Page 4-5, lines 30 and 31: Text in lines 30 and 31 on page 4-5 reads as follows:

All operating nuclear power plants will terminate operations and be decommissioned at some point after the end of their operating licenses or after a decision is made to cease operations. License renewal would potentially delay this eventuality for an additional 20 years beyond the current license period.

To better clarify the requirement for decommissioning of a nuclear power plant and the effect of license renewal on the timing of decommissioning, consider changing the text in lines 30 and 31 on page 4-5 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Unless the NRC approves a longer time, each ~~All~~ operating nuclear power ~~plants~~plant will complete decommissioning within 60 years of permanent cessation of operations ~~terminate operations and be decommissioned at some point after the end of their operating licenses or after a decision is made to cease operations~~. License renewal would potentially delay ~~this eventuality~~ permanent cessation of operations for 20 years beyond the end of the current license ~~period~~ term. (NEI1-7(4)-78)

Response: *The NRC disagrees with the comment. The suggested revisions to Section 4.1.5 of the GEIS would not clarify the description of decommissioning that is in the GEIS. The intent of the referenced text is to indicate that decommissioning could be delayed by 20 years when a plant is granted renewal of its license.*

No changes to the revised GEIS were made as a result of this comment.

A.2.1.15 Comments Concerning the License Renewal Process

Comment: I looked **--** I just want to say I looked at this Appendix B and there are a number of questions that I asked and my general comment on it is that many of the issues in here are considered to be small impact and small impact according to their publicity here is environmental effects are not detectible or are so minor that they will neither de-stabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that these impacts do not exceed permissible levels in the Commission's regulations and are considered small.

But, when you read the Appendix B, judge for yourself whether you think some of these things are small. I don't think so. (DPCA-UNASFV-5)

Response: *This comment is too general for a specific response. Please refer to the GEIS for specific discussions on the magnitude of specific impacts. No change was made to the GEIS as a result of this comment.*

Comment: I just leave with one comment: I think the materials themselves are very well organized and very accessible to someone who is reviewing them to develop comments, and so I offer that appreciation for facilitating the public review process. (AGA-NEI-4)

Response: *The NRC acknowledges the comment. No change was made to the GEIS in response to this comment.*

Comment: Page S-1: The GEIS is intended to improve the efficiency of the license renewal process by (1) providing an evaluation of the types of environmental impacts that may occur from renewing commercial nuclear power plant operating licenses, (2) identifying and assessing impacts that are expected to be generic (the same or similar) at all nuclear plants (or plants with specified plant or site characteristics), and (3) defining the number and scope of environmental impact issues that need to be addressed in plant-specific EISs.

A4NR, et al, would like to know how the NRC defines "efficiency" in the above statement. Is this an efficiency of time, money, or workforce labor? Is it meant to increase efficiency for the agency, the utility, or the stakeholder? Given the fact that for individual reactors in communities across the United States, the NRC has written hundreds − if not thousands − of individual waivers, amendments and exemptions, there is very little that can be said to be *similar* about the aging reactors that face relicensing. Defining − and narrowing − the scope of plant-specific issues may produce an efficiency for the utility or the agency, but not necessarily for the ratepayers, or stakeholders.

A4NR, et al, recommends that the NRC define what it means by "efficiency" achievable through the GEIS, and place that efficiency into quantifiable and measurable units of time, money or effort. (A4NR-11-29)

Response: *The NRC has not attempted to quantify the efficiencies gained through the GEIS. The GEIS was developed to establish an effective environmental assessment process for license renewal. The GEIS is used to avoid duplication and allow the NRC to focus specifically on those issues that are important for a particular plant (i.e., unique to that plant or exceptional in size and scope for those issues ordinarily assumed to be similar for all plants) in the SEIS. Section 1.7 of the GEIS has been modified to explain the concept of tiering.*

Comment: There are some previous Category 2 issues that the NRC based on the experience and insights gained from license renewal processes have been reclassified as Category 1 issues.

You know, clearly we'll look at those and provide our comments. I would expect and hope that in most cases we would be supportive of those changes that have been made, but we also believe that there are some additional issues currently listed as Category 2 that would be good candidates for consideration as Category 1 issues.

The key here is that especially if we're afforded the extra time in development of comments, it would certainly give us the opportunity to provide a much more robust basis for those types of comments. We believe that would greatly facilitate the comment review process, so we're looking forward to that.

An example of a type of issue that we think might be amenable to that, for instance, would be thermal impacts on aquatic organisms. And, again, I would defer to us completing our review and developing much more detailed comments, but we have actually identified a handful of issues that, at least at first blush, we think we would have a good shot at providing a good strong basis for why they might be considered for reclassifying as Category 1. (AGA-NEI-2)

Comment: The next comment that I would like to make goes to the issue of -- a couple of issues that have been introduced or have been carried over that we want to evaluate further with the idea that they might actually be able to [be] deleted in their entirety.

The basis that we want to evaluate for those types of comments quite simply goes to the issue of whether the potential impacts actually change in any way in terms of magnitude or occurrence as a function of a license renewal decision.

Put differently, are they directly germane to the action of approving a license renewal, or are they impacts that will occur at that same magnitude irrespective of whether a license is renewed or not?

An example of that would be the nonradiological groundwater and soil contamination issue. Looking at the way that it's framed and, again, subject to a lot more evaluation on our part, you know, the question we would ask is does the decision really have any effect on the impact?

And, you know, we will take a look at potentially making the case that if it doesn't, that it actually need not be part of the license renewal Environmental Impact Statement. (AGA-NEI-3)

Response: *In general, as stated in the GEIS, an issue is considered Category 1 (generic) if the analysis reported in the GEIS has shown the following:*

(1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics;

(2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel); and

(3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation.

The generic analysis of an issue may be adopted in each plant-specific review.

An issue is considered Category 2 (site-specific) if the analysis reported in the GEIS has shown that one or more of the criteria of Category 1 cannot be met, and, therefore, additional plant-specific review is required.

If all three Category 1 criteria apply to a particular issue, then the generic analysis presented in this GEIS is relied upon by the NRC in evaluating license renewals and plant-specific SEISs, provided there is no new and significant information requiring further analysis. For issues that do not meet all three Category 1 criteria, then the issue is considered a Category 2 issue, and a plant-specific analysis is required for that issue.

No changes were made to the GEIS as a result of these comments.

Comment: Page 2-6 to 2-16: Summary of Impacts Associated with License Renewal Under the Proposed Action: Issue Impact (Category 1 - small)

With only a few months, or less, of experience at actual aging reactors that are now operating beyond their original licenses under NRC approval of renewal, we believe there is no factual, much less operational history, to assure the public that the above issues will have "small" impacts. In addition, there is no assurance that the states will not be left with large ratepayer expenses if the GEIS impact predictions prove to be unreliable.

All issues should remain Category 2 until at least one reactor of each major design (PWR, BWR) has operated an additional ten of the twenty years of NRC approved license renewals. At that point a detailed analysis based on operating experience would provide factual information on which to determine whether foreseeable impacts will be "small, moderate, and/or large." For example, ten years ago:

1. Neither the utilities, the states, nor the NRC, believed that Yucca Mountain funding would be consistently cut and that both executive administration and congressional support for the project would disappear.

2. Terrorists' plans that targeted U.S. reactors were unknown and unthinkable. Today we have American saboteurs rumored to have planned to destroy reactors in Pakistan.[2]

[[2] http://www.dailytimes.com .pk/default.asp?page=2009%5C12%5C26%5Cstory 26-12-2009 pg7 18]

In 2003, the following comment was submitted from one member of the public who attended the GEIS meeting in California:

As a condition of re-licensing, the GEIS for nuclear plant license renewals must require that the licensee:

- has the means to resist an attack on the reactor building, its support structures, and its spent fuel storage − from air, land and water by a team of well-equipped terrorists;

- be required to pass tests and mock-attack drills which would demonstrate the adequacy of its security. These tests should be required every two years and include mock-attacks testing when the licensee is refueling.

Another reason for requiring an observation period of ten years following the start of a 20 year license renewal is that, as indicated earlier in our comments, there have been over 200 license amendments, temporary orders, and waivers for Diablo Canyon and over 400 of the same changes for SONGS-making it difficult to determine a baseline for operational performance and stability of performance. This "shakedown" period of 10 years will allow the NRC to trend whether this need for amendments and waivers is increasing or decreasing with license renewal.

Emergency planning would need to take into account radioactive releases due to possible attack and shifts in populations near reactor sites so that responses could be planned and funded accordingly.

While the country's need for power has increased, the country's use of power has decreased according to the latest statistics from the Energy Information Agency (document DOE/EIA-0226 (2009/09). Another report released Sept 23, 2009 by the ACEEE looks at energy efficiency programs from recent years in 14 states, with utility costs ranging from $0.016 to $0.033 per kWh and an average cost of $0.025 per kWh. ACEEE gathered data on energy efficiency program costs in 14 states * California, Connecticut, Iowa, Massachusetts, Minnesota, Nevada, New Mexico, New Jersey, New York, Oregon, Rhode Island, Texas, Vermont, and Wisconsin. The six natural gas efficiency programs covered in the report also saved energy cost-effectively * spending $0.27 to $0.55 per therm, with an average of $0.37 per therm, less than a third of the average residential retail price seen over the past five years. (http://aceee.org/pubs/u092.pdf?CFID=4116977&CFTOKEN=88188721)

Coupled with the creation of increasingly efficient technology and economically viable alternatives signifies that decision making on power generation over a decade in advance is unrealistic and irresponsible.

Large components designed to last the full design life of reactors (steam generators, turbine rotors, reactor vessel heads, etc) have been or are currently being replaced at most reactor sites. Granting a license renewal ten years before licenses expire provide little economic

assurance that ratepayers will not need to replace them again, as there is no established track record for the performance of this second generation of components.

Each of the above generic issues should result in the solicitation of public and utility comments, be reviewed, and implemented before any further license renewals are considered. A4NR, et al, will recommend that applications for license renewals in California be withheld until the above issues, including seismic design adequacy are resolved. (A4NR-11-19)

Response: *The commenter suggested that all environmental issues should remain Category 2 (site specific) until at least one reactor of each major design (PWR, BWR) has operated an additional ten of the twenty years of NRC approved license renewals. At that point, a detailed analysis based on operating experience would provide factual information on which to determine whether foreseeable impacts will be "SMALL, MODERATE, and/or LARGE."*

The NRC does not agree that there needs to be considerable additional operating experience before reasonable generic judgments about the likely environmental impacts of issues can be made. Facilities seeking license renewal have typically operated for more than 20 years before the filing of their renewal applications. Thus the NRC and other affected stakeholders at all levels have had decades to gain a better understanding of the environmental equilibrium and impacts of plant operations. The NRC has determined that having at least 20 years of operating experience at each power reactor facility is sufficient for the NRC to assess the environmental issues and impacts at the site and make informed generic judgments on the impacts of many environmental issues. As discussed in the corresponding sections of this appendix, many of the issues raised by the commenter: security, the need for power, and emergency preparedness are outside the scope of the license renewal environmental review.

The GEIS and its characterization of environmental issues as either Category 1 (generic) or Category 2 (site specific) were developed to establish an effective environmental review process for license renewal. They are used to avoid duplication and allow the NRC to focus specifically on those issues that are important for a particular plant (i.e., unique to that plant or exceptional in size and scope for those issues ordinarily assumed to be similar for all plants) in the SEIS. Category 1 issues are termed "generic" issues because the conclusions related to their environmental impacts were found to be common to all plants (or, in some cases, to plants having specific characteristics such as a particular type of cooling system). For Category 1 issues, a single level of significance is common to all plants, mitigation was considered, and the NRC determined that mitigation was not likely to result in a benefit. Issues that were resolved generically are not reevaluated in the SEIS because the conclusions reached would be the same as in the GEIS, unless new and significant information is identified that would lead the NRC to reevaluate the GEIS's conclusions. More information on new and significant information is provided in response to Comment CEC-9(1)-10.

Category 2 issues are those that require a site-specific review. For each of the Category 2 issues applicable to the site under review, the NRC evaluates site-specific data provided by the applicant, other Federal and State agencies, and Tribal and local governments, as well as publicly available scientific information and information from members of the public. From this data, the NRC makes a site-specific evaluation of the particular issues and presents its analyses and conclusions in the SEIS for the facility.

An example of an environmental issue that can be addressed generically involves the discharge of chlorine and other biocides that are regulated by the NPDES permit of each nuclear power facility. Regulatory concern about toxic effects of chlorine and its combination products and operating experience with control of biofouling organisms, such as mussels or clams, have led many facilities to eliminate the use of chlorine or reduce the amount used to below the levels that were originally anticipated in the environmental statements issued for construction or operation. Because of these refinements, water quality impacts from biocides were not a concern for regulatory and resource agencies, provided that an applicant remained in compliance with the limits in the NPDES permit. Based on publicly available scientific information, operational monitoring reports, consultations with licensees and regulatory agencies, and comments on the draft revised GEIS, water quality effects from the discharge of chlorine and other biocides are thus considered to be of small significance for all facilities.

The methodology used in the GEIS for categorizing issues as generic or site-specific is an appropriate and effective use of the concept of tiering that was promulgated by the President's CEQ in its 1978 regulations that implemented the requirements of NEPA. The CEQ has stated that its intent in formalizing the tiering concept was to encourage agencies "to eliminate repetitive discussions and to focus on the actual issues ripe for decisions at each level of environmental review."

No change was made to the GEIS as a result of this comment.

Comment: The industry would like to commend NRC in the efforts associated with the revisions to the 10 CFR Part 51 rule and the regulatory documents that support the NEPA process, not only to make the license renewal process more efficient for the applicants but also to make it more transparent for those agencies and the public through the NRC interface during this process. The resource approach taken was an excellent idea. It makes the GEIS good reading material as compared to the 1996 version. It's more user friendly so I really commend you guys on that. (OBIL-Entergy-1)

Comment: Also, I would like to express appreciation of the restructuring that NRC did along the lines of the resource areas, which was described earlier, and the notion of putting together a separate section on environmental consequences that allows one to easily understand the potential impacts associated with license renewal as well as, ideally, the potential benefits. The -

- I think it makes it much easier and more accessible to members of the public. I will comment that I asked my wife to take a shot. She's my best critic and reviewer. She took a look at it and -- and she liked it. And so, for what it's worth, one member of the public appreciates the work that you put into that. (RMD-NEI1-2)

Comment: The Scope of the GEIS is Improperly Narrow: The revised GEIS has neatly packaged the environmental issues by resource area, but there are numerous instances when these areas overlap; i.e. seismology and human health (as a result of an accident during an earthquake), waste management and human health (as a result of an accident involving high level waste storage), ecology, hydrology, and socioeconomics (the effects of damage to the marine environment on the local fishermen). (SLOMFP-13-8)

Comment: The Scope of the GEIS is Improperly Narrow: The separation and restriction of environmental issues by resource area is arbitrary and ineffective. (SLOMFP-13-10)

Response: *The NRC believes that dividing the environmental issues into resource areas allows for a clear and focused discussion of the impacts. While there may be some overlap between resource areas, this approach ensures that all relevant environmental impacts associated with license renewal are appropriately addressed consistent with the requirements of NEPA and 10 CFR Part 51. This approach has been successfully applied to more than 40 SEISs to date and is typical of how EIS analyses are conducted. No change was made to the GEIS as a result of this comment.*

Comment: Page 1-6: determining the significance of environmental impacts associated with an issue. The introduction to the GEIS on 1-6 states the following:

- The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics;

- A single significance level (i.e., small, moderate, or large) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel); and

- Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures would probably not be sufficiently beneficial to warrant implementation.

The NRC states that the generic analysis of an issue may be adopted in each plant-specific review.

What are the criteria for challenging the generic analysis of an issue in a plant-specific review? Please describe or list any license renewal applications where the generic analysis of an issue has been challenged, and also identify any successful challenges for such issues applied to reactors the NRC has approved for relicensing.

Please provide a list of every issue that has been accepted for a Category 2 plant-specific review in a license renewal proceeding. Doing so will give the public a better idea of the scope of input the NRC is open to considering. (A4NR-11-2)

Response: *The NRC makes a concerted effort to identify and evaluate any new information associated with Category 1 issues during plant-specific environmental reviews. The applicant's environmental report (ER), public comments, and any other data records are reviewed and evaluated for any new information about Category 1 issues that could change the conclusions in the GEIS. If new information is discovered that could change the conclusion in the GEIS, the NRC staff then notifies the Commission and conducts a plant-specific impact analysis to determine the significance of the issue. See the response to Comment CEC-9(1)-10 for additional discussion about the definition of "new and significant information."*

Although a number of new environmental issues have been raised during plant-specific license renewal reviews and evaluated by the NRC in plant-specific SEISs, to date these issues were not considered significant and did not invalidate any of the conclusions in the GEIS. Two examples of issues that were accepted for Category 2 plant-specific review follow.

During the scoping meetings for the Calvert Cliffs license renewal environmental review, a member of the public raised the issue of extremophiles, which are microbiological organisms that live in high-radiation and high-temperature environments. The NRC evaluated this issue and determined that, while it was new information, it was not considered significant because extremophiles would not be able to survive and compete with the indigenous microbiota of the relatively cold waters of Chesapeake Bay, once cooling water was discharged from the Calvert Cliffs facility.

*Another issue was identified by the NRC during the environmental review of the North Anna license renewal. The NRC identified a potential issue related to the nuisance species water hyacinth (*Hydrilla verticillata*), a submerged aquatic macrophyte (large plant) that inhabits many freshwater rivers, lakes, and ponds in North America. Although higher water temperatures can increase the growing season of water hyacinths, it was concluded that the issue was not significant because grass carp appeared to be effectively controlling the growth and biomass of the water hyacinth.*

In both of these examples, new information was considered and the results of the environmental impact analyses were published in each plant-specific SEIS. The NRC believes that this

process of considering and evaluating new information ensures the possible inclusion of new issues in plant-specific license renewal reviews. These two examples demonstrate that the NRC considers new environmental issues during plant-specific environmental reviews. Public comments on the draft revised GEIS are discussed in Section 1.9.

Comment: Page 1−14 to 1−15 Public scoping and comments on SEIS: In both the scoping and the public comment process, the NRC will consider comments and will determine whether these comments provide any information that is new and significant compared with that previously considered in the GEIS. If the comments are determined to provide new and significant information that could change the conclusions in the GEIS, these comments will be considered and addressed in the SEIS.

The GEIS should clearly explain the criteria the public will be required to follow to meet the NRC's standard of "new and significant information that could change the conclusions in the GEIS." Without knowledge of these criteria, the public may be falsely assured that conclusions in the GEIS will be reopened as new and significant information comes to light. There is ample evidence that the public and the states have brought forth new and significant information that the NRC has refused to admit in the SEIS. For example: (08-3903-ag(L) 08-4833-ag(CON); O8-5571-ag(CON) United States Court of Appeals for the Second Circuit THE STATE OF NEW YORK; RICHARD BLUMENTHAL, ATTORNEY GENERAL OF THE STATE OF CONNECTICUT; AND THE COMMONWEALTH OF MASSACHUSETTS.) (A4NR-11-11)

Comment: Public Comment Process: The NRC has stated they will consider public comments based on whether these comments provide any information that is new and significant compared with that previously considered in the GEIS. If the comments provide new and significant information that could change the conclusions in the GEIS, NRC will consider and address the comments in the SEIS. The NRC should clearly explain in the GEIS what criteria are used to determine what is considered to be "new and significant information." In prior license renewal proceedings, state representatives and members of the public have provided new and significant information related to seismic, emergency response, population demographics, the potential impacts particularly in largely populated areas from acts of sabotage or a terrorist attack, and other issues related to license renewal, and yet the NRC has found those issues to be non-admissible contentions. It is unclear why the NRC excludes from license renewal proceedings site-specific issues that clearly affect the safety and costs of the continued operation of a nuclear power plant. (CEC-9(1)-10)

Response: *New information can be identified from a number of sources, including the applicant, NRC review activities, other agencies, or public comments. The NRC defines the terms "new and significant" information in Supplement 1 to NRC Regulatory Guide 4.2, "Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses" (NRC 2013b).*

"New and significant" information is defined as follows:

(1) Information that identifies a significant environmental issue that was not considered in NRC (1996) and, consequently, not codified in Appendix B to Subpart A of 10 CFR Part 51 or

(2) Information that was not considered in the analyses summarized in NRC (1996) and that leads to an impact finding different from that codified in 10 CFR Part 51.

Further, a significant environmental issue includes, but is not limited to, any new activity or aspect associated with the nuclear power plant that can act upon the environment in a manner or in intensity and/or scope (context) not previously recognized.

As discussed in Sections 1.8.4 and 1.8.6 of the GEIS, if new and significant information is revealed, then it is first analyzed to determine whether it is within the scope of the license renewal evaluation. If the information is in scope and was not addressed in the GEIS or in 10 CFR Part 51, then the NRC evaluates the significance of the information by calling upon experts from within the NRC, its contractors, or other recognized institutions. If the new information is considered to be significant and it is relevant only to a particular site, then the NRC will perform a site-specific analysis and include its determination as to any environmental impacts arising from this new and significant information in the SEIS for the particular site. If the new and significant information appears to be relevant to other sites as well, then the NRC will consider the issue in future SEISs and include it as a candidate for evaluation in the periodic update of the GEIS and possible amendment to the rule. It is important to emphasize that only issues determined to be within the scope of license renewal are considered in this fashion.

It would not be appropriate to discuss in this forum why particular contentions may have been ruled inadmissible by an Atomic Safety and Licensing Board (ASLB). However, decisions of the ASLB panel contain the Board's reasoning and are a matter of public record available electronically through the NRC's ADAMS system. No change was made to the GEIS as a result of this comment.

Comment: And I could go into more specifics on this document, but, you know, it's just wrong, and nuclear power is wrong. It can't be proven that it's cost-effective. I mean, so many costs are zeroed out when you figure it out.

This is the kind of bookkeeping we had with the economic downturn that we just experienced. We saw it come apart. The NRC's keeping it together, pretty much, as far as money and momentum toward the power. But it can't be proven to be environmental, and in your first pages, the part that David read about, you know, the state having jurisdiction, in that same

argument, that the NRC is just continuing this because -- excuse me -- you guys are employed by this industry, and you have to take it serious.

And this document does not take it serious, because as you jump over the appendixes in these, it's so confusing, to ask the public to comment on this.

I happen to be immersed in "once through cooling" debate for ten years, so I get to read these documents. So they come pretty easy to me, to drift through, but most people aren't going to be able to read this. And you're missing the whole bottom line to this, which is what did they say when they built it and what is the effect now, before you go and start putting generic labels on everything. You better know what the problems are.

And from what I've read in this document, you don't know what the problems are, because the Category 1 problems that you're listing should be Category 2, and they should be individual. So from that standpoint, you guys need a lot more work, and this document is nothing more than a whole bunch of "watering down" of rules, lots of loopholes that corporations can use to not do what they're supposed to do, because they don't have to because it's all generic, and we're destroying it, so let's just keep destroying it.

So to ask the public to feed into a document that's so bad is wrong, to begin with. So I would just say just stop at the beginning, where it says that you're supposed to be watching out for the environment, and just put an end to this. This is ridiculous. (PBCA-Nelson-29)

Response: *This comment expresses general opposition to nuclear power. The NRC does not play a role in determining whether or not a facility operator will seek a renewed license. The decision to seek a license renewal rests entirely with nuclear power facility owners. Similarly, the need for the power supplied by a facility is a determination that is made by other energy-planning decisionmakers, such as State, utility, and, where authorized, Federal agencies (other than NRC). Although a licensee must renew its license to operate a reactor beyond the term of the existing license, the possession of a renewed license is just one of a number of conditions that must be met to continue operation. Once a license is renewed, other factors and entities such as State regulatory agencies and the owners of the nuclear power facility will ultimately decide whether the facility will continue to operate. This final decision will be based on economics, energy reliability goals, and other objectives over which the other entities may have jurisdiction. In addition, the applicant must comply with all applicable Federal, State, and local permit requirements.*

The GEIS and its characterization of environmental issues as either Category 1 (generic) or Category 2 (site specific) were developed to establish an effective environmental evaluation process for license renewal. They are used to avoid duplication and allow the NRC to focus specifically on those issues that are important for a particular plant (i.e., unique to that plant or

exceptional in size and scope for those issues ordinarily assumed to be similar for all plants) in the SEIS. During the environmental reviews of license renewals, the NRC makes a concerted effort to determine whether any new and significant information exists that would change the generic conclusions for Category 1 issues. New and significant information requires analysis in the site-specific SEIS. See the response to comments A4NR-11-19 and CEC-9(1)-10 for more information about the categorization of impacts and new and significant information.

No change was made to the GEIS as a result of this comment.

Comment: The NRC's draft GEIS NUREG-1437 glosses over a myriad of environmental impacts at aging reactors and incorrectly categorizes many issues as generic (category 1). A4NR fails to understand how close to 60 reactors have attained license renewals from the NRC absent complete and open site-specific issues relating to: current rulemaking proceedings (onsite storage, security, emergency planning, etc.), seismic updates, decommissioning shortfalls, hundreds of changes and amendments to original design criteria, lack of a permanent storage facility offsite, unresolved water impacts, changes in population surrounding aging reactors and other issues.

The administration has called for greater transparency from our governmental agencies, yet this proposed Revision actually reduces the openness and thoroughness of proceeding that are proposed to ensure safe operations during the license renewal period. A4NR, et al, recommends the NRC incorporate all public input into the final GEIS and implement all suggestions. (A4NR-11-39)

Response: *The commenters conclude that the NRC has incorrectly characterized many issues as generic rather than site-specific. The NRC's response to the issues listed, many of which are outside the scope of the environmental review, are addressed in the responses to more specific comments from these and other commenters elsewhere in Section A.2 of the GEIS. No change was made to the GEIS as a result of this comment.*

Comment: The first area, I would say, regard how the determination is made whether it's a category one or category two issue. It is clear that NEPA requires that new and significant information be considered. However, what is considered new and significant by the NRC, who is making the call, hopefully just by themselves is making the call, if it is consistent with preexisting truths at the NRC, then it is considered new and significant. However, if it is contrary to preexisting truths, then it is off the table or, better still, NRC claims that the newer and more significant information is safeguards. Therefore, we can't see it.

And the example would be, for example, security, that the references are, I believe, to two Sandia reports, I think that's the way it's referred, and one was redacted, I think down to a page, so it really said nothing. And so, in other words, what NRC is telling state officials, what they

are telling some members of Congress, who certainly have clearance, is in the public, that we are children, we are two year olds that we are to trust you. And therefore the security, everything is fine and we have relied on these studies but, you see, we can't tell you or show you these studies so you can have an independent review, so trust us. That is not acceptable. (NMA-PW-5)

Response: *The NRC defines the terms "new and significant" information in Regulatory Guide 4.2S1, "Preparation of Environmental Reports for Nuclear Power Plant License Renewal Applications," which is publically available through the NRC's Web-based ADAMS. The response to comment CEC-9(1)-10 describes in more detail how the NRC defines and addresses new and significant information in the context of license renewal. While it is unclear exactly which Sandia reports the commenter is referring to, the reports referenced likely contained sensitive, security-related information that would not be available to the general public. Only those with the appropriate security clearance and a need-to-know can view such information.*

No change was made to the GEIS in response to this comment.

Comment: According to the California Energy Commission, Southern California Edison plans to file for a SONGS license renewal application in late 2012. PG&E expected to file one in 2010. Today, as I was waiting for my car battery to be recharged because I had a dead battery, I got an e-mail saying that PG&E has filed with the PUC to be reimbursed to start its license renewal application process

On page 52 of the GEIS, it states "The purpose and need for the NRC's proposed action is to provide an option to continue plant operations beyond the current licensing term to meet future system generation needs."

These needs and ultimately the decision to operate a nuclear reactor under a renewed operating license are to be determined by state utility system and where authorized Federal other than the NRC decision makers. State regulatory agencies, system operators, power plant owners and in some cases other Federal agencies ultimately decide whether the plant should continue to operate.

Yet, the GEIS process will not be completed and adopted before PG&E and perhaps SCE's anticipated filing date for license renewal applications. Therefore, how is the public assured that the GEIS revisions much less the public's comments will be thoroughly considered before the NRC considers a license renewal application for Diablo Canyon or San Onofre?

This question is especially relevant as the NRC has already licensed over 50 reactors without the benefit of the input from the public on GEIS revisions.

It is, therefore, vital that the PUC, the Energy Commission and the state legislature agree and require, not recommend, that all cost benefit and risk studies resulting from the state's analysis be completed, adopted and implemented and the GEIS process be completed and approved before any repair funding for the license renewal for California's reactors be allowed. (DPCA-A4NR1-36)

Response: *Any applications for license renewal received before the effective date of the final rule will be processed under the current rule and the 1996 GEIS. However, the NRC will consider any new and significant information relevant to a particular license renewal proceeding during its site-specific review, regardless of the status of the revised GEIS. See the response to Comment CEC-9(1)-10 for additional details on how new and significant information is addressed. The commenter's recommendation that the State take certain actions before permitting funding of license renewal is beyond NRC's jurisdiction. No change was made to the GEIS as a result of this comment.*

Comment: C. Timing License Renewal Application: The NRC allows a licensee to apply for a license extension too early − when simply one-half the original license is completed. (PW-6-29)

Comment: There is the issue of when people are applying for their license. We know that we live in an age where things improve, imperfections come to light, and we have the ability to do something better. It doesn't feel like that when you have an agency applying for a permit ten and twenty years in advance. It doesn't read as credible or as being anything other than if we can lock you into what we're going to be accountable for now, then if anything comes up later, we can say, sorry, we already got our license.

So as you come up with guidelines, you have got to make sure that no matter when anybody applies for a license, that it includes everything that is up to date as of the time that license comes into effect, not just is issued, but comes into effect. (PBCA-Pinard-15)

Comment: And the application process, to allow an application when a licensee is halfway through their original license makes economic sense, obviously to the energy companies, but it makes absolutely no sense to even suggest that halfway through the original license you can do an environmental impact statement or make any judgment whether this reactor can go 20 years after 20 years, that's ridiculous. (NMA-PW-20)

Response: *The NRC has determined that 20 years of operating experience is sufficient to assess aging and environmental issues at the site. The licensee is required to meet all applicable Federal, State, and local environmental requirements throughout the operational period, including any period of extended operation. Therefore, publication of the SEIS up to 20 years prior to the expiration date of the original operating license does not preclude the need for ongoing environmental compliance activities. Moreover, the NRC may impose additional environmental or safety requirements as part of its ongoing mandate to protect public health and safety, the common defense and security, and the environment on power plant licensees, as necessary, whether or not they have applied for or received a renewed license. No change was made to the GEIS as a result of this comment.*

Comment: The very first sentence of the Summary (page S-1) says that, "The Atomic Energy Act of 1954 authorizes the U.S. Nuclear Regulatory Commission (NRC) to issue commercial nuclear power plant operating licenses for up to 40 years and permits the renewal of licenses upon expiration." Does anything in this sentence imply that a renewal of an operating license can be granted before the expiration of the current license? I believe not! Thus, it appears that there would be a violation of the Atomic Energy Act of 1954 to grant or even consider an extension of an operating license before expiration. (Campbell-31-12)

Response: *The NRC does not agree with the commenter that it is a violation of the Atomic Energy Act of 1954 for the NRC to grant or even consider an extension of an operating license before expiration. In accordance with Section 103 of the Atomic Energy Act (42 USC 2133), 10 CFR Part 50.51 allows for the renewal of nuclear power plant operating licenses. NRC regulations provide that, absent an exemption from the NRC, an applicant may submit an application for license renewal at least 5 years before and not earlier than 20 years before license expiration. See 10 CFR Part 2.109(b) and 10 CFR Part 54.17(c). The NRC has determined that 20 years of operating experience is sufficient to assess aging and environmental issues at the site. Major considerations for seeking license renewal so far in advance of the expiration date of the current license are that it takes about 10 years to design and construct major new generating facilities and long lead times are required by energy-planning decision makers. The licensee is required to meet all applicable Federal, State, and local environmental requirements throughout the operational period. Therefore, publication of the SEIS up to 20 years prior to the expiration of the original operating license does not preclude the need for ongoing environmental compliance activities. No change will be made to the GEIS as a result of this comment.*

Comment: I note that page S-2 says that, "While the NRC staff considers a wide range of alternatives to license renewal, THE ONLY ALTERNATIVE WITHIN NRC'S DECISION-MAKING AUTHORITY IS NOT TO RENEW IT." Why go through this extensive paperwork process if the only alternative within the NRC's decision-making authority is not to renew an operating license? The sentence in the document (preceding the quote above in this

paragraph) said that, "The NRC also cannot ensure that environmentally preferable energy alternatives are used in the future." While the NRC cannot choose what kind of energy will be used, it can eliminate one of the worst energy alternatives as far as impact to the environment by eliminating the option for license extension of these old dangerous nuclear power facilities.

Page S-2 also mentions that "the decision to operate a nuclear power plant under a renewed operating license are to be determined by State, utility, system, and where authorized, Federal (other than NRC) decision makers." Would the NRC hold off on issuance of an operating license extension (or even consideration of a utility's application papers for such a license extension) if a state has called for additional studies and precautions to take place before any consideration of an extension of an operating license (as is the case with the Diablo Canyon facility and state mandated seismic studies)? (Campbell-31-16)

Response: *The NRC was established to regulate the civilian use of nuclear material. The decision on the need for power and type of power generation technology to serve that need is not a decision that the NRC has the authority to make. Such needs may be determined by other energy-planning decisionmakers, such as State, utility, and, where authorized, Federal agencies (other than NRC). By law, the NRC only has the authority to grant or deny a license for a nuclear power plant. The NRC makes a decision to renew or not to renew a license based on public health and safety and common defense and security considerations. A State or other entity requesting additional studies or precautions would not in and of itself cause the NRC to stop reviewing a license renewal or deny an application. No change will be made to the GEIS as a result of this comment.*

Comment: And the main reason I'm here tonight is to address the streamlining process of the environmental impact report and the impression I have is that it might result in fewer opportunities like this for the public to participate and I think that's a huge part of the process that we need to encourage and even if I may not be accurate about that assumption, I would still **--** my comment is to promote even greater participation with the public, get more feedback from alternatives and other opinions and do far more public outreach so a larger number than tonight by hundreds could enjoy the process, participate in it and become better educated on a very important topic.

Because I think this environmental process should include consideration of the alternatives, fair and honest open debate about how we're going to really address global concerns that are a result of climate change in the short time we have to figure this all out. We have to have very honest realistic solutions and I'm not saying whether we're pro or against anything. I think all options should be on the table and we have some serious issues to deal with and I just am here tonight especially to encourage the public input and consider all these things that we heard tonight. Very important topics and ideas and suggestions, concerns.

We just need more people participating in that. So, that's what I'm here to encourage. (DPCA-SCG-27)

Comment: Need for the NRC to Hold License Renewal Hearings Near Reactor Communities: Communities located near operating power plants should be provided an opportunity to comment on the scope of the issues to be considered during the license renewal reviews. The NRC should conduct public meetings in communities close to nuclear power plants where plant owners have applied for license renewal. Meetings should be held both during the day and the evening to accommodate the work schedules for members of the public. (CEC-9(1)-9)

Comment: We also strongly urge the NRC to hold license renewal hearings, including issue scoping and identification hearings, in the vicinity of the plants where plant owners have applied for license extensions. (CEC-9(1)-12)

Response: *The NRC acknowledges the comments and agrees that public participation and input are necessary and important. It is important to note that the revised GEIS and the associated rulemaking will not restrict or limit opportunities for public participation during site-specific license renewal reviews. It is NRC practice to hold at least two sets of public meetings on plant-specific SEISs in the vicinity of the reactor site that is the subject of a license renewal application. These meetings occur at important stages of the environmental review of the application.*

The first set of meetings occur in the vicinity of the nuclear power plant after the license renewal application is received and provides the public an opportunity to provide its insights on the scope of the plant-specific SEIS. Typically, one meeting is in the afternoon and the other during the evening in an attempt to reach as many members of the public as possible. The meeting purpose, times, and locations are commonly advertised in local papers and on the radio to ensure that interested members of the public are aware of the public scoping meetings. Transcripts of the meetings are made available to the public after the meetings are conducted. After the comments have been received, they are evaluated and considered in the preparation of the site-specific analysis, as appropriate. Comments that are considered outside the scope of the environmental review are addressed in the Scoping Summary Report issued prior to the draft SEIS. The comments considered to be in scope are listed in Appendix A of the draft SEIS, along with the discussion about whether the comments were further evaluated as part of the analysis during the preparation of the draft SEIS.

The second set of public meetings occurs after issuance of the draft SEIS and is also held in the vicinity of the nuclear power plant requesting license renewal. The purpose of these meetings, also typically consisting of an afternoon and evening session, are to present an overview of the draft SEIS and to obtain comments from the public and other interested stakeholders related to the draft. Transcripts of these public meetings are made available after the meetings are

conducted. Every comment received is considered and, if appropriate, incorporated into the final document. All of the comments on the draft SEIS are listed in Appendix A of the final SEIS, along with the discussion about whether the comments were within the scope of license renewal and, if appropriate, where changes to the text of the final SEIS were made in response to the comments.

No changes were made to the GEIS in response to these comments.

Comment: Oh, by the way, I should also mention one thing that is very, very relevant. The fact that I have a video camera here tonight, that my career is as a documentary film producer, is in no way a reflection that this is an undertaking I took on my own. I am highly disappointed that the Nuclear Regulatory Commission did not do what they have done for a very long time, which is have [AGP Video, Inc.] videotape these events, so that our entire community can share in them and review them, at their convenience, or on the Internet. (PBCA-Weisman-24)

Response: *The commenter is correct that the six public meetings the NRC held around the country during September and October 2009 on the draft revised GEIS were not videotaped. The meetings were transcribed, and the transcripts are publicly available through the NRC's ADAMS from NRC's Web site at http://www.nrc.gov. The meeting locations and ADAMS accession numbers are as follows: Atlanta, Georgia (ML09281007); Newton, Massachusetts (ML092931681); Oakbrook, Illinois (ML092931545); Rockville, Maryland (ML092931678); Pismo Beach, California (ML093070174); and Dana Point, California (ML093100505). The NRC values the opinion of the commenter regarding the usefulness of videotaping public meetings and will consider that suggestion when planning future public meetings. No change was made to the GEIS as a result of this comment.*

Comment: First of all, I'd like to express appreciation for the NRC's process that they've undertaken in proposing the -- the new regulation and the supporting guidance documents. I think having the public meetings at locations around the country is -- is productive. I -- I don't think NRC should necessarily evaluate, in retrospect, the -- what the level of participation is, necessarily, at those meetings. I think it's more important that you're reaching out and providing the opportunity. And I commend the agency for that. (RMD-NEI1-1)

Response: *The NRC acknowledges the comment, and has taken a number of steps to obtain broad public participation in the GEIS review process. No change was made to the GEIS is response to this comment.*

Comment: Page S-3: In a Notice of Intent published in the *Federal Register* on June 3, 2003, the NRC notified the public of its plan to revise the GEIS and to give people an opportunity to participate in the environmental scoping process. This step was the initial opportunity for public participation in the GEIS revision. In July 2003, the NRC held public scoping meetings in four

locations (one in each of the four NRC regions) − Atlanta, Georgia; Oak Lawn, Illinois; Anaheim, California; and Boston, Massachusetts.

As indicated earlier, A4NR, et al, finds the NRC's attempt at soliciting public input to the process woefully inadequate. As indicated earlier, the NRC held a meeting in 2003 in Anaheim, California, at which only ONE member of the public was present. In this most recent attempt at soliciting comments, the NRC attempted to hold one meeting in California for all of Region IV. The NRC offered a conference call as an alternative, but California had learned from New York's NRC conference call where "The committee discussed a number of hot-button issues dogging the plant, including contaminated water seeping into the Hudson river, aging pipes and the integrity of Indian Point's future plans. But the powwow was nearly inaudible over the phone. NRC officials apologized for the glitch and said a meeting transcript would be available in about a week" and reinforced its demand that the meeting be held where the impacted community lives.

This NRC's effort to hold the meeting over 100 miles away and/or to offer a conference was rebuffed by the public and their representatives, and as a result, the NRC will now schedule meetings in each of California's affected reactor communities.

A4NR recommends that the NRC hold public meetings within a one-hour drive of any affected reactor community, and that telephone or internet "bridge" be disallowed because of the numerous technical challenges and failures evident in this system. (A4NR-11-31)

Comment: I'm speaking on behalf of a public interest group, Pilgrim Watch. We are in the process of the adjudication process for the Pilgrim Nuclear Plant and so I might be speaking a little bit from lessons learned.

And I want to make a point in regard to that, that I think in the future that your public meetings, such as these, would be best to be held beside reactors that have not yet applied for license renewal. That would be more beneficial for them.

It is beneficial, obviously, to speak to people like myself, who have been through the mill or are in the process for the lessons that we have learned, but I think it would be most important for you to plan your next meetings, and you don't necessarily, I would think, have to restrict them to four, to the sites that are coming up. I have not studied this with a fine tooth comb because it seems the NRC has been busy enhancing many rule changes, so I have been actually focusing on emergency planning and some other ones. However, my interest is with this. (NMA-PW-4)

Comment: <u>Section 2 – Procedural Issues: A. Public Involvement & Input Restricted – Recommended</u>: The Honorable Gregory Jaczko's said in a speech entitled, "A Regulator's Perspective on New Nuclear Reactor License Applications," September 24, 2009 that, “NRC is

built upon a solid foundation of a talented workforce dedicated to the safety and security mission of the agency, and guided by sound safety regulations. This solid foundation is *strengthened by public involvement and input,* and by our being open and transparent about what we do and why. I am confident that we can successfully meet these challenges in an effective way, with safety at the heart of our decisions. "[Emphasis added]

1. Stakeholder Scoping Sessions − Number, Location & Lack Public Outreach Stakeholder Meetings: Public involvement and input at the stakeholder regional meetings is restricted and limited by the location of the meetings and minimal to non-existent public notification. In order for there to be meaningful participation, it seems obvious. that meetings should be located convenient to residents near reactor sites due to apply for license renewal and advertised in the local media; not located simply near reactor sites that have already applied for license renewal. For example on September 17, 2009 the regional GEIS Stakeholder meeting was held in Newton Massachusetts, just outside Boston. However, the remaining reactors to apply for license renewal in this region are located in Pennsylvania and New Hampshire. (PW-6-21)

Comment: During the ensuing 75-day public comment period, public meetings will be held in each of the four NRC regions.

As stated in the introduction to these comments, the NRC is not specific about the locations and frequency of meetings in each of the four NRC regions. For example, Region IV covers nearly half the mainland United States, and one meeting would be wholly inadequate to meet the needs of the stakeholders and public. The NRC should commit to holding public meetings in each reactor community where the utility has given notice of intent to file for relicensing, and should include on its service list of notification all relevant state agencies with oversight for utilities, power generation and public safety. (A4NR-11-12)

Comment: In 2003, the Executive Director of Alliance for Nuclear Responsibility-then representing another San Luis Obispo, California organization-was the only member of the public to attend the Nuclear Regulatory Commission's (NRC) initial west coast meeting opportunity for public participation in the Generic Environmental Impact Statement Revision held in California. It should seem obvious to most governmental agencies that when only one member of the public attends (in a state with a population of 36 million) there is a cause to doubt that public believed their participation was welcomed (or accessible, or convenient). It should have raised questions about the NRC's ability to notify the public of meetings and opportunities for participation

Comments provided that evening in 2003 included a very important point which the NRC has again failed to seriously consider in the scheduling of meetings for public comments on its latest GEIS revision ─ the need to hold the meetings *near the reactor communities.* Here they would

find the citizens—the "stakeholders" whom the NRC refers to in its publications—with the most valid concerns about continued operation of aging reactors and the ongoing creation and onsite storage of highly radioactive waste on *our* state's fragile coast. In fact, it was clear from the sign-in sheets at GEIS meetings held in 2009 that the insistence by California's elected representatives that meetings be held near reactor sites resulted in the only meetings where more that two members of the "public" were in attendance. A4NR, et al, continues to question sincerity of the NRC's commitment to openness and transparency when the local public has to turn to its elected officials in order for the NRC to schedule meetings in affected communities.

When the NRC scheduled of public meetings on the GEIS Revision over a hundred miles from either Diablo Canyon, SONGS or any other reactor community, it remains difficult for the public to believe the NRC considers our input valuable. The locations chosen by the NRC signaled to the public, to those who live within the "fallout zones" of these and many other reactor facilities- and to their elected representatives — that their input was neither encouraged nor valued. Lack of recognition that the public can and should provide valuable insight into the NRC's oversight process continues. The NRC's inability to listen to the public in 2003 resulted in wasted time and resources and shadowed the public's perception of the purported "openness" and transparency of the NRC's current license renewal revisions. (A4NR-11-1)

Comment: The process should be open and transparent to the public and the press. The public should be allowed ample time to comment on all issues and town meetings, annual assessments etc. should be publically announced weeks in advance and accessible, to precipitate larger public attendance and education. (DWM-5-3)

Response*: The NRC encouraged and welcomed members of the public, environmental interest groups, and representatives of local, State, Tribal, and Federal government agencies to participate in the scoping and public comment process for the GEIS revision. Revised GEIS, Volume 2, Appendix A, describes the public comment process in detail and summarizes the comments received and NRC's response to public comments on scoping and the draft revised GEIS. The initial scoping period for the GEIS revision began on June 3, 2003, and ended on September 17, 2003. Public scoping meetings were held in each of the four NRC regions during this time period in July 2003. The scoping period was subsequently reopened from September 27, 2005 until December 30, 2005. Members of the public and other environmental interest group stakeholders were able to submit scoping comments by mail, e-mail, or in person at NRC Headquarters during the entire time of the two scoping periods.*

Following publication of the draft revised GEIS and the proposed rule, the NRC again encouraged members of the public, environmental interest groups, and representatives of local, State, Tribal, and Federal government agencies to submit comments during a 75-day public comment period from July 31, 2009, until October 14, 2009 (74 FR 38117). In response to requests from three stakeholders, the NRC extended the comment period for an additional

90 days until January 12, 2010 (74 FR 51522). During this time, the NRC also held six public meetings. Meetings were again held in each of the four NRC regions. Originally, the NRC had only one meeting planned in California (Region IV), but changed the location and added another meeting to accommodate the requests from various stakeholders. The California meetings were held in Pismo Beach, California (near the Diablo Canyon Nuclear Plant), and Dana Point, California (near the San Onofre Nuclear Generating Station). The other meetings were held in Atlanta, Georgia (Region II); Newton, Massachusetts (Region I); and Oak Brook, Illinois (Region III). The sixth, a Webinar meeting, was held at NRC Headquarters in Rockville, Maryland. Open phone lines were also provided at all of the public meetings. Section 1.9 of the revised GEIS describes the public comment process and briefly summarizes major issues raised during the public comment period on the draft revised GEIS.

See the response to comments DCPA-SCG-27, CEC-9(1)-9, and CEC-9(1)-12 for a description of NRC public meeting practices for site-specific license renewal environmental reviews.

Comment: I'd also recommend that public hearings be held on all waste transportation routes if, in fact, the waste is moved and that those hearings are held in each jurisdiction affected by such travel, that we have radiation release data available on the internet in real time, that we require owners of nuclear power plants to set aside sufficient money to cover the cost of decommissioning, that we require public service announcements to made on radio and TV directing the public to evacuation and other significant nuclear incident safety information and finally, that we put a moratorium on relicensing until there is a permanent high-level waste disposal site. (DPCA-A4NR-15)

Response: *The recommendations of the commenter are outside the scope of license renewal. The NRC has determined that issues concerning the ultimate disposition of spent nuclear fuel are ongoing and outside the regulatory scope of this rulemaking and the GEIS. See the response to Comment CEC-9(1)-3. Therefore, there is no basis for a moratorium on license renewal.*

With regard to decommissioning funding, NRC regulations in 10 CFR Part 50 require each power reactor licensee to provide reasonable assurance that funds will be available for decommissioning and prescribes acceptable methods for providing financial assurance and the minimum dollar amounts, adjusted annually, to demonstrate such reasonable assurance. See 10 CFR Parts 50.33(k) and 50.75. Decommissioning funding is out of scope for the license renewal environmental review.

Finally, as explained more fully in response to Comment PW-6-19, emergency preparedness is outside the scope of license renewal. No change was made to the GEIS as a result of this comment.

Comment: And so you have, in the security, for example, that, oh, it's category one but we will consider it if a circuit court, such as the 9th, says that it has to have an environmental review, let's say in California. But because maybe the New Jersey DEP didn't have the case that, trust me, New York Attorney General's Office has, well the 3rd Circuit Court said something else, so take it off the table there. It's a piecemeal approach.

We know there is something wrong, fundamentally wrong with this process, so what should be on the table? (NMA-PW-7)

Comment: For the foregoing reasons, Riverkeeper respectfully submits that the Revised GEIS for license renewal of nuclear power plants is inadequate and incomplete. The environmental review based on the Revised GEIS would fail to provide for a comprehensive review which is necessary to comply with NEPA. (Riverkeeper-20-19)

Comment: The draft revised Generic EIS needs substantial revision if it is going to meet NEPA's requirements. Even given the clear mandate under federal law, the analysis in the draft revised Generic EIS is illusory. This key step in the license renewal review falls short of what it should achieve. Instead, numerous issues that have been repeatedly raised by the State of New York remain unaddressed. Statements submitted by the State of New York in 1991 in the original Generic EIS process regarding upgrading technologies to reduce and mitigate environmental impacts at nuclear generating facilities are even more relevant in 2010. Unfortunately, they are going as unheeded now as they were twenty years ago. As the record demonstrates, the NRC has narrowly drafted regulations, processes, and procedures that do not address key environmental issues in meaningful ways. (NYS DEC-12-1)

Comment: NEPA requires more of the NRC than the agency is providing in the license renewal process for nuclear power plants. The NRC's approach for reviewing license renewal applications from aging nuclear power plants − many with once-through cooling water intake systems that have never undergone environmental review because they pre-dated NEPA − does not achieve the goal of adequately assessing and mitigating environmental impacts as NEPA mandates. The NRC claims that the revised Generic EIS will provide guidance for assessing impacts in Supplemental EISs, which are conducted on a site-specific basis for each plant. As demonstrated above, however, this document hardly provides that guidance. The NYSDEC knows that the guidance is sorely needed, given the State's experience in the NRC's license renewal proceeding for Indian Point. The demonstrated inadequate draft Supplemental EIS for Indian Point should serve to instruct the NRC in crafting the revised Generic EIS. In that way, the data errors and the analytical failures abundant in the Indian Point license renewal proceeding will not be replicated nationwide. (NYS DEC-12-12)

Comment: As an overview, the Draft is a second rate job and the research analysis performed to support conclusions is third rate; thereby confidence in the NRC and this process is undermined. (PW-6-1)

Comment: Pilgrim Watch contends that the Draft incorrectly determined contrary to NRC's own definition of "small impact" that the environmental impact of some issues was "small" when it clearly should have been "moderate to large[1];" and wrongly categorized several issues as Category 1 instead of Category 2[2] These include, for example: human health; solid waste management, onsite storage of spent nuclear fuel and low-level waste storage and disposal; postulated and severe accidents; radionuclides released to groundwater; and decommissioning.

[[1] July 2009, S-5, NUREG-1437, Rev.1: NRC defines in the Draft small impact as, "Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts do not exceed permissible level in the Commission's regulations are considered small." Moderate impact as, "Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource." Large impact as, "Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource."]
[[2] Ibid: The draft says that Category I issues are those that meet all of the following criteria: (1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics; (2) A single significance level (i.e., small, moderate, or large) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel); (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures would probably not be sufficiently beneficial to warrant implementation. For issues that meet the three Category 1 criteria, no additional plant-specific analysis is required in future SEISs unless new and significant information is identified. Category 2 issues are those that do not meet one or more of the criteria of Category 1, and, therefore, require additional plant-specific review.]

NRC justified their conclusions of a "small impact" and Category 1 designation by: (1) totally ignoring or mischaracterizing new and significant information that provided contrary evidence or "Inconvenient Truths" (example, NRC's mischaracterization of meteorology, climatology and BEIR VII); (2) referencing guidance or industry practices, without demonstrating that they, in fact, provide "reasonable assurance" (example, SAMA and Applicant's use of outdated computer code and uses ATMOS); and (3) referencing "safeguard" information unavailable for independent scrutiny (example on site storage spent fuel, NRC's Updated Waste Confidence Rule).

Further, and of considerable importance, NRC incorrectly determined that emergency planning and security were outside the scope of review. They both have a potentially large impact and are site specific. (PW-6-2)

Response: *These comments make only general statements regarding environmental impact issues, express their general opposition to the GEIS, and/or provide no new information. As such, no change was be made to the GEIS in response to these comments. In addition, the categorization of impacts as Category 1 (generic) or Category 2 (site-specific) and significance*

levels are discussed in the response to Comment AGA-NEI-2 and are presented in Section 1.5.2 of the GEIS. Emergency preparedness and security are outside the scope of the license renewal environmental review but are addressed as part of NRC's regulatory oversight program for all operating reactors.

Comment: The Scope of the GEIS Is Improperly Narrow: In a shell game of regulation, the NRC claims in Section 1.6 that some issues are adequately addressed elsewhere − by other agencies and/or proceedings − or dealt with on an ongoing basis. In its plan to review nuclear plants generically, the NRC has effectively excluded from its consideration environmental issues that have major impacts on public safety:

- Disposition of Spent Nuclear Fuel
- Emergency Preparedness
- Safeguards and Security

Additional excluded issues that would not stand up to scrutiny include:

- Changes to Plant Cooling Systems
- Need for Power

The NRC acknowledges unresolved problems, but excludes them from consideration in the GEIS. Examples include the following:

- Aging: " ...operational safety issues and safety issues related to aging are considered outside the scope for the environmental review..." (1-8, lines 7,8)
- Security: "Security issues such as safeguards planning are not tied to a license renewal action..." (1-12, line 25)
- High-level waste storage: "The NRC is confident that there will eventually be a licensed high-level waste repository." (1-9, line 31) (SLOMFP-13-7)

Comment: The Scope of the GEIS Is Improperly Narrow: SLOMFP objects to the elimination of critical issues in the determination of license renewal action and to the failure to acknowledge and assess the interactive and cumulative effects of overlapping issues. (SLOMFP-13-11)

Response: *The issues identified by the commenters are considered outside the scope, or, in some cases, generic for the environmental review of a license renewal. These include, for example, the onsite storage of spent nuclear fuel during the license renewal term, emergency preparedness, safeguards and security, and need for power. The reasons for excluding these issues are discussed in GEIS Section 1.7 and in the NRC's response to specific comments raising these issues elsewhere in this appendix. It should be noted that aging management, while outside the environmental review of a license renewal, is considered during the safety review of a license renewal. The need for power is considered in the environmental review of proposals to initially construct new nuclear power reactors. Changes to plant cooling systems, to the extent they involve safety-related issues, would be considered in NRC safety reviews;*

however, the NRC will not make a decision or any recommendations to mitigate adverse impacts of cooling system operations, as they fall under the jurisdiction of State or other Federal agencies. Human health impacts of onsite spent fuel storage continue to be well within regulatory limits (as set forth in 10 CFR Parts 20 and 72), and the radiological impacts of onsite storage continue to meet the standard for a conclusion of SMALL impact. Nonradiological environmental impacts continue to be SMALL. The overall conclusion for onsite storage of spent nuclear fuel during the license renewal term is that the environmental impacts will be SMALL for each plant. Additionally, impacts associated with potential severe accidents, including those at spent fuel pools, during the license renewal term are discussed in Section 4.9.1.2 and Appendix E of the GEIS.

With regard to malevolent acts or sabotage, it is the NRC's position that malevolent acts or sabotage are speculative and beyond the scope of a NEPA review and are, therefore, outside the scope of the GEIS. The NRC believes that the consequences of events initiated by malevolent acts or sabotage would be comparable to or bounded by the severe accidents considered in the GEIS. At present, however, the NRC will consider malevolent acts or sabotage as part of a license renewal environmental review for plants located within the jurisdictional area of the U.S. Court of Appeals for the Ninth Circuit, as a result of the Ninth Circuit decision in San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006). For additional discussion, see Appendix E, Section E.3, of the revised GEIS.*

The other issues, emergency preparedness, and safeguards and security (which includes preventing malevolent acts or sabotage), are considered part of the NRC's ongoing regulatory and safety oversight of all civilian nuclear power plants, whether their owners are seeking license renewal or not. No change was made to the GEIS as a result of these comments.

Comment: The draft revised Generic EIS misses critical and well known environmental issues and effectively precludes their review. For example, the NRC mentions in this draft Generic EIS that impingement and entrainment impacts from cooling water intake systems will be fully assessed in a site-specific Supplemental EIS. As a participating party in the license renewal proceeding for Indian Point Units 2 & 3, it is clear to the NYSDEC that this is not true in that proceeding. Therefore, the NYSDEC has concluded that the woeful experience with that site-specific Supplemental EIS provides a compelling need for the NRC to set out more guidelines in the revised Generic EIS. Not only has New York State had to deal with such a stale Generic EIS, but, as demonstrated below, the NRC has drafted a site-specific Supplemental EIS in the Indian Point license renewal proceeding based upon faulty data and analyses. This result must be corrected for the Indian Point license renewal process, and importantly, not be allowed to be repeated at other plants because the revised Generic EIS is so deficient.

Thus, NYSDEC advances a novel proposition − the Indian Point Supplemental EIS should inform the NRC to provide more guidance in the Generic EIS for the preparation of site specific

Supplemental EISs. If the NRC takes such a step, and heeds the comments of New York State from both 1991 and now, a more meaningful review of critical environmental issues can be possible for the license renewal applications for nuclear generating facilities. That meaningful review will also comply with NEPA. (NYS DEC-12-3)

Response: *With respect to in-scope environmental issues, the overall environmental license renewal process, including the GEIS, the SEIS, the guidance provided in the ESRP (NRC 2013a) and NRC (2013b), as well as the potential hearing process, is utilized for the basis for consideration of all important environmental impacts and is consistent with NEPA and 10 CFR Part 51.*

The ESRP provides guidance to the NRC implementation of the provisions of 10 CFR Part 51. It provides guidance by listing the acceptance criteria and describing the environmental review procedures for each environmental resource area, including evaluating new and significant information and potential mitigation factors, if necessary. The NRC uses this review plan to prepare site-specific supplements to the GEIS. Use of the ESRP in the environmental review process ensures the consideration and review of all relevant environmental issues; ensures consideration of other Federal, State, regional, local, and affected Native American Tribal environmental issues; ensures the standardization of analytical and evaluation procedures for the review of each environmental issue; and ensures concentration on review of the potential environmental impacts of significance.

With regard to using the Indian Point SEIS as a model for the revised GEIS, lessons learned and knowledge gained during all previous license renewal reviews provided significant sources of new information for this assessment. Since 1996, more than 40 site-specific supplements to the GEIS have been prepared. In addition, new research, findings, and other information were considered when the significance of impacts associated with license renewal was being evaluated.

Comment: A. The Draft Generic EIS Avoids Thorough Analysis of the Environmental Impacts for License Renewals of Nuclear Power Plants in the United States: The publication of this draft Generic EIS illustrates the significant procedural and substantive hurdles that the NRC has put in the way of public review and participation in the license renewal proceedings of nuclear generating facilities. The State of New York has participated in the license renewal proceeding for Indian Point Units 2 & 3, and yet fundamental environmental issues have not been adequately addressed in that forum. With the release of the revised Generic EIS, those issues will not be analyzed, addressed, or reviewed for Indian Point or any other facility. The process demonstrates that in whatever forum an interested party raises an issue, the NRC claims that it is never the proper forum. The review process, although ostensibly open to all, in reality is a carefully constructed "shell game." Parties attempting to participate in the reviews have to know what they need to know before they need to know it. The NRC process on license renewal

effectively deprives the public from meaningfully participating in the consideration of environmental issues in what is mandated by law to be a comprehensive environmental review process. When there are Significant impacts to waterways, such as the Hudson River, and alternatives such as closed-cycle cooling technology are available, the NRC's failure to consider those alternatives means that the environmental impacts will never be adequately considered for operation of the nuclear facility.

The NRC has established a two-part environmental review process for the license renewal of nuclear power plants in the United States. The Generic EIS is intended to address environmental impacts that are common to numerous plants. In addition to this Generic EIS, a Supplemental EIS process for individual plants is intended to address environmental impacts at specific facilities. In practice, however, a thorough and comprehensive review of issues is thwarted by this two-part process because they are out of sync with each other.

The draft revision at issue here is for the 14-year-old Generic EIS. Parties engaged in license renewal proceedings, and who have gone through the" contentions" process seeking a hearing on the already-filed license renewal applications, must deal with the woefully outdated Generic EIS that was originally published in 1996. The NRCs regulations require the Generic EIS to be reviewed on a ten-year cycle, and updated if necessary. Many years later, the NRC has published a draft revision. But yet again, the NRC fails to fully analyze key issues, and punts many key issues to other parts of the process, having precluded the possibility of the issue being addressed in the NEPA review. Public review is further complicated by the fact that the "record" available to interested parties seeking a hearing on a particular license renewal proceeding is incomplete when “contentions" are required to be filed. Moreover, the Supplemental EIS when published many, many months after the NRC’s imposed deadline to file contentions almost ensures that the "missing" pieces of the record will also not be considered in the proceeding. These factors collude to complicate consideration of important issues, which is especially true for impacts on aquatic resources. (NYS DEC-12-2)

Response: *The comment takes issue with the environmental review and hearing process associated with license renewals. The NRC believes it has established a comprehensive, fair, and transparent review process with numerous opportunities for public input as described more fully in Section 1.9 of the revised GEIS. The NRC disagrees with the commenter’s assertion that there is never a proper forum to raise an issue; however, issues such as requiring the installation of a closed-cycle cooling system are outside the statutory authority of the NRC and are, therefore, not addressed.*

No change was made to the GEIS as a result of this comment.

Comment: A good first step in fulfilling your moral and legal responsibilities is to require a rigorous on-site specific review of environmental health, economic and safety impacts of SONGS generating license extension application. (DPCA-CREED3-19)

Response: *NRC's review of an application for license renewal, including any potential application from SONGS, has four components: a safety review, an environmental review, inspections, and an independent review by the Advisory Committee on Reactor Safeguards (ACRS).*

The NRC performs a safety review of the information provided in the application (as supplemented with additional information provided by the applicant at the NRC's request). The results of the safety review are documented in a publicly available safety evaluation report.

The NRC publishes the results of the license renewal environmental review in a publicly available plant-specific draft SEIS, and the public is invited to comment. Then, after considering all public comments, the NRC issues the final SEIS.

Teams of inspectors with experience in nuclear plant safety visit the site and verify that the applicant has implemented its aging management plans as committed to in the application. The results of plant inspections conducted as part of license renewal are documented in inspection reports and are made publicly available. The results are also included in the safety evaluation report. (These inspections are in addition to NRC's ongoing regulatory oversight program for all operating reactors, which also includes inspections.)

The ACRS is an independent panel of experts that advises the Commission on matters related to nuclear safety. The ACRS reviews the applicant's safety analysis report, the NRC's safety evaluation report, and the results of the onsite inspections and makes its recommendation to the Commission regarding issuance of the renewed license.

No change was made to the GEIS as a result of this comment.

Comment: Page 1-7: The GEIS introduction states "Scoping also identifies and eliminates from detailed study issues that are not significant or have been covered by a prior environmental review. Having a defined scope for the environmental review allows the NRC to concentrate on the essential issues of actions being considered rather than on issues that may have been or are being evaluated in different regulatory review processes, such as the safety review (NRC 2006)."

If there are issues involved in a site-specific relicensing proceeding that "may have been or are being evaluated in different regulatory review processes, such as the safety review (NRC 2006)" is the NRC required to update the evaluation or resolve the "different regulatory review

processes" before approving a license renewal? If not, under what NRC criteria can the public and/or the state challenge issues that "may have been or are being evaluated in different regulatory review processes"? Please provide any examples of NGO or state challenges that were successful after issues were evaluated in "different regulatory review processes"? (A4NR-11-3)

Response: *For each license renewal, two reviews are required: an environmental review and a safety review. These reviews are conducted independently and in parallel by the NRC. If there is an issue in one of those reviews that is determined to have an impact in the other review, both of those evaluations must take that issue into account before a decision to grant a renewed license will be made. For example, if during the course of the safety review a plant modification is required to address an aging management concern, the plant-specific SEIS may need to address the environmental impacts associated with that modification. Absent new and significant information, issues that were considered under different regulatory review processes, such as in rulemakings or other generic environmental review statements, would not have to be reevaluated in the license renewal proceeding.*

Any person whose interest may be affected by a license renewal proceeding and who desires to participate as a party in that proceeding may petition to intervene by filing a petition in accordance with 10 CFR 2.309. Similarly, in accordance with 10 CFR 2.802, any interested person may petition the NRC to issue, amend, or rescind any NRC regulation.
No change was made to the GEIS as a result of this comment.

Comment: Page 1-8: Actions subject to NRC approval for license renewal are limited to continued nuclear power plant operation consistent with the plant design and operating conditions for the current operating license and to the performance of specific activities and programs necessary accordance with 10 CFR Part 54.17.

As there have been over 200 license amendments, temporary orders, and waivers, etc. for Diablo Canyon and over 400 of the same changes for SONGS, the public asks which plant design criteria is assumed as the baseline in the GEIS, and if there are any "temporary orders" in place at the time of license renewal application, must they be resolved into a "permanent" form before any consideration of their impact on extended operation and the license renewal process can continue? For example, onsite storage of radioactive waste was never considered when nuclear plants were licensed. When the local community asked that seismic issues be addressed in the onsite storage proceedings (known to the industry and NRC as ISFSI's) the NRC denied that contention and directed the local community to reopen the original licensing proceedings, even though a new active offshore fault was discovered in 2008 - making it the second active fault discovered after the original permits were granted. (A4NR-11-4)

Response: *The NRC's safety review of a specific license renewal is used to determine whether there is reasonable assurance that activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis (CLB). The CLB is the particular set of NRC requirements applicable to a licensed operating nuclear power facility.*

The CLB includes the applicant's written regulatory commitments for ensuring compliance with and operation within the applicable NRC requirements and the plant-specific design basis. Documents in the CLB include:

- *NRC regulations contained in applicable parts of Title 10 of the Code of Federal Regulations (specifically Parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 54, 55, 70, 72, 73, and 100) and associated appendices*
- *NRC orders*
- *safety and environmental license conditions*
- *technical specifications and environmental protection plans*
- *exemptions*
- *plant-specific design information, as documented in the most recent Final Safety Analysis Report (FSAR)*
- *NRC environmental reviews (EISs, supplements, and environmental assessments)*
- *the licensee's commitments remaining in effect that were made in docketed licensing correspondence, such as responses to NRC bulletins, generic letters and enforcement actions, NRC safety evaluations, or licensee event reports.*

The CLB changes as documents such as the FSAR or the technical specifications are revised or as the licensee's regulatory commitments change. As a result, the NRC requires that each year after submittal of the license renewal and at least three months before scheduled completion of the NRC review, the applicant submit an amendment to the renewal application that identifies any change to the CLB of the facility that would materially affect the contents of the license renewal.

The NRC is committed to ensuring that both spent nuclear fuel and low-level radioactive wastes are managed to prevent health impacts to the public. Spent nuclear fuel is currently stored at reactor sites in the spent fuel pools and/or in independent spent fuel storage installations

(ISFSIs). This practice is expected to continue until DOE is ready to take possession of the spent nuclear fuel. At this time, it is uncertain when this will happen.

Interim storage needs vary among plants, with older units having less available pool storage capacity than newer ones. However, given the uncertainty as to when a geologic repository will open and the lack of other options, it is likely that some sort of expanded spent fuel storage capacity beyond the original design capacity will be needed at all nuclear power plants.

On March 3, 2010, DOE submitted a motion to the Atomic Safety and Licensing Board to withdraw its application for a permanent geologic repository at Yucca Mountain, Nevada. In light of the uncertainty surrounding the use of Yucca Mountain, if another repository for spent nuclear fuel is proposed, an environmental impact statement would be prepared.

For spent nuclear fuel, the Waste Confidence Decision and Rule represented the Commission's generic determination that spent nuclear fuel can continue to be stored safely and without significant environmental impacts for a period of time after the end of the licensed life for operation of a nuclear power plant (after the permanent shutdown of the power reactor and expiration of the plant's operating license). This generic determination, codified in 10 CFR 51.23(a), meant that the NRC did not need to consider the storage of spent nuclear fuel after the end of a reactor's licensed life for operation in the National Environmental Policy Act (NEPA) documents that support its reactor and spent-fuel storage license application reviews.

On December 23, 2010, the Commission published a revision of the Waste Confidence Decision and Rule to reflect information gained based on experience in the storage of spent nuclear fuel and the increased uncertainty in the siting and construction of a permanent geologic repository for the disposal of spent nuclear fuel and high-level waste. In response to the 2010 Waste Confidence Decision and Rule, the states of New York, New Jersey, Connecticut, and Vermont, and several other parties challenged the Commission's NEPA analysis in the decision, which provided the regulatory basis for the rule. On June 8, 2012, the United States Court of Appeals, in New York v. NRC, 681 F.3d 471 (D.C. Cir. 2012), vacated the NRC's Waste Confidence Decision and Rule, after finding that it did not comply with NEPA.

In response to the court's ruling, the Commission issued CLI-12-16 on August 7, 2012, in which the Commission determined that it would not issue licenses that rely upon the Waste Confidence Decision and Rule until the issues identified in the court's decision are appropriately addressed by the Commission. CLI-12-16 provided, however, that the decision not to issue licenses only applied to final license issuance; all licensing reviews and proceedings should continue to move forward. In SRM-COMSECY-12-0016, dated September 6, 2012, the Commission directed the NRC staff to proceed with a rulemaking that includes the development of a generic EIS to support a revised Waste Confidence Decision and Rule and to publish both the EIS and the revised Waste Confidence Decision and Rule in the Federal Register within

24 months (by September 6, 2014). The Commission indicated that both the EIS and the revised Waste Confidence Decision and Rule should build on the information already documented in various NRC studies and reports, including the existing environmental assessment that the NRC developed as part of the 2010 Waste Confidence Decision and Rule. The Commission directed that any additional analyses should focus on the issues identified in the D.C. Circuit's decision. The Commission also directed that the NRC staff provide ample opportunity for public comment on both the draft EIS and the proposed Waste Confidence Decision and Rule.

In accordance with CLI-12-16, the NRC will not approve any site-specific license renewal applications until the deficiencies identified in the D.C. Circuit's decision have been resolved. Two license renewal issues that rely, wholly or in part, upon the Waste Confidence Decision and Rule are the "onsite storage of spent nuclear fuel" and "offsite radiological impacts of spent nuclear fuel and high-level waste disposal." Both of these issues were classified as Category 1 in the 1996 GEIS and the 10 CFR Part 51 final rule that was promulgated in 1996 (61 FR 28467, June 5, 1996), which codified the findings of the 1996 GEIS into 10 CFR Part 51, Subpart A, Appendix B, Table B-1. The draft revised GEIS that was published for public comment in 2009 (74 FR 38239, July 31, 2009) and the concomitant proposed rule (74 FR 38117, July 31, 2009) continued the Category 1 classification for both of these issues. As part of the NRC's response to the New York v. NRC decision, the NRC has revised these two issues accordingly.

Specifically, the NRC has revised the Category 1 issue, "Onsite storage of spent nuclear fuel," to narrow the period of onsite storage to the license renewal term. In both the 1996 GEIS and rule and the 2009 draft revised GEIS and proposed rule, the NRC relied upon the Waste Confidence Decision and Rule to make a generic finding that spent nuclear fuel could be stored safely onsite with no more than a small environmental impact for the term of the extended license (from approval of the license renewal application to the expiration of the operating license) plus a 30 year period following the permanent shutdown of the power reactor and expiration of the operating license.

The Waste Confidence Decision and Rule provided the basis for the 30 year period following the permanent shutdown of the reactor and expiration of the operating license. The 2010 Waste Confidence Decision and Rule extended this post-reactor shutdown onsite storage period from 30 years to 60 years. Given the New York v. NRC decision, and pending the issuance of a generic EIS and revised Waste Confidence Decision and Rule (as directed by SRM-COMSECY-12-0016), the period of onsite storage of spent nuclear fuel following the permanent shutdown of the power reactor and expiration of the operating license is now excluded from this GEIS issue. This issue now only covers the onsite storage of spent fuel during the license renewal term.

Similarly, the NRC has revised the Category 1 issue, "Offsite radiological impacts of spent nuclear fuel and high-level waste disposal." This issue pertains to the long-term disposal of spent nuclear fuel and high-level waste, including possible disposal in a deep geologic repository. Although the Waste Confidence Decision and Rule did not assess the impacts associated with disposal of spent nuclear fuel and high-level waste in a repository, it did reflect the Commission's confidence, at the time, in the technical feasibility of a repository and when that repository could have been expected to become available. Without the analysis in the Waste Confidence Decision, the NRC cannot assess how long the spent fuel will need to be stored onsite. Therefore, the NRC has reclassified this issue from a Category 1 issue with no assigned impact level to an uncategorized issue with an impact level of uncertain.

Upon issuance of the revised Waste Confidence Decision and Rule and its supporting generic EIS, the NRC will make any necessary conforming amendments to its regulations in 10 CFR Part 51 and supplement the GEIS as necessary. As referenced previously, the Commission will not approve any license renewal application for an operating nuclear power plant until the issues identified in the New York v. NRC court's decision are appropriately addressed by the Commission.

No change was made to the GEIS as a result of this comment

Comment: Operation and Maintenance Deficiencies Should be Addressed in the GEIS:

Recent NRC inspection reports on Diablo Canyon (August, 2009) indicate that PG&E is not meeting industry standards in its identification and resolutions of problems at the plant. In late October, 2009, it was discovered that for 18 months the plant was run with defective control of some of the valves relied upon to flood the Unit 2 reactor with essential cooling water in the event of a serious accident or sabotage. An NRC report on its findings has not yet been made available.

SLOMFP contends that a plant's mechanical and personnel history provide critical predictive information which the NRC must consider before extending the life of a nuclear facility. Yet, there is no resource area in the Draft GEIS that explores the plant's operation and maintenance record. This must be a Category 2 issue. (SLOMFP-13-2)

Comment: The Scope of the GEIS is Improperly Narrow: There are also limitations to the categories. What about a maintenance category? Where does the NRC look at maintenance history at each plant and analyze negative trends? (SLOMFP-13-9)

Response: *The NRC's safety review of license renewals considers the applicant's operating experience, including potential maintenance and corrective action issues, in assessing the applicant's capability to adequately manage the effects of aging during the period of extended*

operation. Ongoing NRC safety inspections also review operational and maintenance issues at each plant. Thus, an applicant's general operational history and maintenance record is outside the scope of the environmental review of license renewal, as it is covered in the safety review of license renewal. However, past operational and maintenance events at nuclear power plants having environmental impacts, such as fish kills or spills, would be addressed in the GEIS to the extent applicable to a given resource area. Should the magnitude of the environmental impacts of a past event at a particular site constitute new and significant information that would change the conclusion in the GEIS, the impacts would be addressed in a plant-specific SEIS. The response to Comment CEC 9(1)-10 discusses "new and significant information" in more detail. No change was made to the GEIS in response to this comment.

Comment: Section 2 – Procedural Issues: A. Public Involvement & Input Restricted – Recommended: The Honorable Gregory Jaczko's said in a speech entitled, "A Regulator's Perspective on New Nuclear Reactor License Applications," September 24, 2009 that, "NRC is built upon a solid foundation of a talented workforce dedicated to the safety and security mission of the agency, and guided by sound safety regulations. This solid foundation is *strengthened by public involvement and input,* and by our being open and transparent about what we do and why. I am confident that we can successfully meet these challenges in an effective way, with safety at the heart of our decisions." [Emphasis added]

3. NRC Staff: The adjudication technically is between two parties, the Applicant and the Petitioner.

Problem: The NRC Legal and Technical Staff in most, if not in all license renewal adjudications, take an active role similar to the two parties − filing motions, replies, etc. In most, if not all, cases to date the NRC has taken the side of the Applicant so that the Petitioner is placed at an unfair disadvantage – two parties against one. To make matters worse, the NRC Staff are not subject to discovery or required to provide complete disclosures and the ASLB relies upon the NRC legal staff to interpret or explain what the regulations mean.

Solution: The NRC Staff, just as any other outside party, should simply be allowed to file amicus briefs, as appropriate. (PW-6-23)

Comment: A4NR, et al, has reviewed the comments filed by Pilgrim Watch (PW) and supports all solutions proffered by PW. In addition, we have elaborated on certain PW comments and solutions below:

Problem: The NRC Legal and Technical Staff take an active role in all respects similar to the two parties - filing motions, replies, etc. In [virtually all] cases to date, the NRC has taken the side of the Applicant, so that the Petitioner is placed at an unfair disadvantage − 2 to 1.

PW Solution: The NRC Staff and any others should simply be allowed to file amicus briefs, as appropriate.

A4NR supports PW's solution. The public is often perplexed as to why the NRC's mandate "to protect public health and safety" manifests itself as the NRC pursuing every avenue to accommodate utility concerns. The public who provides insightful questions and expert information rarely, if ever, prevails in an NRC proceeding. In California the result has been costly proceedings (during licensing on seismic design adequacy, and during onsite waste storage security) where the public has prevailed in that the NRC was eventually directed to address their concerns. Yet the bottom line is that the NRC's determination to reinforce−rather than question − utility filings, and deny participation, hearings, experts, cross-examination and compensation to an informed public is not in the interest of democracy. (A4NR-11-25)

Comment: A4NR, et al, has reviewed the comments filed by Pilgrim Watch (PW) and supports **all** solutions proffered by PW. In addition, we have elaborated on certain PW comments and solutions below:

Problem: Petitioners noted internal inconsistencies in the regulations − one section contradicts another.

PW Solution: The regulations need to be updated to resolve inconsistencies and go out to comment before becoming finalized.

Example: The licensee is required to have an aging management program for components within scope. The question is how the aging management is judged. In Pilgrim's license renewal adjudication the adequacy of the Aging Management Program was judged simply on whether it provides "reasonable assurance" that the components will perform the functions outlined in 10 C.F.R. § 54.4(a)(1)-(3) - that is whether the components would function in a design base failure; or whether the standard also is to assure that the Current Licensing Basis (CLB) will be maintained throughout the renewal period based upon 10 C.F.R § 54.21 and 10 C.F.R § 54.29. Because there is a conflict in the regulations, inevitably the District Court of Appeals will have to decide - placing a burden on the parties.

A4NR, et al, fully support PW solution. As California's utilities have begun to apply for license renewals, A4NR will request that PW's solution be adopted and implemented before the state allows utilities to file. Absent this solution, the state faces exposure to the economic impacts from challenging possible regulatory discrepancies. In the decades since California's reactors were licensed, state agencies have had to use precious resources to challenge NRC decisions due to inconsistencies or inadequacies of NRC regulations, and a continuation of this policy is irresponsible. (A4NR-11-26)

Response: *The changes suggested by the commenters are beyond the scope of the GEIS revision and the related 10 CFR Part 51 rulemaking. In accordance with 10 CFR 2.802, any interested person may petition the NRC to issue, amend, or recind any NRC regulation.*

No change was made to the GEIS as a result of these comments.

Comment: Section 2 – Procedural Issues: A. Public Involvement & Input Restricted – Recommended: The Honorable Gregory Jaczko's said in a speech entitled, "A Regulator's Perspective on New Nuclear Reactor License Applications," September 24, 2009 that, "NRC is built upon a solid foundation of a talented workforce dedicated to the safety and security mission of the agency, and guided by sound safety regulations. This solid foundation is *strengthened by public involvement and input,* and by our being open and transparent about what we do and why. I am confident that we can successfully meet these challenges in an effective way, with safety at the heart of our decisions. "[Emphasis added]

6. Consistency: NRC changes the rules of the game during the adjudication process so that with the ground constantly shifting the Petitioner is placed in a losing situation. Consistency is required for public confidence.

Example: Docket 50-293, Pilgrim Watch, Contention 1:
The ASLB on October 16, 2006 accepted Pilgrim Watch's Motion to Intervene on Contention 1 and 3. Pilgrim Watch's Contention 1, as amended by the Board, stated, "The Aging Management program proposed in the Pilgrim Application for license renewal is inadequate with regard to aging management of buried pipes and tanks that contain radioactively contaminated water, because it does not provide for monitoring wells that would detect leakage.[18]"

[[18] Memorandum and Order (Ruling on Standing and Contentions of Petitioners Massachusetts Attorney General and Pilgrim Watch), LBP-06-23, 64 N.R.C. 257 (2006)]

Mid-stream, on October 17, 2007, December 19, 2007 and January 11, 2008, the ASLB considerably narrowed the original order saying that: the only issue remaining before this Licensing Board regarding Contention 1 is "...whether Pilgrim's existing AMPs have elements that provide appropriate assurance as required under relevant NRC regulations that the buried pipes and tanks will not develop leaks so great as to cause those pipes and tanks to be unable to perform their intended safety functions.[19]

[[19] Memorandum and Order, LBP-07-12, 66 N.R.C. (October 17, 2007) (Summary Disposition Order); Order Revising Schedule for Evidentiary hearing and Responding to Pilgrim Watch's December 14 and 15 Motions, LBP-06-848-02 N.R.C. (December 19, 2007); Order Denying Pilgrim watch's Motion for Reconsideration, LBP-06-848-02 NRC (January II, 2008)]

Further safety function was narrowly *re-defined* by the ASLB to the only thing that matters about such pipes and tanks is leaks that are so great as to permit a design base failure. The effect of the interlocutory decisions was to prevent Petitioner from including within scope a number of the key ways in which the Aging Management Program (AMP) did not provide reasonable assurance that radioactive or other leakage from buried pipes and tanks would comply with the current licensing basis ("CLB") during license renewal − the point. As a result, the adjudicatory process failed to consider the standard set by the CLB, the standard against which the AMP must be evaluated, and therefore the public has no assurance, reasonable or otherwise, whether the CLB will be maintained over the license renewal period. The ground constantly shifted. Again consistency is required for public confidence in the process. (PW-6-26)

Response: *The commenter expresseds disagreement with an Atomic Safety and Licensing Board's (ASLB) disposition of a safety issue admitted into the license renewal hearing for the Pilgrim Plant. License renewal safety issues in general, and matters that are or were before the NRC's ASLB, are outside the scope of the GEIS.*

No change was made to the GEIS in response to this comment.

Comment: The Alliance for Nuclear Responsibility would like to see a written agreement between Federal and state agencies and the legislature that all studies to determine if continued operation of California's aging reactors especially in light of recent seismic and erosion reports be completed, adopted and implemented before any consideration of extending licenses for San Onofre or Diablo Canyon.

Absent this written agreement, the public's participation in the process will be viewed as a mockery of the democratic process. (DPCA-A4NR1-37)

Response: *The NRC will consider any license renewal that is submitted in accordance with its regulations in 10 CFR Part 51 and 10 CFR Part 54. Although a licensee must renew its license to operate a reactor beyond the term of the existing license, the possession of a renewed license is just one of a number of conditions that must be met to continue operation. Once a license is renewed, other factors and entities such as State regulatory agencies and the owners of the nuclear power facility will ultimately decide whether the facility will continue to operate. This final decision will be based on economics, energy reliability goals, and other objectives over which the other entities may have jurisdiction. The fact that a State or other entity is engaged in energy resource planning activities or studying issues relevant to continued operation of the plant would not in and of itself cause the NRC to defer its own decision on whether an applicant meets NRC's requirements for a renewed license. No change was made to the GEIS in response to this comment.*

Comment: If the NRC renews the operating license, the decision on whether or not to continue nuclear plant operations will be made by the licensee and State or other Federal (non-NRC) decision makers. This decision would be based on economics, increased energy efficiency production and use, conservation, reliable generation and distribution of electric power, improved fuel diversity, and environmental objectives.

A4NR, et al, requests that the NRC clarify whether the decision to continue operations is a state issue. And if so, how can the NRC be entertaining PG&E's application while the state has recommended and mandated studies that would provide a factual basis on which to determine if an [additional] 20 years of operation and the resultant production of highly radioactive waste will be in the best interest of California's resource planning and future economical generation. (A4NR-11-13)

Response: *The NRC makes the decision to grant or deny a license renewal based on whether the applicant has demonstrated that the environmental and safety requirements in the NRC's regulations can be met during the period of extended operation. However, other agencies are in a position to specify conditions or reject permits that are required by the applicant for operation, such as the NPDES permit, which is administered either by a State or the U.S. Environmental Protection Agency.*

Although a licensee must renew its license to operate a reactor beyond the term of the existing license, the possession of a renewed license is just one of a number of conditions that must be met to continue operation. This is because the NRC does not have a role in the energy-planning decisions of State regulators and licensee officials. Once a license is renewed, other factors and entities such as State regulatory agencies and the owners of the nuclear power facility will ultimately decide whether the facility will continue to operate. This final decision will be based on economics, energy reliability goals, and other objectives over which the other entities may have jurisdiction. Moreover, given the absence of the NRC's authority in the general area of energy planning, the NRC's identification of a superior alternative does not guarantee that such an alternative will be used.

From the perspective of the applicant and the State regulatory authority, the purpose of renewing a license is to maintain the availability of the nuclear facility to meet energy requirements beyond the current term of the facility's license. Economic considerations have a significant influence on the decision to continue operation. For example, the need for power, an issue outside the scope of NRC's decision on license renewal, could be an important factor to State regulators in deciding whether the plant should continue to operate. However, the fact that a State or other entity is engaged in energy resource planning activities would not in and of itself cause the NRC to defer its own decision about whether an applicant met NRC's safety requirements for a renewed license.

No change was made to the GEIS as a result of this comment.

Comment: I'm affiliated with the Sierra Club, ECO SLO, Mothers For Peace, Alliance For Nuclear Responsibility, and the Committee For Unity With Nature of the Pacific Yearly Meeting of Quakers.

California law prohibits the licensing of new nuclear plants because there is no safe method for storing the waste. I contend that relicensing therefore is illegal, and an attempt at circumventing California law.

If we can't have newer, better designed plants, we certainly should not have these "old clunkers." All right. Relicensing this far in advance, anyway, is kind of ludicrous, and we're talking about doing it before the facts are in. What kind of thinking is that?

The GEIS talks about the fact that site-specific issues need to be identified by the plant operators. How can that be? It should be that the site-specific issues, in other words, the problems are the responsibility of NRC. (PBCA-Groot-36)

Response: *The NRC makes the decision to grant or deny a license renewal based on whether the applicant has demonstrated that the environmental and safety requirements in the NRC's regulations can be met during the period of extended operation. However, other agencies are in a position to specify conditions or reject permits that are required by the applicant for operation, such as the NPDES permit, which is administered either by a State or the U.S. Environmental Protection Agency. Although a licensee must renew its license to operate a reactor beyond the term of the existing license, the possession of a renewed license is just one of a number of conditions that must be met to continue operation. Once a license is renewed, other factors and entities such as State regulatory agencies and the owners of the nuclear power facility will ultimately decide whether the facility will continue to operate. With regard to the timing of license renewal, the NRC has determined that 20 years of operating experience is sufficient to assess aging and environmental issues at the site; therefore, an applicant may apply for a renewed license up to 20 years prior to the expiration of their current license.*

The NRC issued guidance to license renewal applicants (RG 4.2, Supplement 1) that called for the applicant to provide such information in its environmental report, a part of the license renewal. This is just a starting point, however. During the site-specific scoping process and the environmental review, the NRC is independently looking for any information from other sources, such as scientific studies, operating experience at other plants, and comments from other agencies, the public, and other stakeholders, that could demonstrate that there are unique characteristics related to the facility or the environment surrounding the facility that would lead to the conclusion that the generic determination for a particular issue is not valid for a specific

site. The NRC discusses and evaluates potential new and significant information in the SEIS. No change was made to the GEIS as a result of this comment.

Comment: We also, and I understand it would not, I assume it would not be appropriate at this point to talk about what I would consider procedural issues, such things as you talk about reasonable assurance often. I mean that's a buzz word throughout the NRC. I think it's one of, maybe the language, the first words you learn when you join the group or something, I don't know.

But that's a real problem with this because nowhere is it defined. We know reasonable assurance requires proof, but what level of proof? The NRC never says. And so, for example, if the bridge over in Minneapolis is rebuilt and they say well we have reasonable assurance at a level of 51 percent that this bridge isn't going to fall down in the next two months, versus well, you know, we have evidence that meets a standard of proof of, oh, 90 percent, then I think you would feel a little different going over that bridge.

But the NRC, although they do say, you know, technically, that it's a two-step process, what they fail to do is state what level of proof is required. Technical judgment, certainly that doesn't mean anything. Beauty is in the eye of the beholder, that's all [they] say. I'm sure the technical judgment of NEI is very different than the technical judgment of my experts. So I think until the NRC faces this issue, as has been faced in some other court cases where they came up with 95 percent, in medical cases, that you're saying, it’s mumbo jumbo, you’re not saying anything. (NMA-PW-17)

Comment: A4NR, et al, has reviewed the comments filed by Pilgrim Watch (PW) and supports all solutions proffered by PW. In addition, we have elaborated on certain PW comments and solutions below:

A4NR, et al, concurs with PW concerns relating to 'Reasonable Assurance." It has been the NRC's disingenuous treatment of public and state intervenors concerns relating to license renewal that prompted the formation of our organization. The NRC's decisions have economic and reliability impacts that are the sole jurisdiction of the states. Each time the NRC denies participation, ignores contentions, or rules against their own established rules, the public and the states must expend resources to protect their interests. All issues that could impact economic and reliable operation should be up to the states, which will ultimately pay for the impacts of the NRC's determination of "Reasonable Assurance" if "Sound technical judgment" is not related to a defined level of assurance backed up with verification − a clear preponderance of facts that the defined level of assurance will be met.

The NRC should create "Reasonable Assurance" where "Sound technical judgment" is related to a defined level of assurance back-up with verification − a clear preponderance of facts that

the defined level of assurance will be met. Absent the creation of this definition, A4NR will recommend that it is not in the best interest of economic and reliable energy planning to allow utilities to file license renewal applications. (A4NR-11-23)

Comment: B. Reasonable Assurance Standard: The Draft uses the term "reasonable assurance" throughout the document yet, like the NRC in other, contexts, the Draft never bothers to define exactly what "reasonable assurance" is supposed to mean.[20] We appreciate that there is a burden to prove "reasonable assurance" with a "clear preponderance" of the evidence *[North Anna Envtl., Coalition* v. *NRC,* 533 F. 2d 655,667-68 (D.C. Cir. 1976)]. It is a two-step process. It is necessary for NRC to define what level of assurance is "reasonable assurance." For example is it 51%, 99%, or some place in between? Absent a standard, the term "reasonable assurance" has no meaning.[21] For an analogy if the public were told that there was "reasonable assurance" that evidence showed that the rebuilt levees in New Orleans had a 51% probability to withhold water in a storm they would feel far less confident than if they were told that there was "reasonable assurance" from the evidence that there was a >90% chance that they would hold.

[[20] See Draft pages 69, 134, 453 and 455 where it refers to the NRC having “reasonable assurance" regarding emergency planning; dose commitments from gaseous radioactive waste; low level waste issues; and spent fuel issues.]

[[21] See: Pilgrim Watch Petition for Review of LBP-06·848, at 7, Adams Accession Number ML083240599; Pilgrim Watch Reply to Entergy's Answer in Opposition to Pilgrim Watch's Petition for Review, December 2008, at 2, Adams Accession Number ML083440445. Pilgrim Watch's Reply to Entergy stated that, "**Reasonable Assurance:** The fundamental dispute is whether reasonable assurance has been shown when the standard for "reasonable assurance" has not been defined. Entergy referred to cases saying that reasonable assurance is "sound technical judgment applied on a case-by-case basis" and "compliance with Commission regulations." However, what assurance must that "sound technical judgment" prove? "Sound technical judgment” that there is a 51% chance that the Minneapolis Bridge won't collapse during the next rush hour would not provide “reasonable assurance." "Sound technical judgment," that there is less than a 5% likelihood of the bridge collapsing, or of Pilgrim's buried pipes leaking during the license renewal term, might do so, if supported by a clear preponderance of the evidence. And as Judge Young said, the preponderance of the evidence does not define what level of assurance is "reasonable." (Concurring Opinion, LBP-06-848-02, p.55) "Sound technical judgment" must be related to a defined level of assurance and backed up with verification − a clear preponderance of facts that the defined level of assurance will be met. PW does not disagree that reasonable assurance "is not susceptible to a formalistic quantification or mechanistic application." But the potential consequences of a nuclear power plant failure are severe, and the Board did not define what level of assurance of on-going compliance with the CLB is required for that "assurance" to be considered "reasonable."] (PW-6-28)

Response: *Before a renewed license can be issued, the NRC must find, among other things, that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the Commission's regulations. Neither the Atomic Energy Act nor the NRC's regulations define the term "reasonable assurance." However, NRC case law (ASLB and Commission decisions) in the context of license renewal hearings have indicated that an applicant must demonstrate that it satisfies the "reasonable assurance standard."*

No change was made to the GEIS as a result of this comment.

Comment: Do you want me to say anything about finances or have I just said enough? Should we all go home?

Because I have some other real important procedural things maybe you might think about, one is participation with finances, that it seems that a certain percent of monies goes to Yucca Mountain, for example, or, you know, what have you. Well why not a percent, a very small percent, going into a kitty so those who are accepted into the adjudication process and meet a poverty level, that was me, could dip into it?

And I think it certainly would be, leave a better taste in the mouth of the Atomic Safety Licensing Board that you have a fairer presentation because I, for example, had to pay for everything out of my own pocket, and I'm not the only person who is doing stuff like this. And it does not even begin, when it's the Lampert back pocket versus Pillsbury, the NRC staff, Entergy, I don't call that a fair fight because I am very limited in the witnesses that I can hire, etcetera, etcetera, and I think this is reasonable.

I know the Canadian Government is doing things of this sort and it's been done in some states with the chemical industry and it's something you all ought to be thinking about. I also find a two to one fight unfair, that the NRC staff and sometimes, and I guess in a few of the adjudications on license renewal, has not said anything, but typically they have been on the side of the applicant. I do not understand why the NRC staff, just like anybody else, would simply be allowed to file amicus briefs and that's the end of it. I think that's something to consider. (NMA-PW-18)

Comment: Section 2 – Procedural Issues: A. Public Involvement & Input Restricted – Recommended: The Honorable Gregory Jaczko's said in a speech entitled, "A Regulator's Perspective on New Nuclear Reactor License Applications," September 24, 2009 that, "NRC is built upon a solid foundation of a talented workforce dedicated to the safety and security mission of the agency, and guided by sound safety regulations. This solid foundation is *strengthened by public involvement and input,* and by our being open and transparent about what we do and

why. I am confident that we can successfully meet these challenges in an effective way, with safety at the heart of our decisions. [Emphasis added]

2. Participation, Finances: In order to fulfill the Chairman's goals to assure "public involvement and input," lack of financial resources should not be an impediment for those accepted into the license renewal adjudication process to participate.

Problem: The expense of litigation (filings, including copying and mailing; witness fees; and legal fees) make it impossible for many, if not most, individual members of the public, public interest groups and local governments to participate in the process; or if they are able to take part in the process, to severely limit them in their ability to obtain the number and quality of expert witnesses required to put forward their case. Although rules say that, *Where an intervenor would call a witness but for the Intervenor's financial inability to do so, the Licensing Board may call the witness as a Board witness and authorize NRC payment of the usual witness fees and expenses. The decision to take such action is a matter of Licensing Board discretion which should be exercised with circumspection. If the Board calls such a witness as its own, it should limit cross-examination to the scope of the direct examination", Consumers Power Co. (Midland Plant, Units I & 2),-ALAB-382, 5 NRC 603, 607-08 (1977).* (Emphasis added).

The rule does not solve the problem. Because: (1) there are often sizeable expenses beyond witnesses − filing/copying fees and legal fees; and (2) "The decision to take such action is a matter of Licensing Board discretion which should be exercised with circumspection." This leaves it entirely up to the Board who at that point in the proceedings are not fully informed about the issue to be able to properly determine what is and what is not important for them to hear.

We know that "While NEPA does not require agencies to select particular options, it is intended to "foster both informed decision making and informed public participation, and thus to ensure the agency does not act upon incomplete information, only to regret its decision after it is too late to correct" *(citing Louisiana Energy Services* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 88 (1998).

Solution: The NRC should establish a "kitty" for Petitioners to draw upon for incurred expenses and establish guidelines for determining qualifications for assistance and amounts made available. (PW-6-22)

Comment: A4NR, et al, has reviewed the comments filed by Pilgrim Watch (PW) and supports all solutions proffered by PW. In addition, we have elaborated on certain PW comments and solutions below:

Another issue in PW comments with which A4NR is in full agreement: The problem of filing contentions in the relicensing procedure is that there are expenses beyond witnesses – filing/ copying fees and legal fees − and the sentence that "The decision to take such action is a matter of Licensing Board discretion which should be exercised with circumspection." So that it is not a real solution to the problem but it, in and of itself, indicates recognition that there is a problem.

The NRC should assess all licensees to establish a "kitty" for Petitioners accepted into the adjudicatory process and who meet a pre-determined qualifying financial level.

A4NR has provided California specific corroboration of financial challenges for the public:

California example of the problem as cited by PW**:** In the case of the proceedings to store highly radioactive waste in casks onsite at Diablo Canyon, the NRC denied several important issues. One, the adequacy of security at the proposed waste storage facility, was challenged by San Luis Obispo residents at a cost of close to $100,000. The federal circuit court ruled in the intervenors favor, but a timely and costly process was involved before partial reimbursement was granted.

The community was unable to simultaneously afford a challenge to the NRC's denial of its contention on seismic adequacy of the proposed storage site. Since that time the United State's Geological Survey has disclosed another major active earthquake fault, 1800 feet offshore and California legislators have mandated that further studies be initiated. This issue was also discussed on page 11 of A4NR comments.

A4NR, et al, additional solution*:* For over three decades the California Public Utilities Commission (CPUC) has provided intervenor funding for those organizations representing ratepayers who make a significant difference to the record. This process encourages public participation, rewards those who have provided valuable insights and creates a more open, transparent and inclusive record and an extra layer of economic protection for utility customers. The NRC would benefit from templating the CPUC intervenor compensation process.[4] The CPUC's Public Participation page begins with the following quote from Margaret Mead "Never doubt that a small group of thoughtful, committed citizens can change the world. In fact, it's the only thing that ever has." We believe this is also the position of the Obama administration and the NRC would benefit from Ms. Mead's mindset.

[[4] http://docs.cpus.ca.gov/published/REPORT/46182.htm#P319_12731] (A4NR-11-24)

Response: *The comments suggest that the NRC should assess licensees a fee or otherwise create a fund to compensate intervenors who participate in contested license renewal*

proceedings. The changes to the regulations and hearing procedures suggested by the commenters are beyond the scope of the Part 51 rulemaking and the GEIS revision.

No change was made to the GEIS as a result of these comments.

Comment: I think it's also important, well as I already started out with category one and category two, that basic issue there [see identifier NMA-PW-5 for the comment on this issue]. And what else? Hearings, I think all hearings should allow cross examination because the luck of the draw in who you get from the Atomic Safety Licensing Board, on how many questions will be asked to which party's witnesses, and whether the questions will be leading or not leading, and I'm not really, I don't mean to say anything against the board that I have, I'm not saying this, but I've talked to some other people and it is only reasonable that there should be allowance for cross examination and that the attorneys representing either party should not have to have duct tape over their mouths when they are there. That strikes me as not a reasonable procedure. (NMA-PW-19)

Comment: Section 2 – Procedural Issues: A. Public Involvement & Input Restricted – Recommended: The Honorable Gregory Jaczko's said in a speech entitled, "A Regulator's Perspective on New Nuclear Reactor License Applications," September 24, 2009 that, "NRC is built upon a solid foundation of a talented workforce dedicated to the safety and security mission of the agency, and guided by sound safety regulations. This solid foundation is *strengthened by public involvement and input,* and by our being open and transparent about what we do and why. I am confident that we can successfully meet these challenges in an effective way, with safety at the heart of our decisions. "[Emphasis added]

4. Hearings: Problem: During the so-called "informal hearings," the ASLB alone asks the party's expert(s) questions − obviously limiting the Intervenor's participation and input. This can present a problem because, again, the ASLB is not fully versed in the subject and may limit the discussion and risk acting upon incomplete or incorrect information.

Solution: Allow cross examination, and opening and closing statements at all hearings. (PW-6-24)

Response: *The changes suggested by the commenters are beyond the scope of the GEIS revision and the related Part 51 rulemaking. In accordance with 10 CFR 2.802, any interested person may petition the NRC to issue, amend, or recind any NRC regulation.*

No change was made to the GEIS as a result of this comment.

Comment: Unavoidable Adverse Impacts Should Not Be Accepted: In Section 14.14.1, Unavoidable Adverse Impacts are specified and simply accepted. The Draft GEIS reasons that

if an adverse impact can't be dealt with, the conclusion is that it is to be accepted. SLOMFP reasons that since there are so many generic unavoidable adverse impacts, license renewals should automatically be ruled out as too hazardous to the environment and the public to be acceptable. (SLOMFP-13-14)

Response: *As stated in Section 4.14.1 of the GEIS, the impacts of continued nuclear plant operations and refurbishment that are anticipated to occur are discussed for each resource area in Sections 4.1 through 4.11 of the GEIS. Some of these impacts cannot be avoided because they are inherently associated with nuclear plant operations and cannot be fully mitigated. Unavoidable adverse impacts would vary among plants and would depend on the specific characteristics of each plant and its interaction with the environment. These unavoidable adverse impacts would need to be evaluated in plant-specific SEISs. However, the key point is that it is the magnitude of the unavoidable adverse impacts of refurbishment and continued operations, not the fact that there will be unavoidable impacts, that may determine, in part, whether a renewed license will be issued. No change was made to the GEIS in response to this comment.*

Comment: Mitigation: Although Chapter 4 is titled Environmental Consequences and Mitigating Actions, we see nothing that requires any license renewal applicant to do anything to mitigate identified impacts. Throughout the revised GEIS there are numerous mentions of mitigation or mitigating strategies, however, we are left wondering who is responsible for implementing the mitigation. If the NRC identifies an impact as MODERATE or LARGE, who is responsible for mitigating or lessening the impact? The SEIS cannot simply identify possible mitigation and identify no party responsible for its implementation. The public expects and demands that all impacts be mitigated and that the applicant (i.e., the utility making the money while impacting public resources) be held responsible and accountable. (PIIC-8-10)

Response: *In plant-specific SEISs, the NRC evaluates the impacts of license renewal using information provided by the licensee in its environmental report and information gathered from various agencies, experts, and the public. On the basis of this evaluation, the NRC may suggest mitigation to reduce impacts. However, the NRC can only require a licensee to mitigate impacts of those actions that are within NRC's jurisdictional authority, i.e., safety-related actions. Other mitigation requirements may be imposed by those Federal and State agencies that have jurisdiction over affected resources. These mitigation requirements are often prerequisites for obtaining permits from these agencies. The NRC will not grant a renewed license unless the licensee has obtained all necessary permits for operations. No change was made to the GEIS in response to this comment.*

Comment: NRC's draft says that they based their decision on whether to change the categorization of issues in the 1996 GEIS on "new research, findings, and other information...considered in evaluating the significance of impacts associated with license

renewal." The purpose of their evaluation was, "to determine if the findings presented in the 1996 GEIS remain valid, in doing so, the NRC considered the need to modify, add to, or delete any of the 92 issues in the 1996 GEIS." (Summary, S·2, Scope of the Generic Environmental Impact Statement, lines 25-28)

PW Comment: It sounds well and good; but the "Devil is in the details." Reading NRC's statement carefully, it is clear that they committed to nothing. As their statement reads, they simply could have considered only a handful of articles. Clearly, we believe that NRC is responsible to base updates on all available current scientific information and it is evident that they did not do so. In fact it seems clear that research and documents containing "Inconvenient Truths" either were avoided or totally misrepresented.

Example: (1) Meteorology (Draft 3.3 Meteorology, Air Quality and Noise M3.12 References): The references for meteorology include simply NRC Reg. Guide 1.23, Rev 1 (March). Absent are all the new significant documents on plume modeling of complex sites from NRC, DOE, EPA, National Oceanic, and Meteorology Scientists published studies referenced, for example, in State Of New York's Motion For Summary Disposition On Use Of Straight Line Gaussian Air Dispersion Model For The Environmental Impact Analysis Of Significant Radiological Accidents At Indian Point And NYS Contention 16/16A, (DPR-26, DPR-64) August 28, 2009 and accompanying Declaration Of Bruce A. Egan, Sc.D., 18 forward and PW's Brief in Response to CLI-09-11, (Docket No. 50-292-LR, ASLPB No. 06-848-02-LR), June 25, 2009. (2) Health: absent, for example, is the German Governments KIKK case control study of infant leukemia around nuclear reactors. (PW-6-30)

Response: *With regard to the atmospheric modeling studies referenced by the commenter, the issue of atmospheric dispersion models used in SAMA analyses has been studied in detail. This included a detailed code comparison completed in 2004 with the objective of determining if the average atmospheric transport and dispersion results from so-called straight-line codes such as MACCS2 are sufficiently accurate that more complex models are not required. In that study, documented in NUREG/CR-6853, "Comparison of Average Transport and Dispersion Among a Gaussian, a Two-Dimensional, and a Three-Dimensional Model," results from the MACCS2 code were directly compared to those from the LODI (Lagrangian Operational Dispersion Integrator) code.*

As discussed in NUREG/CR-6853, this comparison shows that MACCS2 provides results consistent with those from the more complex plume models at distances up to 100 miles (161 kilometers). This is well beyond the 50-mile (80-kilometer) radius considered in the SAMA analysis. The MACCS2 predictions for average, time-integrated, ground-level air concentrations (which directly relate to inhalation and cloudshine doses), and for average deposition (which directly relates to groundshine and ingestion pathway doses) were very comparable (i.e., less than a factor of two) to predictions made by the state-of-the-art NARAC codes, ADAPT/LODI, at

all distances. The direct comparison to the state-of-the-art NARAC codes demonstrates that straight-line air dispersion modeling is well within its range of validity when used to perform SAMA analyses.

With regard to the health study cited by the commenter, the NRC's mission is to protect public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects (i.e., cancer and other biological impacts) of radiation on humans. The limits are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations (International Commission on Radiological Protection [ICRP], National Council on Radiation Protection and Measurements [NCRP], and the National Academy of Sciences [NAS]) and are conservative to ensure that the public and workers at nuclear power plants are protected. The NRC actively participates and monitors the work of these organizations as well as some of the radiation health studies conducted in the United States and internationally to keep current on the latest trends in radiation protection. The NRC did not review the study cited. The revised GEIS used existing NRC regulations, programs, and guidance (i.e., Regulatory Guides, Technical Specifications, effluent controls, REMP, inspection) as a basis to assess the potential impacts to human health and other environmental issues. Therefore, the validity of NRC's radiation protection standards and associated guidance is not within the scope of this rulemaking. If the NRC determines that there is a need to revise its radiation protection regulations, it will initiate a rulemaking. The rulemaking will be conducted in an open and collaborative manner that will include stakeholder participation.

No changes were made to the GEIS as a result of this comment.

Comment: Page 2-4: Refurbishment and Other Activities Associated with License Renewal. In the 1996 GEIS, the NRC assumed that licensees would need to conduct major refurbishment activities to ensure the safe and economic operation of nuclear plants beyond the current license term. Activities included replacement and repair of major components and systems, upgrades, and equipment. Replacement of many systems, structures, and components included steam generators and pressurizers for PWRs and recirculation piping systems for BWRs. It was assumed that many plants would also undertake construction projects to replace or improve infrastructure. Such projects could include construction of new parking lots, roads, storage buildings, structures, and other facilities.

The 1996 GEIS sent a clear signal to the nuclear industry to begin replacing components that *may* need to be replaced before a license renewal could be granted. The result was swift − applications for ratepayer funded replacement projects of large components that were designed to last the full original license term were filed sometimes as little as halfway through the original license term. Hence, the current GEIS draft statement that "Most nuclear plants have not

identified any refurbishment activities associated with license renewal" resulted from the GEIS 1996 "clear signal."

Yet the GEIS 1996 signal provided no assurance that these same parts will not need to be replaced again to ensure safe operations during license renewal periods. Thus, the NRC will be deciding license renewals based on the condition of components that had proven to be not as robust as initially promised and with no assurance replacements will last any longer. (A4NR-11-14)

Response: *The NRC disagrees with the commenter's assertion that the 1996 GEIS sent a "clear signal" to replace components prior to applying for license renewal. Licensees are responsible for maintaining operational safety and maintaining or replacing equipment as necessary to remain in compliance with applicable NRC requirements and the requirements of other Federal, State, and local authorities whether or not they seek license renewal. The timing of refurbishment activities is determined by need, not by the timing of the license renewal schedule. Thus, it is possible that some components that were replaced before submittal of a license renewal could require replacement again after the license was renewed at some time during the period of extended operation. To date, while several license renewal reviews have included refurbishment activities (and were addressed in the SEIS), most have not. However, even if not included in a license renewal, refurbishment activities requiring NRC approval would still receive an appropriate NEPA review under 10 CFR Part 51. No change was made to the GEIS as a result of this comment.*

Comment: The draft GEIS states that "Detailed analyses have not been performed for refurbishment actions in this GEIS revision. Instead, the impacts of typical activities during the license renewal term, including any refurbishment activities, are addressed for each resource area…"

The lack of a detailed analysis appears to be due to an absence of actual data on the operation of reactors beyond original licenses. The original 40-year license for Oyster Creek expired this year (2009). This spring, the NRC approved a very vigorously contested license renewal at Oyster Creek. Since we are barely 6 months into the operation of a relicensed reactor, there is lack of actual information on the continued need for refurbishment actions and other impacts of an additional twenty years of operation. In the months following Oyster Creek's relicense period, the reactor exceeded the number of unplanned shutdowns allowed by the NRC, including one incident barely weeks into the relicense period when Oyster Creek went into cold shutdown on April 25, after one of the plant's two transformers failed. The transformer that failed was a 30-year-old replacement that Exelon installed in February to replace another transformer that caught on fire on February 2. Plant operators declared an unusual event after the fire.

As another example, on October 5, 2009 it was disclosed that "in addition to Oyster Creek, affected plants [faulty clasps on spent fuel storage casks] include Millstone Power Station in Connecticut (relicensed 11/05), Susquehanna in Pennsylvania, Ginna in New York (relicensed 5/04), Brunswick in North Carolina (relicensed 6/06) and Cooper Nuclear Station in Nebraska. As dry cask storage is being imposed at all reactor sites it would appear that this is an issue that either must be resolved in GEIS proceedings and/or relegated to a Category 2 proceeding and mitigated to ensure that radioactive waste is being stored as safely as possible.

Therefore A4NR, et al, recommends all issues that the public and/or state question should be allowed in SEIS proceedings, even if the GEIS unilaterally deems issues to be "small". (A4NR-11-15)

Response: *Refurbishment actions at nuclear power plants would continue to be addressed in plant-specific environmental reviews. The lack of detailed analysis is not due to the absence of actual data on the operation of reactors beyond the original license. It is because these refurbishment actions would vary at each nuclear plant. As explained in Section 2.1.2 in the GEIS, refurbishment activities (e.g., steam generator and vessel head replacement) have already taken place during the current operating license term at a number of nuclear plants, and impacts have been accounted for in annual site evaluation reports, environmental operating reports, and radiological environmental monitoring program reports. These activities have been conducted for economic, reliability, or efficiency reasons during refueling or maintenance outages, and very few applications have identified any refurbishment activities associated with license renewal. The NRC acknowledged in the 1996 GEIS that licensees may undertake refurbishment activities for reasons of safety, economics, reliability, or efficiency. Section 2.1.2 of the GEIS has been revised to better explain this situation.*

As stated in Section 1.2 of the GEIS, the proposed action is the renewal of commercial nuclear power plant operating licenses. For NRC to determine whether the license should be renewed, an applicant is required to perform certain analyses to demonstrate that it can effectively manage the effects of aging and continue safe operations beyond its current licensing period, and to provide sufficient information for the NRC to determine whether continued operation of the nuclear plant during the renewal term would endanger public safety or the environment. These analyses include an assessment of the effects of potential age-related degradation on certain long-lived, passive systems, structures, and components. In the 1996 GEIS, the incremental aging management activities implemented to allow operation of a nuclear power plant beyond the original 40-year license term were assumed to fall under one of two broad categories: (1) surveillance, monitoring, inspection, testing, trending, and recordkeeping actions, most of which are repeated at regular intervals, and (2) major refurbishment actions, which usually occur infrequently and possibly only once in the life of the plant for any given item. The NRC finds that the discussion of environmental impacts from refurbishment activities in the 1996

GEIS are valid and conservative and describe impacts that are likely greater than—or at least equal to—the actual impacts from those activities during the license renewal term.

With respect to the commenter's recommendation, and regardless of the conclusions in the GEIS, the NRC is required by regulation (see 10 CFR Part 51.71(b) and 10 CFR Part 51.91(a)(1)) to address major points of view and all substantive comments and issues, that are within the scope of license renewal environmental review, raised by members of the public, environmental interest groups, and representatives of local, State, Tribal, and Federal government agencies during scoping and public comment periods on draft plant-specific SEISs.

Comment: Another part of the problem is that no matter how many people say we are not relicensing San Onofre, we are -- we are -- they are rebuilding it from the inside out and corporations do not invest money to do that unless they have every intention of continuing to operate and if they were actually rebuilding everything from the inside out, that would be terrible, but it would be better than what they're doing. Because what they are doing is rebuilding what they can see is broken. What about all the parts they cannot see? (DPCA-SHoffman-24)

Response: *Refurbishment activities are physical activities or changes to the facility or site that are undertaken to prepare a nuclear power facility for continued operation. These activities, which occur as needed, include enhanced inspection, surveillance, testing, maintenance and repair, replacement, and modification of plant systems, structures, and components. For some facilities, replacement of large components of the nuclear steam supply system (e.g., steam generator or pressurizer) may be necessary; repair or replacement of pumps, pipes, control rod systems, electronic circuitry, electrical and plumbing systems, or motors may be necessary as well.*

Not many facilities are expected to need refurbishment activities in connection with license renewal. Many applicants anticipate that they will replace components and conduct additional inspection activities within the bounds of normal facility component replacement and inspection. Few of the applications received to date have identified major facility refurbishment activities or modifications necessary to support the continued operation of the facility beyond the end of the existing operating license.

As part of the license renewal safety review, the applicant must confirm whether the design assumptions made during the plant's initial licensing about the length of time the plant would be operated will continue to be valid throughout the period of extended operation or whether aging effects will be adequately managed. The applicant must demonstrate that the effects of aging will be managed in such a way that the intended functions of "passive" or "long-lived" structures and components (such as the reactor vessel, reactor coolant system, piping, steam generators, pressurizer, pump casings, and valves) will be maintained during extended operation. For

active components (such as motors, diesel generators, cooling fans, batteries, relays, and switches) surveillance and maintenance programs will continue throughout the period of extended operation.

If additional aging management activities are needed, the applicant may be required to establish new monitoring programs or increase inspections. For instance, applicants should specify activities that need to be performed (such as activities related to water chemistry and inspections) to prevent and mitigate age-related degradation. These activities increase the likelihood that the program is effective in minimizing degradation and that a component is replaced if specified thresholds are exceeded.

Plant maintenance activities not associated with license renewal are outside the scope of the environmental review for license renewal. The NRC provides continuous oversight of nuclear power plants through its Reactor Oversight Process (ROP) to verify that they are being operated and maintained in accordance with NRC regulations. This oversight includes having full-time NRC inspectors located at the plant and periodic safety inspections conducted by NRC inspectors based in an NRC Regional Office. The inspections look at a plant's compliance with NRC's regulations, which include the following: plant safety (routine and accident scenarios), radiation protection of plant workers and members of the public, radioactive effluent releases, radiological environmental monitoring, emergency preparedness, radioactive waste storage and transportation, quality assurance, and training. The NRC has full authority to take whatever action is necessary to protect public health and safety.

No change was made to the GEIS as a result of this comment.

Comment: Trust Responsibility of the Federal Government; The GEIS was written in 1996, at a time when most federal agencies had well-developed and well-implemented Indian policies; the GEIS did not include any discussion of Indian tribes or how the NRC would work with Indian tribes to resolve or address any issues arising from power plant relicensing. It is quite disappointing that the revised GEIS does not recognize or mention tribes or tribal sovereignty. Federally-recognized Indian Tribes are governments, with unique legal and political standing and rights. Tribal governments are not State governments and are not local governments. Indian tribes enjoy a Government-to-Government relationship with all Federal Government agencies, which includes the NRC. There should be some recognition of this status in the revised GEIS and a statement that the NRC will endeavor to work with tribes on a government-to-government basis to try and address, and resolve any issues resulting from power plant license renewals. (PIIC-8-1)

Response: *While it is acknowledged in the GEIS that Federally recognized Tribes are key stakeholders, the role that Federally recognized Tribes play in the license renewal process is not as clear as it could be. Sections 3.7.1 and 4.7.1 of the GEIS have been modified in*

response to this comment to clearly emphasize the NRC's responsibility to consult with Federally recognized Tribes during the license renewal process.

A.2.1.16 Comments Concerning Issues Outside the Scope of License Renewal: Safeguards and Security; Emergency Preparedness; Need for Power; Aging Management; and Other Issues

Safeguards and Security

Comment: Plant Safety Culture: Concerns about safety culture problems at SONGS have increased in recent years and are well-documented. The NRC noted that the license renewal environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant and that safety and security matters are considered outside the scope of the license renewal review (GEIS, p. A-95). Investigations of the Columbia Space Shuttle disaster (2003) an[d] the Challenger Space Shuttle (1986) disaster disclosed major deficiencies in risk and safety assessments and management practices for these shuttle programs [that] developed over time. In its Response to Comments in the GEIS, Vol. 2, p. A-84 to A-85, the NRC staff noted improvements in the NRC's inspection and assessment procedures following the Davis-Besse reactor head degradation and NRC's enhanced Reactor Oversight Program to more fully address licensee safety culture. However, we strongly believe that a plant's safety culture merits reexamination during license renewal reviews, similar to the need for a reexamination of aging plant hardware. Therefore, a plant's safety culture should be included as a Category 2 issue for review on a site-specific basis. A plant's safety culture should be included in the assessment of the adequacy of the licensee's aging management plans and should be reevaluated on a plant-specific basis during license renewal reviews. (CEC-9(1)-7)

Response: *Following an event at the Davis-Besse nuclear power plant where the licensee determined that the causes that led to the event were indicative of a weak safety culture, NRC lessons learned pointed toward the need for additional NRC efforts to evaluate a licensee's safety culture (SECY-04-0111 and SECY-05-0187). As part of this effort, the NRC reviewed the agency's Reactor Oversight Process (ROP) to determine how it can be enhanced to more fully address safety culture. The NRC issued SECY-06-0122, dated May 24, 2006, which describes the safety culture initiative activities and the outcomes of those activities, including the changes made to the ROP to more fully address safety culture. The ROP safety culture changes were made to: (1) provide opportunities for the NRC to identify safety culture weaknesses and to encourage licensees to take appropriate actions before the plant experiences significant performance degradation, (2) provide criteria for considering when to request licensees to perform a safety culture assessment, and (3) provide guidance on how the NRC should evaluate a licensee's safety culture assessment and how to perform an independent NRC assessment of a licensee's safety culture.*

In response to a Commission Action Memoranda (NRC 2008c) issued February 25, 2008, the NRC expanded the Commission's safety culture policy to address the unique aspects of security. As a result of those changes, the Commission issued a revised policy statement on June 14, 2011 (76 FR 34773).

As safety culture is an issue covered under a current regulatory process, it is outside the scope of license renewal and, therefore, outside the scope of the GEIS. No changes were made to the GEIS as a result of this comment.

Comment: We need increased security around San Onofre because to take up what Berty was saying, the nuclear power plant is more vulnerable and more exposed right now to potential terrorist activities and I know that we pooh-pooh this and we stick our head in the sands, but Homeland Security after 9/11 designated the nuclear power plants as being prime targets. This facility is now open and exposed and more vulnerable than ever before. So, we -- you know, part of this whole re-licensing issue must take a look at the fact that nuclear power plants are potential targets for terrorists. (DPCA-CREED2-8)

Comment: One other point I know that one of the original targets of 9/11 was San Onofre. So, I mean it's just like Craig was saying. It's vulnerable. It is potentially not protected. It's a very unsafe situation just from the standpoint of national security. (DPCA-Scott-12)

Comment: Secondly, I'm concerned and this has been alluded to by a couple of the other people commenting tonight and I won't lie and claim that on a series of lunch breaks at my day job I was able to thoroughly read and memorize the entire 600-plus page document, but in reading over that document, I didn't see any mention of terrorism or national security implications of this technology. It would seem to me that a Generic Environmental Impact Statement that is intended to apply to every relicensing of a nuclear plant in America should be considering at a threshold level the potential for terrorist targeting of these plants as well as the nuclear proliferation implications at a time when we are seeing rogue regimes around the world obtaining nuclear weapons and terrorist organizations including al-Qaeda so far we hope being caught again and again attempting to obtain nuclear material which is ultimately obtained through the civilian commercial nuclear industry.

I think that the impact of proliferating this technology and participating in an international regime which makes this material more readily available with each plant that we license or relicense to these groups that are a threat to our national security that possibility -- and the environmental implications of that possibility because such a terrorist attack will clearly have severe environmental repercussions wherever it occurs and in a wide region around wherever it occurs, that potential really does need to be addressed in the environmental impact statement. (DPCA-Nader-21)

Comment: And the more of these meetings that I've gone to and listened to the experts talk and now, I become very conscious about nuclear power and I read about it everywhere in the world and all the plants and America is -- the thing that I know is that it's absolutely deadly and I don't think there's any protecting that plant down there. I mean I can walk right up to the wall every day and I just don't see even the Marines. I know in France they're going crazy. They're putting anti-aircraft guns and stuff around their plants because the whole country is powered by nukes and they're pretty frightened about the whole tourist activity. [Note: The second to last word, “tourist” was likely a transcription error and should have been “terrorist.”] (DPCA-Collamer-32)

Comment: A sampling of issues with the potential for very large environmental impacts, that should be studied on a site-specific basis includes -- I have a short list of just four here.

So these are things that we think should be somewhere on that B list, and in Category 2 or 3. One issue is terrorist attacks on vulnerable spent fuel pools. Environmental effects of a terrorist attack on spent fuel pools. That's not anywhere in there.

Neither are the environmental effects of terrorist attacks on dry casks. The NRC agrees with the Departments of Homeland Security, and the Department of Energy, that nuclear facilities are, by definition, targets of terrorists.

But the spent fuel pools at all these 104 plants were designed and built long before the age of terrorism, and they are not protected, adequately, by attack from air or other means.

So to ignore that vulnerable component when deciding what issues need Environmental Impact Statements, site-specific, seems irresponsible to us.

Similarly, the environmental impacts of sabotage from within a nuclear power plant, should terrorists gain entry, or infiltrate the workforce, is not among those to be assessed under either the generic or the site-specific rules. So these we see as omissions of very important matters. (PBCA-SLOMFP1-2)

Comment: And as a condition of relicensing the GEIS for nuclear power, license renewals should require that the licensee has the means to resist an attack on the reactor building, its supporting structure, and its spent fuel storage, from air, land and water, by a team of well-equipped terrorists; be prepared to pass tests and mock attack drills, which would demonstrate the adequacy of security; and many other aspects. (PBCA-Cochran-5)

Comment: So safe accommodation as the NRC claims. At [SONGS] and Diablo, the earthquake and tsunami dangers are completely different from any other plant, obviously [See identifier PBCA-Schumann-8 for the response to this comment. The comment is repeated here to preserve the commenter's continuity of thought.] But the same is true for terrorist aspects for any plant because of location and/or design of the plants.

And I want to quote from the report of the National Academy of Sciences from 2005, which addressed the issue of terrorism at -- and the meaning for spent fuel pools. And I quote here from that report.

It says: "The potential vulnerabilities of spent fuel pools to terrorist attacks are plant design specific. Therefore, specific vulnerabilities can only be understood by examining the characteristics of spent fuel storage at each plant." End of quote.

Furthermore, another 20 years of exposure to intense radiation and heat will likely cause further embrittlement of components such as pool racking and/or fuel cladding.

The G force that's generated in earthquakes depends largely on the strength of the quake and the distance from the epicenter.

So this aspect alone would require very different mitigation measures at different plants.

Accordingly, the safe accommodations of spent fuel storage on site depends on the different mitigation measures at each site and be evaluated at site-specific, the EIS.
(PBCA-Schumann-10)

Comment: And then as far as fending off terrorists at nuclear facilities -- anyway, the Honorable Dan Hirsch is the expert on this. You like that name, I be[t]. And I believe I heard something like the only scenario the NRC considered is if two or three people were armed and working together, or something.

There couldn't be four people getting together to pull any stunt now, could there?
(PBCA-Campbell-32)

Comment: Safeguards and Security: The NRC states that security issues are not tied to a license renewal action but are considered to be issues that need to be dealt with constantly as part of the current license (GEIS, p. 1-12). However, extending a plant's license to allow it to operate an additional 20 years changes the security threat by adding large quantities of spent fuel to the reactor site. These additional quantities of spent fuel could pose a richer and more attractive target for potential terrorists. License renewal results in a far greater accumulation of

spent fuel being stored at a reactor than was originally envisioned when the plants were first licensed.

The revised GEIS should recognize the increased potential for terrorist attacks on nuclear power plants and spent fuel storage facilities, including air attacks similar to those that occurred on Sept. 11, 2001. It should also recognize that plants located in densely populated areas or along major routes may be more attractive targets for such attacks than more remotely located plants. Until it can be proven that the nation's nuclear power plants, including control rooms and spent fuel storage areas, can withstand terrorist attacks or that nuclear plant operators can prevent them, environmental impact reviews for license renewal should include meaningful site-specific analyses of the potential risks and environmental impacts from large-scale terrorist attacks, taking into consideration the potentially affected population (i.e., residents, businesses, and workers) and available transport routes. Therefore, the potential impacts from sabotage or a terrorist attack on a plant should be considered Category 2, site-specific issues and should be included during a plant's license renewal environmental impact review. Although some of the security information pertaining to nuclear power plants must remain "safeguarded" information, sufficient information should be provided to the public during the license renewal review regarding whether all reasonable efforts are being made to minimize the risks and consequences of a potential terrorist attack. (CEC-9(1)-4)

Comment: Failure to Evaluate Terrorist Attacks**:** As noted above, the Atomic Energy Act, 42 U.S.C. § 2011 *et seq*., requires the NRC to ensure that nuclear power plants are secure against sabotage and other deliberate attacks. Specifically, the NRC must determine that the operation of a facility is "in accord with the common defense and security and will provide adequate protection to the health and safety of the public." 42 U.S.C. § 2232(a).

The federal government has acknowledged that there is a continuing and credible threat of terrorist attacks.[13] As President Obama recently said: "We are at war."[14] The attempted destruction of an airliner on December 25, 2009, reminds us that terrorist groups can and will continue to plan attacks on the country's vital interests.[15]

[[13] Obama Details New Policies in Response to Terror Threat, New York Times, Jan. 8, 2010. //www.nytimes.com/2010/01/08/us/politics/08terror.html?hp]
[[14]Obama: "We are at war." New York Times, Jan. 7, 2010. http://thecaucus.blogs.nytimes.com/2010/01/07/obama-review-revealed-significant-national-security-shortcomings/]
[[15]Obama says Al Qaeda in Yemen Planned Bombing Plot and He Vows Revenge. New York Times, Jan. 3, 2010. http://www.nytimes.com/2010/01/03/us/politics/03]

The Revised GEIS fails to address the real concerns raised by a potential terrorist attack on a nuclear power station. The Revised GEIS treats the threat of terrorism exactly as it does emergency evacuation and accumulation of spent nuclear fuel. It ignores it. Section 1.7.4 of the Revised GEIS states that the "NRC requires that nuclear power plants be both safe and

secure." The Revised GEIS then concludes that "Security issues ... are not tied to a license renewal action...." *Id.* Because security is deemed by the NRC to be independent of license renewal, "decisions and recommendations concerning safeguards and security at nuclear power stations are ongoing and outside the regulatory scope of this GEIS." *Id.*

This approach is illogical and inconsistent with NEPA. The purpose of an environmental review is to allow decision makers to know and understand the full range of potential impacts to public health and safety and the environment from a proposed action. Ignoring major impacts is a flat violation of federal law.

Clearly, since September 11, 2001, there has been a heightened awareness that nuclear facilities are at risk of terrorist attacks. Such an attack might target the reactor containment building of a nuclear generating facility, but it might also target potentially more vulnerable targets, such as the spent fuel pools, that have considerably less structural protection. As noted in a Princeton University study, a successful terrorist attack on a spent fuel storage pool at a large nuclear reactor could have consequences "significantly worse that Chernobyl."[16]

[[16] Reducing the Hazards from Stored Spent Power-Rector Fuel in the United States, Science and Global Security, 11:1-51, 2003, p. 2]

NRC cannot maintain that a terrorist attack on a nuclear power station is not a foreseeable risk. In fact, NRC itself has long recognized that nuclear power stations are potentially vulnerable to attack. As early as 1977, the agency's published design basis threat ("DBT") regulation explicitly acknowledged the possibility of attack. Final Rule, Requirements for the Physical Protection of Nuclear Power Reactors, 42 Fed. Reg. 10836 (Feb. 24, 1977).[17] In 1994, the DBT rule was amended to include vehicle based bomb threats. Final Rule, Protection Against Malevolent Use of Vehicles at Nuclear Power Plants, 59 Fed. Reg. 38889 (Aug. 1, 1994). Further, in 2002, the NRC itself ordered nuclear plant operators "to develop specific guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities using existing or readily available resources (equipment or personnel) that could be effectively implemented under the circumstances associated with loss of large areas of the plant due to explosions or fire, including those that an aircraft impact might create." Letter from J. Boska, NRC, to M. Balduzzi, Entergy Operations (July 11, 2007).[18] In fact, one emergency drill at the Indian Point assumed that the facility was attacked by terrorists using a hijacked 737 airplane.[19] Clearly, NRC cannot maintain that a terrorist attack is not foreseeable when the agency itself has foreseen it.

[[17] Similarly, the NRC's 1979 environmental impact statement including a section dealing with possible sabotage attacks.]
[[18] ML071920023.]
[[19] Final Exercise Report Indian Point, Oct. 24, 2004 (ML050190165) Appendix 4.]

Other federal agencies have publicly warned of the dangers of terrorist attacks on nuclear power stations. For example, on November 15, 2002, the FBI sent a bulletin to law enforcement agencies, warning them that Al-Qaeda's "highest priority targets remain within the aviation, petroleum, and nuclear sectors."[20] The 9/11 Commission's report revealed that Khalid Sheikh Mohammad, the mastermind of the 9/11 attacks, originally planned to hijack additional aircraft to crash into targets on both coasts, including nuclear power plants. The 9/11 Commission Report, at 154. As late as July 2001, the terrorists were considering attacking a specific nuclear facility in New York, which one of the pilots "had seen during familiarization flights near New York." *Id.* at 245.

[[20] Text of FBI Terror Warning, CBSNews.com (Nov. 15, 2002), http://www.cbsnews.com/stories/2002/11/15/attack/main529501]

In addition, on September 4, 2003, the United States General Accounting Office ("GAO") issued a report noting that the nation's commercial nuclear power plants are possible terrorist targets and criticizing the NRC's oversight and regulation of nuclear power plant security. GAO, Nuclear Regulatory Commission: Oversight of Security at Commercial Nuclear Power Plants Needs to Be Strengthened, GAO-03-752 (2003). The GAO weighed in again in 2006 in a separate report stating that, "[a]ccording to the [NRC]..., there continues to be a general credible threat of a terrorist attack on the nation's commercial nuclear power plants, in particular by al Qaeda and like-minded Islamic terrorist groups." Testimony Before the Subcomm. on Nat'l Security, Emerging Threats, & Int'l Relations, House Comm. on Gov't Reform, Nuclear Power Plants Have Upgraded Security, But the NRC Needs to Improve Its Process for Revising the DBT, GAO- 06-555T, at 1 (2006).

In 2005, the National Academy of Sciences released a report from a study it conducted at the request of Congress, with the sponsorship of the NRC and the Department of Homeland Security, of the security risks posed by the storage of spent fuel at nuclear plant sites. See Nat'l Acad. of Scis., Safety and Security of Commercial Spent Nuclear Fuel Storage; Public Report (2006) [hereinafter NAS Study]. Based upon information provided by the NRC, the National Academy of Sciences judged that "attacks with civilian aircraft remain a credible threat." *Id,* at 30 It noted that terrorists might choose to attack spent fuel pools because they are "less well protected structurally than reactor cores" and "typically contain inventories of medium- and long-lived radionuclides that are several times greater than those contained in individual reactor cores," *Id.* at 36. The National Academy of Sciences concluded that the storage pools are susceptible to fire and radiological release from a wide range of conditions, including intentional attacks with large civilian aircraft, *Id,* at 49, 57. According to a report prepared for Congress by the Government Accountability Office, the nation's nuclear power plants remain vulnerable to a terrorist attack. [21]

[[21] Nuclear Power Plants Efforts Made to Upgrade Security, but the Nuclear Regulatory Commission's Design Basis Threat Process Should Be Improved, March 2006, GAO-06-388.]

The threat of attack or sabotage to the nation's nuclear power stations is real and present. Terrorists are still attempting to create a "dirty bomb" or otherwise cause a deliberate release of radioactive material. On October 28, 2008, Dr. Mohamed ElBaradei, Director General of the International Atomic Energy Agency (IAEA), addressed the United Nations General Assembly and warned the world about nuclear terror: "The possibility of terrorists obtaining nuclear or other radioactive material remains a grave threat."[22] Dr. ElBaradei also warned of "the potential of terrorists targeting nuclear facilities."[23] He stated that the "safety and security of nuclear material is a legitimate concern of all States" and that "[t]he willingness of terrorists to commit suicide to achieve their evil makes the nuclear terrorism threat far more likely than it was before September 11."[24]

[[22] World At Risk − The Report of the Commission on the Prevention of WMD Proliferation and Terrorism, Graham & Talent (December 2008), http://www.preventwmd.gov, at 43.]
[[23] International Atomic Energy Agency, *Calculating the New Global Nuclear Terrorism Threat* (November 1, 2001) *available at* www.iaea.org/worldatom/Press/P_release/2001/nt_Pressrelease.shtml.]
[[24] *Id.*]

In December 2008, the Commission on the Prevention of WMD Proliferation and Terrorism (the "WMD Commission") reported: "Terrorist organizations are intent on acquiring nuclear weapons or...material...."[25] On September 10, 2008, New York City Police Commissioner Raymond Kelly testified to the WMD Commission that:

> Everything we know about al Qaeda tells us that they will try to hit us again, possibly the next time with a weapon of mass destruction. We must do everything in our power to stop them before it's too late.[26]

[[25] *Id.* at 43-44.]
[[26] *Id.* at 112.]

It is clear that the threat of terrorism is very real and the possibility of an attack or sabotage needs to be considered in any NEPA analysis.

An environmental impact statement, at a minimum, must contain an analysis of all relevant potential environmental impacts. "NEPA was created to ensure that agencies will base decisions on detailed information regarding significant environmental impacts and that information will be available to a wide variety of concerned public and private actors. *Morongo Band of Mission Indians v. Federal Aviation Administration,* 161 F.3d 569,575 (9th Cir. 1998)." *Mississippi River Basin Alliance v. Westphal,* 230 F.3d 170, 175 (5th Cir. 2000). As the Ninth Circuit stated:

> When we consider the purposes that NEPA was designed by Congress to serve, what was done here is inadequate. Congress wanted each federal agency spearheading a major federal project to put on the table, for the deciding agency's and for the public's view, a sufficiently detailed statement of environmental impacts and alternatives so as to permit informed decision making. The purpose of NEPA is to require disclosure of relevant environmental considerations that were given a "hard look" by the agency, and thereby to permit informed public comment on proposed action...

Lands Council v. Powell, 379 F.3d 738 (9th Cir. 2004).

NEPA mandates a full analysis of foreseeable impacts. Terrorism is a foreseeable threat to nuclear power facilities and related infrastructure. The Revised GEIS fails to contain the required impact analysis regarding continued accumulation of spent nuclear fuel, emergency evacuations, and the risk of terrorism. Therefore, important data is lacking in this GEIS and, until it is made available, this environmental impact document is incomplete. (CT AG-10-9)

Comment: Environmental Impacts of Attacks Should be Considered: All nuclear facilities have been identified as targets of terrorists by the NRC, as well as Homeland Security and other federal agencies. Yet this issue is excluded from consideration in the GEIS.

Furthermore, the obvious fact that a failure of security − i.e. a successful terrorist attack − has the potential for catastrophic consequences for the environment and human health is ignored.

SLOMFP is currently pursuing a legal challenge of the NRC in the Ninth Circuit of the U.S. Court of Appeals. The NRC violated both NEPA and a June, 2006 ruling by the Ninth Circuit Court in favor of SLOMFP when the regulators excluded from consideration credible attack scenarios on the dry casks at Diablo Canyon that could have devastating environmental impacts. Under NEPA, environmental impacts that are "reasonably foreseeable" and have "catastrophic consequences, even if their probability of occurrence is low" must be taken into account. The GEIS does not take into account the principles of this ruling by the second-highest court in the nation.

SLOMFP demands the NRC include acts of sabotage or terrorism in its Draft GEIS as Category 2, a large impact with site-specific needs and requirements. (SLOMFP-13-17)

Comment: B. Draft Incorrectly Determined That Emergency Planning & Safeguards are Outside Review in License Renewal:

2. SAFEGUARDS & SECURITY:

a. Security Belongs in Scope: The Draft says that safeguards and security shall not be looked at in license renewal unless a District Court of Appeals in that state has ruled otherwise. This is wrong for several reasons:

It runs counter to Chairman Jaczko's call for public involvement and input. Because unless the public at a particular site has considerable financial resources to hire an experienced attorney and funds for expert witnesses, the case is unlikely to be brought before the court; or if it is brought forward it is unlikely to be successful. Courts give deference to agencies and defer to its analysis unless it is without substantial basis in fact. However NRC relies on "studies" that are subject to safeguards so that it is not possible to show by independent analysis that the analysis lacks substantial evidence when the petitioner cannot see that evidence −Alice in Wonderland.

We know that the 911 Commission and NRC are aware that reactors are on the terrorist's hit list and if they were successful the consequences could be catastrophic. [See the Massachusetts Motion to Intervene in Pilgrim and [Entergy Nuclear Vermont Yankee] ENVY's License Renewal Application and the NYS Attorney General's Motion to Intervene in Indian Point's License Renewal Application expert testimony by Dr. Gordon Thompson]. The environmental impacts that must be considered in an EIS include those which are "reasonably foreseeable" and have "catastrophic consequences, even if their probability of occurrence is low..." 40 CFR § 1502.22(b)(1).

The fact that the likelihood of an impact may not be easily quantifiable is not an excuse for failing to address it in an EIS. NRC regulations require that "to the extent that there are important qualitative considerations or factors that cannot be quantified, these considerations or factors will be discussed in qualitative terms" 10 CFR § 51.71.

b. Security - a Category 2 Issue: Reactors vary in both vulnerability and their attractiveness as targets. For example:

<u>Vulnerability</u>: GE Mark I reactors' spent fuel pools are located outside primary containment, in the attic of the reactors with a thin roof overhead. Therefore they are especially vulnerable to acts of malice. NUREG 1738 says that containments in BWR Mark I reactors provide no substantial barrier to aircraft penetration from a mid-weight commercial aircraft; they did not model larger aircraft or smaller aircraft with explosives. We know, for example, that penetration of the containment is a step beyond penetration of the spent fuel pool that is outside primary containment. Also NUREG 1738 looked at Vermont Yankee's susceptibility to a severe earth

quake and said that in a strong quake it would be subject to seismic fragility. The damage from explosives is due from shock waves, comparable to a seismic event. NUREG 1738 went further and said as a result of a heavy seismic shock, the bottom of the spent fuel pool could fall out. It is a logical extension to predict the same could occur from explosives.

Attractiveness: Reactors near large population centers, such as Indian Point and Diablo Canyon, are especially attractive targets due to the potential devastation that a successful attack could cause. Likewise symbolic targets would have appeal, such as Pilgrim − located in America's Hometown − and TMI. Therefore, this is not a generic issue, all reactors cannot be treated the same. (PW-6-20)

Comment: Section 2 – Procedural Issues: A. Public Involvement & Input Restricted – Recommended: The Honorable Gregory Jaczko's said in a speech entitled, "A Regulator's Perspective on New Nuclear Reactor License Applications," September 24, 2009 that, "NRC is built upon a solid foundation of a talented workforce dedicated to the safety and security mission of the agency, and guided by sound safety regulations. This solid foundation is *strengthened by public involvement and input,* and by our being open and transparent about what we do and why. I am confident that we can successfully meet these challenges in an effective way, with safety at the heart of our decisions. "[Emphasis added]

7. *Safeguards & Security:* The Draft says that safeguards and security shall not be looked at in license renewal unless a District Court of Appeals in that state has ruled otherwise. Problem: (1) Unless the public or government agency/department at a particular site has the financial resources to hire an experienced attorney and funds for expert witnesses, the case is unlikely to be brought before the court; or if it is appealed, to be successful. This runs counter to Chairman Jaczko's call for public involvement and input. (2) Safeguards and security are not issues that are necessarily limited to a District Court's jurisdiction. The National Academy of Sciences and Attorney Generals of Massachusetts, New York, Connecticut and California have demonstrated that the consequences, for example, of an attack on a spent fuel pool could be devastating for hundreds of miles and to our nation's economy as a whole. Solution: Fairness dictates that safeguards and security should be looked at in license renewal as a Category 2 issue. (PW-6-27)

Comment: Inadequate Assessment of the Environmental Consequences of Severe Accidents: Continued Failure to Specifically Address the Risk of Intentional Acts of Sabotage: The Revised GEIS maintains that "the risk of a successful terrorist attack (i.e., one that results in a zirconium fire) is very low."[84] Notably, the NRC continues to rely upon Sandia National Lab studies that are classified as "sensitive security related" and, thus, not available to the public, to support its conclusion that environmental consequence of a terrorist attack would be adequately mitigated.[85] Accordingly, NRC folds this issue into its generic determination that the impact of

severe accidents is "small," and would continue to not require any site specific analysis, including SAMAs related to terrorist attacks.

[[84] Revised GEIS Appendices at E-35.]
[[85] *See id.* at E-36.]

However, ample evidence undermines the NRC's conclusions here. Firstly, the Revised GEIS downplays the potential risk of terrorist attack on nuclear power plants. Numerous reports indicate that nuclear power plants remain likely targets of terrorist attacks. The 9/11 Commission Report revealed that the mastermind of the 9/11 attacks had originally planned to hijack additional aircrafts to crash into targets, including nuclear power plants, but wrongly believed the plants were heavily defended.[86] This report indicates that the terrorists were considering attacking a specific nuclear facility in New York which one of the pilots had seen during a familiarization flight near New York.[87] This was likely Indian Point, especially given the fact that almost 20 million people live within 50 miles of the facility.[88] In the years since the 9/11 attacks, the federal government, including the NRC, has repeatedly recognized that there is a credible threat of intentional attacks *on* nuclear power plants.[89] Notably, existing nuclear power plants in the United States were built between the 1950s and the 1980s and were not intended to be able to withstand the impact of aircraft crashes or explosive forces, thus, making success of a potential terrorist attack a credible possibility.[90]

[[86] Nat'l Comm'n on Terrorist Attacks Upon the U.S., *The 9/11 Commission Report* (2004), at 154 ("9/11 Commission Report").]
[[87] 9/11 Commission Report at 245.]
[[88] *See, e.g.,* Witt Report at 4, 81-82.]
[[89] *See, e.g.,; Wide-Ranging New Terror Alerts,* CBS News.com (May 26, 2002), *available at,* http://cbsnews.com/stories/2002/05/24/attack/main510054.shtml (discussing heightened alert of the U.S.'s nuclear power plants as a result of information gained by the intelligence community); *FBI Warns of Nuke Plant Danger,* CBS News.com (May 1, 2003), *available at,* http://www.cbsnews.com/stories/2003/09/04/attack/main57I556.shtml (discussing FBI warning to nuclear plant operators to remain vigilant about suspicious activity that could signal a potential terrorist attack); General Accounting Office, *Nuclear Regulatory Commission: Oversight of Security at Commercial Nuclear Power Plants Needs to be Strengthened,* GAO-03-752 (2003) (noting that U.S. nuclear power plants are possible terrorist target, and criticizing the NRC's oversight of plant security); *FBI's 4th Warning,* CBS News.com (July 2, 2004) (discussing FBI warning of recent intelligence showing Al-Qaeda interest in attacking nuclear plants).]
[[90] *In re All Nuclear Power Reactor Licensees,* DD-02-04 (Nov. 1, 2002), *available at* http://www.nrc.gov/reading-rm/doc-collections/petitions-2-206/directors-decision/2002/mI022890031.pdf; *NRC: Nuclear Power Plants Not Protected Against Air Crashes,* Associated Press (Mar. 28, 2002).]

Furthermore, as discussed above, the Revised GEIS continues to underplay the severity of consequences of spent fuel pool fires that could result from an intentional attack. For example, at Indian Point, the impacts of terrorist attack would be far ranging. Such impacts are explained in a report prepared on behalf of Riverkeeper in connection with Riverkeeper's Petition for Hearing in the Indian Point relicensing proceeding by Edwin Lyman, entitled, *Chernobyl on the Hudson? The Health* & *Economic Impacts of a Terrorist Attack at the Indian Point Nuclear*

Power Plant. This report is attached hereto in support of the comments made herein, for your consideration in the instant rulemaking proceeding, as Exhibit G.

Once again, the existence of mitigation measures which have been implemented to reduce the risk of intentional attack only highlight the fact that a comprehensive site-specific assessment as part of the NEPA process has never been performed, and is greatly needed here.[91] The inadequate assessment of intentional attack on nuclear power plants, thus, further erodes the NRC's basis for concluding that the consequences from severe accidents are categorically "small for all plants."

[[91] *See generally* Riverkeeper's IP DSEIS Comments at 26-33.]

Additionally, it is crucial that NRC require consideration of intentional attack in licensee and NRC Staff SAMA analyses. Failure to do so will once again lead to highly inaccurate results.[92] For example, in the Indian Point relicensing proceeding, in the first step the SAMA analysis (i.e., establishing the baseline of severe accidents), Entergy and the NRC Staff did not consider the contribution to severe accident costs made by such intentional attacks at Indian Point. [93] The present value of cost risks for an attack at an Indian Point reactor and its pool exceeds half a billion dollars, which would warrant significant expenditures on SAMAs.[94] The present value of cost risks for an attack on a reactor alone are also significant − $62 million to $73 million.[95] However, relevant SAMAs with a value of this magnitude were not considered.

[[92] *See generally* Thompson Report.]
[[93] Indian Point Draft Supplemental EIS § 5,2; Entergy's Environmental Report at § 4.21.]
[[94] *See* Thompson Report at 45-46, Table 7-7, Section 9.]
[[95] *Id.* at 49.]

It is, thus, clear that the failure to consider the risk of intentional attack renders the required SAMA analysis highly inaccurate. (Riverkeeper-20-15)

Comment: The security issue for these categories, they're not really clearly listed as to where security falls, and whenever they talk about security the paper, they always talk about the plant, they're not talking about the spent fuel pools, and cesium fires from the spent fuel pools is a very real danger, especially as you have allowed them to compromise the safety distance with double racking, and I understand there's a proposal for triple racking. (PBCA-Pinard-20)

Response: *The NRC disagrees with the commenters that security issues at nuclear facilities, including SAMAs relating to terrorist-initiated events, should be addressed in the revised GEIS. Security-related issues are addressed as a current operating issue, rather than a license renewal issue. As a result of the terrorist attacks of September 11, 2001, the NRC conducted a comprehensive review of the agency's security program and made further enhancements to security at a wide range of NRC-regulated facilities. These enhancements included significant*

reinforcement of the defense capabilities for nuclear facilities, better control of sensitive information, enhancements in emergency preparedness to further strengthen NRC's nuclear facility security program, and implementation of mitigating strategies to deal with postulated events potentially causing loss of large areas of the plant due to explosions or fires, including those that an aircraft impact might create.

The NRC routinely assesses threats and other information provided by a variety of Federal agencies and sources. The NRC also ensures that licensees meet appropriate security-level requirements. The NRC will continue to focus on prevention of terrorist acts for all nuclear facilities and will not focus on site-specific evaluations of speculative environmental impacts resulting from terrorist acts. While these are legitimate matters of concern, the NRC will continue to address them through the ongoing regulatory process as a current and generic regulatory issue that affects all nuclear facilities and many of the activities conducted at nuclear facilities. The issue of security and risk from malevolent acts at nuclear power facilities is not unique to facilities that have requested a renewal of their licenses.

With regard to malovelent acts or sabotage, it is the NRC's position that malevolent acts or sabotage are speculative and beyond the scope of a NEPA review and are, therefore, outside the scope of the GEIS. The NRC believes that the consequences of events initiated by malevolent acts or sabotage would be comparable to or bounded by the severe accidents considered in the GEIS. At present, however, the NRC will consider malevolent acts or sabotage as part of a license renewal environmental review for plants located within the jurisdictional area of the U.S. Court of Appeals for the Ninth Circuit, as a result of the Ninth Circuit decision in San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016 (9th Cir. 2006). For additional discussion, see Appendix E, Section E.3, of the revised GEIS.*

Comments relating to spent fuel pools are addressed in Section A.2.1.10 of this appendix. Comments relating to emergency preparedness are addressed later in this section.

No change was made to the GEIS as a result of these comments.

Comment: The NRC should adopt in the GEIS the same rules and regulations regarding safeguards and security as were adopted by the Commission for *newly* proposed reactor designs and sites. If the *new* reactor safety and security standards are deemed necessary to protect human health and the environment, then such standards should be applied retroactively to any reactor that will continue to operate beyond its original license, or the licensee must demonstrate how the existing reactor meets those newer standards. The very fact that the NRC has a newer and more stringent standard for reactor safety going forward is a tacit admission that those of the past must be somehow inadequate. (A4NR-11-9)

Comment: I am a member of Mothers For Peace. But Jane speaks for us. I'm speaking as an individual
I who lives within a very short distance of the plant, and I wanted to go over some things that I noticed also.

The NRC should adopt in the GEIS the same rules and regulations regarding safeguards and security as were adopted by the Commission for the new proposed reactor designs and sites.

If the new reactor standards are deemed necessary to protect human health and the environment, then such standards should be applied, retroactively, to any reactor that will continue to operate beyond its original license, or the licensee must demonstrate how the existing reactor meets those newer standards.

We should not have lesser standards because our plant was built 20 years ago. The very fact that the NRC has a newer and more stringent standard for nuclear safety, going forward, is a tacit admission that those of the past must somehow be inadequate. Otherwise, I would assume they would not have put those into being. (PBCA-Cochran-3)

Comment: I'm a Down-Winder because I live in La Jolla and we are requesting that when the standards are looked at all existing plants be subject to the same standards as all new plants. Because if new plants have to meet standards, it would make sense that those were the standards that were in place to protect public health. So, all existing plants should meet those standards. (DPCA-A4NR-14)

Response: *With regard to applying the standards for new nuclear power plants to those that have already been built, the NRC believes that its safeguards and security requirements for operating licenses are comprehensive and robust to assure continued safe operation. The safe operation of nuclear power plants, which includes security-related issues, is not limited to license renewal but is dealt with on an ongoing basis as a part of the current operating licenses. Safety and security inspections are and will be conducted throughout the operating life of the plant, whether during the original or renewed operating license term. If issues are discovered at a nuclear power plant, they are addressed immediately, and any necessary changes are incorporated into the current operating license. As such, the regulatory safety oversight at operating reactors is ongoing and outside the regulatory scope of license renewal. No change was made to the GEIS as a result of these comments.*

Emergency Preparedness

Comment: My basic comment right now although I have – there are many issues of concern, but one of the issues that I'm particularly focusing on right now is the fact that nowhere do I see a change or an increase in a discussion on public preparedness and evacuation.

Three years ago, Chris Shays' committee in Congress had a hearing whereby the NRC stated that their responsibility was the nuclear power plant. FEMA who was also present, their responsibility was the disaster relief and clean up.

Shays mandated that FEMA do evacuation feasibility studies specifically for Indian Point, I think it was Turkey Point in Florida or in New York I guess and then one in Florida and San Onofre.

Those of you, and I use to live in San Clemente, know that there is no evacuation from San Clemente. How in the -- you know, how on earth could they build a nuclear power plant in an area where there is no feasible evacuation in the event of any incident.

A number of us have been working trying to comment or contact our elected officials because we've discovered that unless you live in San Clemente or possibly San Juan Capistrano you do not know what to do in the event of a nuclear incident. This is a fault in the licensing standards that there is not a component that extends the emergency planning preparedness beyond a ten-mile radius given the current population status.

A comment was made by River Keepers that was put forth to the NRC taking a look at Indian Point because it's ten miles from New York or 30 miles from New York City.

I don't know how many people were here when they had the fire in San Onofre, but the ash went to Mission Viejo, Laguna Woods, Laguna Hills, Laguna Beach and that's way beyond the ten-mile radius.

So, to set an artificial limit of the emergency protection zone to ten miles is a flaw in the system and I think that when they start the licensing and licensing renewal practice, they have to do a much more realistic evacuation planning. To not be able to have an evacuation plan is totally unacceptable and would be reason to halt the current retrofitting of the steam generator at San Onofre right now until some sort of public preparedness is created.

We've sent this memo to a number of our state legislators and I'm going to read it because I don't see Carla Mays or Erin Moran here to read this document. It won't take long.

"We are calling for the project to be halted until there are safety fairs training, iodine pill distribution, mailers, PSAs in the media on the current Songs project and nuclear preparedness. There needs to be an increase in funding of the agencies specifically for this task and a mandate for immediate implementation."

I talked to Donna Buxton who is head of the Orange County Emergency Operations Center. She's very frustrated that they have no resources to do any public training, get out the

information on a potential nuclear accident. I'm hoping to address this to the Orange County Board of Supervisors.

It is critical that we have an educated public in the event of an accident. Wholesale panic would be -- would create a disaster worse than Katrina.

It's important that this education and community preparedness be extended beyond just Orange County and San Diego County but also to Riverside County, San Bernardino County and Los Angeles. (DPCA-CREED2-7)

Comment: We would like to see more public participation and more public hearings before any extension of the licensing period especially for San Onofre given the fact that there is little or no community education, public preparedness and I'm not talking about the first responders. I'm talking about you, me and the rest of the citizens so that they know what to do.

Whether our schools are prepared. Do they have the iodine pills at the various schools? Do they have the transportation set up? Do the school buses know what -- you know, do the schools know what to do with the children in the event of an incident?

I think probably only in San Clemente and San Juan Capistrano, but what about Mission Viejo, Laguna Hills, Laguna Niguel and beyond.

There should also be radiation detectors in public buildings at least within a 50-mile radius. We don't know. There needs to be some sort of detection that expands outside of just the nuclear power plant for public safety. (DPCA-CREED2-9)

Comment: If you're going to take a periphery of public evacuation, in other words, how much area should you consider, should the NRC consider for the public being evacuated, I would see Three Mile Island. In other words, how much land was involved? Was that a hundred mile periphery? Et cetera. Et cetera. And then the other one is Chernobyl. Those would be the two that I would definitely look at.

And it wouldn't -- like Craig said, it wouldn't just be ten miles. It would be a lot more than that. I mean Chernobyl is, as you know, a very notorious situation. (DPCA-Scott-13)

Comment: A lot of people have an agenda here and I'm well aware of that and I'm not too naïve, but basically there's a few concerns of mine and I already mentioned a few of them, but safety is the biggest one and I went to a previous meeting and there were no evacuation plans in place. There were safety like plans. As people have commented, there were no like drills and I don't know if that's going to change. Hopefully, after this meeting, that would be great.

But, since I live in Southern California, I'm concerned about this region although I'm concerned about other parts of the region. (DPCA-Costa-17)

Comment: It doesn't particularly reassure me either to know that the Federal Government's zone of responsibility is only ten or 15 miles from the plant or to know that within that zone of responsibility, the Federal Government would take responsibility for evacuation or for emergency response.

And my first comment on the draft Generic Environmental Impact Statement is that the more realistic impacts of an accident no matter how unexpected that accident might be **--** accidents by definition are unexpected. If you expected them, they wouldn't be accidents. Right? No matter how unexpected that accident might be, the impacts to be reviewed and considered need to include the impacts outside of your ten or I5-mile zone.

The ones that -- a more realistic reading of history shows us -- in the case of Chernobyl, I believe it was about 1200 miles away. I realize that Chernobyl was a somewhat different technology. It was the Soviet Union which we hope had laxer and less accountable standards than America, but it does illustrate what can happen if something goes unexpectedly wrong with this technology and I don't think it's adequate or sufficiently reassuring to simply dismiss it by saying that we don't expect it to happen. (DPCA-Nader-20)

Comment: So, let me share some things that have happened in these meetings. About five years ago, there was a NRC hearing and there was a representative from FEMA at that hearing. There's been a lot of talk about evacuation tonight. So, I asked the gentleman from FEMA to please explain to me how he would evacuate at 5:00 on a Friday before a holiday and his answer was that's not a fair question. I think that's a really fair question because accidents as the eloquent gentleman before me just pointed out are accidents. We do not know when they will happen and the idea that we could evacuate the area around San Onofre is ludicrous. Could never be done.

It couldn't be done on a Wednesday morning at 10:00. Because as soon as anybody got wind of the problem, the roads would be a parking lot and not just in the immediate area of San Onofre. All the way to San Diego. All the way to Los Angeles. All the way to Las Vegas. So, evacuation is just one part of the problem. (DPCA-SHoffman-23)

Comment: Naturally, I'm concerned about the evacuation. The fact that the only way you can go south out of here is down one road is frightening because of our -- because of Camp Pendleton and the only way I know of to get out of here going the other is Pacific Coast Highway or the same freeway and I know what it's like. I commuted to Irvine for many years when I taught there and I can tell you that one accident of moderate severity and maybe no injuries can tie up that freeway for hours and I have made the mistake more than once of getting

off thinking I could do better. I probably don't need to tell you what happens because you probably have the same problem. (DPCA-Exelby-31)

Comment: Now, about public safety and the citizens of San Clemente knowing about this, that has been explained in detail, but the public's never there. I'm usually -- me and about four other citizens are the only ones in the room and everybody else is explaining. All of the first respondings and I'm telling you they really have thought about this, but the public I don't think knows it and according to what I've heard tonight, I would -- and that meeting I went to, that was two years ago when I heard that one. When they did get up and explain all that. (DPCA-Collamer-34)

Comment: Evacuation planning. The exact comment that was made about getting out of an area around San Onofre on a Friday afternoon at 5:00 was said 20 years ago. We still don't have an answer for it now.

Being a resident of Laguna Beach, when the evacuation plans were set up, Laguna Beach residents were told that they were going to be hosts for people that would have be evacuated and the city council of Laguna Beach said hosts? We're leaving, too.

So, we haven't come up with the solutions to these problems and we're adding new ones and the new one that I would particularly like to address today is the containment structure of San Onofre [see identifier DPCA-PACK-44 for the comment on San Onofre]. (DPCA-Pack-43)

Comment: The other thing is regarding the testing of the emergency preparedness out at Diablo and at all of the plants.

When I was a supervisor, I had the privilege, actually, of being part of that, and I think I was never more surprised in my life, at some of the shortfalls that were there.

Let's start with the first one. The first one is they're always scheduled everybody always knows when they are. It's 8:00. The donuts and coffee will be ready by 7:30. Okay.

What happens on a holiday? What happens when it's not convenient for everybody?

You're not taking into account what we have seen happen in real emergencies, and that is the kind of, "Oh, my gosh, where's so and so?" I don't think you even know where all your emergency personnel live, at a moment's notice.

And how are you going to get them in when you have people trying to get out?

I saw the people in charge, in the control room, double-counting buses, saying, oh, we'll get the students out from Cal Poly with buses, and then I'm kind a going, How many do you have? And now we have even less. Okay.

Things that, if it were a random time, where are your bus drivers? Where are the buses? It's never done random and it needs to be done at least once when everybody isn't totally ready for it. Because what we have seen around the United states, in Katrina, under a chlorine cloud in the Midwest, was that what was predicted to happen did not happen.

Now we can't make sure that everything's going to be perfect, but you can at least run through a mock effort when everything isn't stacked in your favor, and see what happens, and then deal with the best that you can do.

And I know that's all we'll ever be able to do. But people have got to stop talking as though everybody's going to be taken care of -- rest homes, prisons, and everything. It's not going to happen. And you all know that.

So the lead people, to not be prepared for the best available that they can do, is really going to only add to confusion, not solve it, or mitigate it. (PBCA-Pinard-19)

Comment: Someone needs to point out that we are failing. We're failing on many levels. Let me give you your report card to the nuclear industry, the NRC, and nuclear technology, in general.

Disaster response capability. F. We can have an earthquake or a human error at Diablo, and experience catastrophic damage here. Our nation is not good at responding -- I like what Peg Pinard pointed out about our ability to respond to disaster training [see identifier PBCA-Pinard-19 for the referenced comment on emergency planning and evacuation]. (PBCA-Biesek-43)

Comment: What else was -- well there are plenty of things missed. You weren't going to look at emergency planning. Well that's taking off the table again some of the main issues that the public is concerned about. Have there been site specific, are there site specific differences? Obviously nuclear reactors, many of them are originally licensed to operate in sparsely populated areas. Pilgrim is an example of that because Plymouth was considered out in the boondocks. But as 30 years, 40 years approaches, these heretofore sparsely populated areas are now more densely populated areas.

However, the infrastructure has often not changed. That is a site specific, pertinent factor. To say well this isn't important because FEMA does a foolish biennial exercise or we have full faith in our emergency plans is not credible. Why isn't it credible? Our community hasn't approved

the plans for years. The neighboring community has not approved the emergency plans for years and we are not different. And so to have these levels really of smoke screens, and that's what I feel like we are dealing with.

We justify or you justify taking emergency planning as an issue we are not going to discuss because you are basing it on the false assumption that the emergency plans in the biennial exercises demonstrate everything is a okay. Well here is a quick example. The emergency plan is based upon the keyhole concept. If you read NUREG 0654, I'm probably going to have to get really strong glasses but if you read that, you'll see they are saying you evacuate two miles around, then there is a keyhole, evacuate all or a portion in the keyhole from two to five, maybe from five to ten and then when you pass the ten mile finish line, all is fine.

And the evacuation time estimates done by KLD are based upon that concept of that's what's going to happen, okay? But there is a fundamental flaw going on because that is based upon the straight line Gaussian plume, that plumes will blow the radiation in a straight line. However, that's not applicable because in complex situations, you need a variable trajectory model because the wind is variable. What is a complex situation? In a coastal area, either by a lake or the ocean, or river valleys or hills or considerable vegetation, mountains, and how do we know this?

Well the NRC told us so, that's how we know this. The NRC has warned, since the early '70s, that in complex situations, the straight line Gaussian plume is not applicable. Again in the '80s. Recently, of this very year, the NRC, one of their chief emergency planners, LaVie is his name, and he made a presentation, which is on atoms, and slide after slide after slide describes how and where the straight line Gaussian plume is not applicable for emergency plans.

And the New York Attorney General and Pilgrim Watch has brought this forward in this NR SAMA adjudications, but the New York Attorney General has done a pluperfect job in filing a motion for summary disposition in the Indian Point license renewal based on the fact that the straight line Gaussian plume is -- no, he didn't say that, what I'm thinking, is not appropriate at that site, just as the same expert witness said, in the current ongoing adjudication of Pilgrim, not in a coastal site, citing not only NRC documents that high, citing DOE documents that high.

EPA, for example, does not even recommend [ATMOS] in complex situations in their --. Well you don't want to know, Part W, but you go on and on and on. And so, therefore, the foundations done of emergency planning is fallacious. However, you use, here in this document, in a rather shameful manner, that because the plans are okay, because FEMA says they are okay, then therefore we can blow it off and it's something we don't have to discuss. (NMA-PW-12)

Comment: In 1983, in response to the 1979 reactor core melt at Three Mile Island and studies such as the 1975 Reactor Safety Study, NRC announced its Safety Goal Development Program based on a "defense-in-depth approach...in order to prevent accidents from happening and to mitigate their consequences" through "siting in less populated areas" and "emergency response capabilities." 48 Fed. Reg. 10772, 10775 (1983) ("Safety Goals Policy Statement"). Thus, NRC acknowledges that emergency planning and evacuation measures can mitigate the environmental impacts of a radiation release. As such emergency planning and evacuation measures should be examined as part of the NEPA analysis that takes place as part of the process to determine whether or not an operating license should be renewed.

The Proposed GEIS continues to exclude from the environmental impact review of relicensing any analysis of the actual effectiveness of emergency preparedness and evacuation planning in the event of a radiological emergency at a relicensed nuclear power plant. The NRC also does not consider this issue at any other stage of the relicensing proceeding. The State of New York objects to this exclusion of emergency planning and evacuation from the NEPA analysis, particularly as it relates to Indian Point, where effective evacuation is critical if environmental impacts from a design basis accident or a severe accident are to be mitigated.

NRC itself has indicated with regard to emergency planning, these "regulations are premised on the assumption that a serious accident might occur and that evacuation of the EPZ might well be necessary." *In the Matter of Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), 22 N.R.C. 681, 713 (ALAB Oct 22, 1985). Each licensee is required to establish emergency preparedness plans which are to be implemented in the event of an accident, including protective action measures for the public. 10 C.F.R. § 50.47. Given that federal agency action under consideration and review is the decision by NRC to renew a NRC operating license and given that NRC does not allow the State to have any decision-making role in NRC's siting of a reactor or the renewal of its operating license, NEPA imposed on the NRC the obligation to undertake a transparent and comprehensive review of the plans to ensure that on- and off-site emergency evacuation plans can mitigate environmental impacts in the event of a radiological emergency. The plans must provide for two emergency planning zones (EPZs); (i) a plume exposure pathway EPZ (requiring preplanned evacuation procedures) of about 16 km (10 miles) in radius and (ii) an ingestion exposure pathway EPZ of about 80 km (50 miles) in radius. 10 C.F.R. § 50.47. Other standards include appropriate ranges of protective actions for each of these zones; provisions for dissemination to the public of basic emergency planning information; provisions for rapid notification of the public during a serious reactor emergency; and methods, systems, and equipment for assessing and monitoring actual or potential off-site consequences in the event of a radiological emergency condition. 1996 GEIS at 5.2.3.3. Once a major radiological release occurs, effective emergency and evacuation plans are the only method of substantially mitigating the immediate public health and environmental impacts of radiation exposure. Nevertheless, the 1996 GEIS excludes emergency planning and evacuation

as a mitigation measure that must be analyzed before a plant's license is renewed. 1996 GEIS at 5-10; Table 9 at pages 9-2 through 9-6.

Despite the fact that effective emergency planning is the sole method of substantially mitigating the immediate impacts of a serious radiological release, the NRC's Proposed GEIS continues to exclude any consideration or analysis of a license renewal applicant's emergency planning and preparedness in the environmental impact review process. Proposed GEIS at 1-10. The exclusion of emergency preparedness from the environmental review continues despite the NRC's stark acknowledgement in its 1996 GEIS that "evacuation can have a significant influence on early fatality risk" (1996 GEIS at 5-24) and early fatalities are surely an environmental impact of a radiological emergency.

The effectiveness of emergency preparedness and evacuation is particularly critical at Indian Point and at other plants near large population centers which would likely not be granted an original operating license today because they would fail to meet key license criteria with regard to population density and the difficulties it raises for evacuation planning. 10 C.F.R. § 100.21(h). As NRC's former director of the Office of State Programs said in 1979, "it is insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Times Square, 20 miles from the Bronx…[it is] one of the most inappropriate sites in existence," Robert Ryan, NRC's Director of the Office of State Programs, *Report of the Office of the Chief Counsel on Emergency Preparedness to the President's Commission on the Accident at Three Mile Island, October* 31, 1979.

Rather than require license renewal applicants near densely populated areas to establish the actual efficacy of their emergency preparedness plans in order to continue operating their plants for another twenty years, the NRC determined that there is "no need for a special review of emergency planning issues" before a license is renewed because oversight of emergency preparedness and evacuation plans is “ongoing and outside the regulatory scope of license renewal." Proposed GEIS at 1-11, 1-12. In other words, NRC assumes that its ongoing regulatory process ensures adequate emergency planning.

Developments since the 1996 GEIS make the NRC's confidence in the ongoing regulatory process untenable and demonstrate that effective emergency preparedness and evacuation plans will almost certainly not be in place in the event of a radiological emergency. For example, the NRC's conclusion that the ongoing regulatory process is adequate to protect people in the event of an emergency is premised, in part, on the assertion Section 1.7.3 of the Proposed GEIS that "nuclear power plant owners, government agencies, and State and *local officials* work together to create a system for emergency preparedness and response that will serve the public in the unlikely event of an emergency." (emphasis supplied). The NRC also asserts that "each plant owner is required to exercise its emergency plan with the NRC, FEMA, and offsite authorities at least once every two years to ensure that State and local officials

remain proficient in implementing their emergency plans." *Id.* at 1-11. Thus the Proposed GEIS assumes that the licensee's emergency and evacuation plan will create a smooth integration of the various government agencies that would be involved in an emergency, and that a continuing testing of the efficacy of that integration between federal, State and local officials will be conducted.

However, changes in the real world since the 1996 GEIS wholly undermine the NRC's assumptions about the smooth interlocking of the various agencies involved during an emergency. For example, the Proposed GEIS's assumption that plant owners, "government agencies and State and local officials work together to create a system for emergency preparedness" (Proposed GEIS at 1-10) is clearly unwarranted; since 2003, the county governments of Westchester, Rockland, and Orange have refused to provide the annual certification for the emergency plans based on their concern that those plans are inadequate to protect the public and have refused to participate in exercises based on them. *See, e.g.,* January 17, 2003 letter from E. Diana, Orange County Executive, to E. Jacoby, New York State Emergency Management Office, ML030350231. The NRC is thus left to rely on Executive Order No. 12657, signed by President Reagan in 1988, that applies "whenever State or local governments, either individually or together, decline or fail to prepare commercial nuclear power plant radiological emergency preparedness plans," and specifically requires that "FEMA shall substitute its own resources for those of the State and local governments only to the extent necessary to compensate for the nonparticipation or inadequate participation of those governments." Exec. Order No. 12657, Section 2(b)(2) (Nov. 18, 1988).

However, the State and Federal Governments are not realistically in a position to step in and implement evacuation plans for the counties which are closest to the problem but have declined to participate or cooperate. Although FEMA may claim confidence in its ability to carry out an evacuation plan in the absence of local government cooperation, Hurricane Katrina exposed such judgments as risky and questionable. Even the White House's report on Katrina noted that "[w]ith respect to evacuation—fundamentally a State and local responsibility—the Hurricane Katrina experience demonstrates that the Federal government must be prepared to fulfill the mission if State and local efforts fail. Unfortunately, a lack of prior planning combined with poor operational coordination generated a weak Federal performance in supporting the evacuation ... " *The Federal Response to Hurricane Katrina − Lessons Learned,* United States White House, Washington, D.C. (Feb. 2006) at 56. The potential failure of first responders and emergency professionals to respond to catastrophic emergencies in a timely way, and the possibility of panic ensuing from a fast breaking emergency scenario undermines the Executive Order's conclusion that the federal government will just get the evacuation 'job' done regardless of reality. *See* Declaration of Raymond C. Williams (Nov. 27, 2007) at ¶¶ 26, 28 ("Williams Decl.")(ML0734001931)(Ex. D).

In fact, in the 1996 GEIS, the NRC recognized that the "changing environment" in which a plant exists during the license renewal period, particularly an increase in the general population in the vicinity of a plant, can cause an increase in public risk as the plant continues to operate, "because the number of people that will need to be evacuated or otherwise protected from radiation exposure will increase. 1996 GEIS at 5-11. As the NRC acknowledged in the 1996 GEIS, these "changing environment" impacts are "noncontrollable," and therefore their potential for increasing risk as well as the magnitude of any such increase in risk must be "specifically examined." 1996 GEIS at 5-11.

The NRC's attempt in the 1996 GEIS to "specifically examine" the increased risk due to future population growth is flawed, as it relates to Indian Point. For example, the 1996 GEIS purports to predict increases or decreases in accident consequences risks during a plant's relicensing term, in part by applying certain risk factors to population figures within the 50 mile radius at the middle year of the license renewal. 1996 GEIS at 5-20 - 5-25. Table 5.3 of the 1996 GEIS asserts that the population within the 50 mile radius of Indian Point in 2030, (the middle year of license renewal) will be 15,195,541 and the population in the highest frequency wind direction in the 50 mile radius will be 602,427. These population figures are substantially underestimated, considering that the 50 mile radius population in is already more than 17,000,000. *See* Edwin Lyman, *Chernobyl on the Hudson? The Health and Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Plant* (2004) at 23 (extrapolating 2009 population from 2000 Census. *data)(available at* http://www.ucsusa.org/assets/ documents/nuclear_power/indianpointhealths tudy.pdf). Thus, the NRC's alleged continuing review of emergency preparedness and evacuation planning cannot be relied on, if the NRC is assuming a substantially smaller population in the vicinity of the plant in 2030 than actually exists in 2009 when a substantially larger population will likely exist in 2030 during the middle year of license renewal.

In sum, the NRC's on-going oversight of emergency preparedness and evacuation plans for the EPZ of Indian Point has been wholly inadequate to ensure that the public is protected during a radiological emergency. Therefore, the effectiveness of the NRC-approved emergency plans must be considered in the NEPA analysis of the Indian Point license renewal application as a Category 2 site-specific issue. Indeed, because emergency evacuation is such a critical method of mitigating or avoiding the severe acute health impacts of radiation exposure, the effectiveness of emergency planning and evacuation must be considered in the NEPA analysis of all license renewal applications, not just Indian Point's, as a Category 2 issue because site-specific conditions will predominate in devising effective evacuation plans. (NYS AG-14-8)

Comment: I call for serious study regarding what can be termed a "multiple" emergency planning and evacuation scenario -- which obviously would consider various factors relating to evacuation scenarios as well. And, seeing that roads and other transportation arteries are different around each nuclear power facility, thus the issue should be deemed "Category 2." Some of the multiple scenarios within a limited time frame which must be thoroughly assessed

are the combination of a sizable earthquake, serious nuclear accident, and damaged and thus difficult to access and successfully travel along evacuation routes. Another such scenario would involve a sizable earthquake, tsunami, and damaged and difficult to access evacuation routes. (Campbell-31-1)

Comment: Emergency Response Planning: The NRC considered the need for a review of emergency planning issues in the context of license renewal and concluded that programs for emergency preparedness at nuclear plants apply to all licensees, that all operating licensees must keep up with changing demographics and other site-related factors (GEIS, p. 1-11), and that there is therefore no need for a special review of emergency planning issues in the context of an environmental review for license renewal (GEIS, p. 1-12). However, the public has expressed considerable concern about the adequacy of evacuation plans and emergency preparedness plans, particularly with regard to access to emergency routes in the event of an earthquake or terrorist attack. Although the NRC and utilities routinely conduct table-top exercises, people are concerned about the lack of real testing of these plans and whether such plans will work in an actual emergency. Some have expressed concern that the infrastructure is not adequate to evacuate large populations, such as the more than 12 million people who live within a 50-mile radius of SONGS. Another common concern is that evacuation routes might be blocked due to traffic congestion or damaged roads, for example, following a major earthquake.

Clearly the population potentially impacted by the release of radioactive materials following an accident or attack on a nuclear power plant and the viability of emergency preparedness plans vary from plant to plant. As such, the NRC should include an evaluation of emergency planning as a Category 2, plant specific issue. (CEC-9(1)-6)

Comment: Emergency Evacuation Impacts Not Considered**:** The Revised GEIS clearly and unequivocally states that "NRC will not make a decision or any recommendation on the basis of information presented in this GEIS regarding emergency preparedness at nuclear power plants." Revised GEIS, Section 1.7.3. The Revised GEIS states that existing emergency plans "cover preparations for evacuation, sheltering, and other actions to protect residents...." *Id.* The Revised GEIS concludes that the Federal Emergency Management Agency ("FEMA") "has the lead in overseeing offsite planning and response…." *Id.*

Under NEPA, a reviewing agency is required to consider the impact on the environment resulting from the total effects of the contemplated action and other past, present, and "reasonably foreseeable" future actions. See 40 C.F.R. 1508.7 (1990). Furthermore, NEPA mandates that federal agencies contemplating "major federal actions significantly affecting the quality of the human environment," 42 U.S.C. § 4332(2)(C), are obligated to include in the recommendation or report on the anticipated action an environmental impact statement ("EIS"), as "evidence that an agency has considered the reasonably foreseeable environmental effects

of a proposed major action before making a decision to take the action." *Town of Orangetown v. Gorsuch,* 718 F.2d 29, 34 (2d Cir.1983), *cert. denied,* 465 U.S. 1099 (1984).

To meet the mandates of NEPA, the Revised GEIS must identify and discuss all anticipated adverse impacts in a clear and comprehensive fashion, including any adverse unavoidable environmental effects resulting from the implementation, alternatives to the proposed action, the relationship between short-term uses and the long-term maintenance of the environment, and any irretrievable commitments of resources involved in the proposed action. Such a detailed statement "insures the integrity of the agency process by forcing it to face those stubborn, difficult-to-answer objections without ignoring them or sweeping them under the rug" and serves as an "environmental full disclosure law so that the public can weigh a project's benefits against its environmental costs." *Sierra Club v. United States Army Corps of Eng'rs* (Sierra Club II), 772 F.2d 1043, 1049 (2d Cir. 1985); *see also Robertson v. Methow Valley Citizens Council,* 490 U.S. 332, 349 (1989). (CT AG-10-7)

Comment: This Revised GEIS contains no consideration of the larger scale impacts of an accident or attack on emergency evacuation or response. NEPA requires a consideration of all potential impacts from a proposed government project. Nowhere does NEPA allow an agency to decline to examine the environmental impacts of a project because some other agency may have a role. The emergency evacuation plan is a central and critical element of the NRC's reactor permit and regulatory program. Emergency response and evacuation plans will differ in certain respects based on local conditions. But many elements can and should be standardized in order to provide uniform and consistent national standards. For example, protocols for notifying state and local officials and the public can and should be standardized. Similarly, computer modeling of evacuation and emergency training and response procedures should be common to all power stations.[10] Thus, the NRC's NEPA review of the potential impacts resulting from operation of nuclear reactors, and the spent fuel pools and dry cask storage facilities for an additional 20 years must include an analysis of the impacts of standardized elements of emergency response and evacuation for nuclear power stations.

[[10] As an example, the Final Exercise Report, Oct. 24, 2004, (ML 050190165) regarding an emergency exercise at Indian Point noted that the evacuation order was given in English to Spanish-speaking residents near the power plant, Section 1.3, that inaccurate information was given to the public, Section 2.1, that government officials failed to communicate with each other, Section 2.3.1 and that, in one case, an automated telephone system was incomplete and radiation dose assessment personnel were not notified of the staged "accident." Section 2.4.1 These kinds of systemic errors and mistakes could happen at any facility across the country and the environmental consequences need to be evaluated and addressed.]

This requirement is particularly important because an accident or attack at a nuclear power facility would cause not only a potential catastrophe for the local population, but would have far reaching downwind effects.[11] As was demonstrated by the 1986 disaster at the Chernobyl nuclear power station in the Ukraine, not only are people in the immediate vicinity affected by a

major release of radioisotopes, but so are vast areas at great distances potentially contaminated, creating disastrous public health and environmental consequences for communities many miles from the actual site. Further, these adverse impacts can continue for many years after the event. Consequently, NRC must evaluate the impacts to human health and safety and the environment of an immediate accident or attack on the entire potentially impacted downwind environment, as well as the collateral impacts of the long-term relocation of large numbers of displaced citizens who live in the immediate vicinity of an affected plant, as well as the potential millions more who live within the 50-mile radius, in the event of major downwind contamination.[12]

[[ll] Emergency planning for Indian Point, for example, includes plans covering both a 10-mile radius emergency planning zone ("EPZ") and a separate 50-mile radius ingestion pathway EPZ. The 50-mile radius EPZ includes substantial portions of the State of Connecticut, including its largest city, Bridgeport, and its most populous county, Fairfield. The immediate consequences of an evacuation order would affect approximately one-third of the population of Connecticut. In 2003, James Lee Witt, the former director of the Federal Emergency Management Agency (FEMA), issued a report detailing the deficiencies in the emergency evacuation plan for the Indian Point EPZ. Mr. Witt concluded that safe evacuation of the area surrounding Indian Point is highly unlikely, if not impossible. James Lee Witt Associates, Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone (2003).]
[[12] Indian Point Independent Safety Evaluation, July 31. 2008, p.5.] (CT AG-10-8)

Comment: Emergency Preparedness: The NRC will not make a decision or any recommendations on the basis of information presented in this GEIS regarding emergency preparedness at nuclear power plants. Nuclear power plant owners, government agencies, and State and local officials work together to create a system for emergency preparedness and response that will serve the public in the unlikely event of an emergency. The emergency plans for nuclear power plants cover preparations for evacuation, sheltering, and other actions to protect residents near plants in the event of a serious incident.

The public and the states are discovering new information that increases the foreseeability of simultaneous events such as earthquakes, hurricanes and floods and/or attacks on the reactor or waste storage sites, with attendant lack of access to emergency routes, or impacts of such simultaneous events upon emergency routes as well as offsite radioactive releases. The need to address multiple emergency scenarios should be considered in the NRC's GEIS and in Emergency Planning proceedings. (A4NR-11-8)

Comment: Failure to Require an Assessment of Emergency Preparedness: A fundamental flaw with the Revised GEIS is the NRC's continued narrow scope of the environmental review which, *inter alia,* precludes assessment of emergency preparedness at nuclear power plants.[47] The NRC rationalizes that "[b]efore a plant is licensed to operate, the NRC must have reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency."[48] The Revised GEIS further explains how NRC's finding of reasonable

assurance is founded upon compliance with NRC regulations and guidance, which require that nuclear power plant licensees routinely demonstrate effectiveness of their emergency plans.[49]

[[47] *See id.* at 1-10, 1-11 ("The NRC will not make a decision or any recommendations on the basis of information presented in this GEIS regarding emergency preparedness at nuclear power plants.")]
[[48] *See id*. at 1-11.]
[[49] *See id.* 1-11.]

However, this reasoning is flawed since NRC's emergency preparedness regulatory scheme is inherently deficient, and, as such, reliance upon those regulations is misguided. Indeed, due to the purely procedural nature of the emergency planning standards found in 10 C.F.R. § 50.47(b), which fail to set actual benchmarks for determining what constitutes a workable emergency plan, there is no guarantee that a particular plan would actually be effective in light of site-specific concerns.[50]

[[50] Riverkeeper explained at length the deficiencies of the emergency preparedness regulatory scheme in recent comments on a recent proposed update to the emergency planning regulations. *See* Riverkeeper's Comments on NRC's Proposed Enhancements to Emergency Preparedness Regulations (Oct. 19, 2009), ADAMS Accession No. ML093100527 (hereinafter "Riverkeeper EP Comments"). Riverkeeper provides these comments in further support of the comments made herein, for your consideration in the instant rulemaking proceeding, as Exhibit E.]

This is starkly apparent when examining the situation at Indian Point. Of the nation's commercial reactor sites, Indian Point, located just 24 miles north of New York City, (35 miles north of Times Square) tops the list as the nuclear power plant with the greatest population density within a 10-mile radius (at least 300,000) and 50-mile radius (approximately 20 million people).[51] This represents nearly a doubling of the population since Indian Point's initial licensing. This high population density, coupled with the nature of the region's infrastructure (prone to severe congestion), present serious impediments to effective emergency evacuation. Indeed, a 2003 traffic study performed for Entergy by KLD Associates determined that evacuation times for the Emergency Planning Zone around Indian Point had doubled since 1994. The original estimate was 2.5 hours for people to proceed with evacuation, with a total of 5.5 hours for complete evacuation. KLD's 2003 estimates increased mobilization time to 4 hours, while complete evacuation of the region in good weather conditions could take up to 9.5 hours and in snow conditions up to 12 hours.[52] Shadow evacuation, which is not adequately addressed by NRC emergency planning regulations and guidance, would further increase this time. Based on these evacuation time estimates, which apply only to the narrow 10-mile Emergency Planning Zone, it is clear that many residents could not be evacuated in time to avoid exposure to high doses of radiation under a traditional release scenario, much less a fast-breaking release.

[[51] *See, e.g.,* James Lee Witt Associates, LLC, Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone (2003) (hereinafter "Witt Report") at 4, 81-82. The NRC has previously acknowledged that Indian Point has the "highest population within 10, 30 and 50 miles of any nuclear power plant in the U.S. At 50 miles, its population is more than double any other plant site." *See* U.S. Nuclear Regulatory Commission, Consolidated Edison

Company of New York: Indian Point, Units 2 and 3, Memorandum and Order, January 8, 1981, at 6; *see also* Indian Point Draft Supplemental EIS" at Table 2-1.]
[[52] Indian Point Energy Center Evacuation Time Estimate, Tbl. 1-1, p. 1-12, KLD Associates, Inc., 2003.]

According to an independent analysis of Indian Point's emergency plan commissioned by former New York Governor George Pataki in 2003 and authored by former FEMA director James Lee Witt, the radiological emergency plan for Indian Point is badly flawed, unworkable and key components are unfixable. Witt found that "...the current radiological response system and capabilities are not adequate to...protect the people from an unacceptable dose of radiation in the event of a release from Indian Point…"[53] Even the NRC has voiced concerns associated with the location of Indian Point: in 1979, Robert Ryan, the NRC's Director of the Office of State programs, stated "I think it is insane to have a three-unit reactor on the Hudson River in Westchester County, 40 miles from Times Square, 20 miles from the Bronx...[Indian Point is] one of the most inappropriate sites in existence."[54]

And yet, due to the lack of enforceable standards, NRC consistently finds the requisite "reasonable assurance," in the Indian Point emergency plan, despite the glaring problems that would hinder effective evacuation at the facility.

[[53] Witt Report at viii.]
[[54] Report of the Office of the Chief Counsel on Emergency Preparedness to the President's Commission on the Accident at Three Mile Island, October 31, 1979, p. 5.] (Riverkeeper-20-12)

Comment: Failure to Require an Assessment of Emergency Preparedness: The NRC's emergency preparedness regulations are further deficient because they fail to fully consider the effects of accidents or intentional attacks involving onsite nuclear waste. The likelihood for such a scenario is not insignificant given the vulnerabilities of such facilities, for example, those at Indian Point: the spent fuel pools at Indian Point are not housed under containment, but rather in non-reinforced cinderblock industrial buildings which are admittedly penetrable by aircraft; the dry casks in the Indian Point ISFSI are stored on an outdoor concrete pad, lined up in rows that are easily visible from the air and the Hudson River. Moreover, numerous reports indicate that nuclear power plants remain likely targets of terrorist attacks.[55] The results of such an occurrence could potentially be catastrophic. For example, at Indian Point, an attack on the densely packed IP2 or IP3 spent fuel pools would result in contamination of a significant portion of the 10-mile emergency planning zone and the 50-mile ingestion pathway zone. A 2006 National Academy of Sciences Study concluded that storage pools are susceptible to fire and radiological release from intentional attacks.[56] The environmental impacts of a fire in a spent fuel pool may be severe, extending over a geographic area larger than a state's legal boundaries and continuing for decades.[57] Federal government reports note that a radioactive release could begin in less than an hour.

[[55] For example, a 2006 study by the National Academy of Sciences on security risks posed by the storage of spent fuel at nuclear plant sites, confirmed that attacks by civilian aircrafts remain a plausible threat. Nat'l Acad. Of

Sciences., *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report* (2006) (hereinafter "2006 NAS Study"). The study found that attacks on spent fuel pools are attractive targets since they are less protected structurally than reactor cores and typically contain much greater inventories of medium and long-lived radionuclides than reactor cores. *Id.*]
[[56] *See* 2006 NAS Study at 49, 57.]
[[57] *See generally* Gordon R. Thompson, "Risk Related Impacts from Continued Operation of the Indian Point Nuclear Power Plants" (Institute for Resource and Security Studies) (November 28, 2007) (hereinafter "Thompson Report"). Riverkeeper provides this report in further support of the comments made herein, for your consideration in the instant rulemaking proceeding, as Exhibit F.]

And yet, NRC's emergency preparedness scheme, including the pending proposed update, fails to adequately require that nuclear power plant licensees are capable of dealing with such severe radiological consequences.[58] This simply further demonstrates how emergency plans may not provide the needed "reasonable assurance" that the public would be protected in the event of an emergency.

[[58] *See generally* Riverkeeper EP Comments.]

Therefore, it is clear that compliance with existing emergency preparedness regulations and guidance does not necessarily guarantee adequate emergency preparedness at nuclear power plants in light of all relevant factors. Indeed, the Revised GEIS's statement that "[t]hrough its standards and required exercises, the Commission reviews existing emergency preparedness plans throughout the life of any facility, keeping up with changing demographics and other site related factors,"[59] is utterly belied by the foregoing. The need to address emergency preparedness during the license renewal environmental review process, thus, quickly becomes apparent.

[[59] *See* Revised GEIS at 1-11.]

This becomes even clearer when examining nuclear power plant siting regulations: were Entergy applying for a license to build a new nuclear power plant where Indian Point is now located, it is unlikely they would be allowed to do so, based on its proximity to such a highly populated area.[60] The regulations for reactors built *after* 1997 require that every site must have an exclusion area and a low population zone.[61] These regulations define low population zone as "the area immediately surrounding the exclusion area which contains residents, the total number and density of which are such that there is a reasonable probability that appropriate protective measures could be taken on their behalf in the event of a serious accident."[62] The regulations do not specify a permissible population density or total population within this zone because the situation may vary from case to case.[63] The regulations go on to say whether a specific number of people can, for example, be evacuated from a specific area, or instructed to take shelter, on a timely basis will depend on many factors such as location, number and size of highways, scope and extent of advance planning, and actual distribution of residents within the area.[64] As far as Indian Point is concerned, there is no low population zone, therefore if Entergy

were applying to build a new nuclear power plant as opposed to a relicensing it would likely not be permitted.

[[60] *See* 10 C.F.R. Pts. 100.3, 100.10(b), 100.11, & 100.21(h).]
[[61] 10 C.F.R. § 100.21(h).]
[[62] 10 C.F.R. § 50.2.]
[[63] *Id*.]
[[64] *Id*].

Therefore, if held to the same standard as a new nuclear power plant, an evaluation of emergency preparedness would likely preclude license approval. It defies logic to then exclude consideration of this issue in a license renewal review, given significant changes to the baseline environment upon which initial evaluations were made. The NRC cannot continue to hide behind a set of deficient regulations. The NRC should, thus, include emergency preparedness as a site-specific Category 2 issue for review, and require an assessment of all relevant concerns, including population changes, transportation/traffic issues, varying radiological consequences, etc. (Riverkeeper-20-13)

Comment: B. Draft Incorrectly Determined That Emergency Planning & Safeguards Are Outside Review in License Renewal:

1. Emergency Preparedness, a. NRC's Rationale Lacks Merit- Emergency Planning Deserves to be in Scope

The Commission incorrectly determined that there is no need for a special review of emergency planning issues in the context of an environmental review for license renewal (NUREG-1850). It is outside the scope.

The rationale provided in the Draft says the emergency plans for nuclear power plants cover preparations for evacuation, sheltering, and other actions to protect residents near plants in the event. Before a plant is licensed to operate, the NRC must have "reasonable assurance" that adequate protective measures can and will be taken in the event of a radiological emergency. Therefore, the Commission has determined that there is no need for a special review of emergency planning issues in the context of an environmental review for license renewal (NUREG-1850). In sum, decisions and recommendations concerning emergency preparedness at nuclear plants are ongoing and outside the regulatory scope of license renewal.

PW finds NRC's position and rationale without merit.

(1) The Draft says that, "Before a plant is licensed to operate, the NRC must have "reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency." However, as PW explained in Section 1 of this comment, "reasonable

assurance" is a meaningless term because NRC never defines what level of proof − clear preponderance of the evidence presented – is required for there to be "reasonable assurance" − 51% or > than 90% certainty. Therefore, "reasonable assurance" is a meaningless term.

(2) Local and State officials, at many sites, believe the plans won't work, along with the public. The reasons for their lack of confidence are explained below. The net effect is that the NRC's expressed confidence in planning further undermines the public's confidence in NRC and in this GEIS process.

(3) There are site specific differences in preparedness due, for example, to the size of the population in relation to available emergency response infrastructure and resources.

Local and State officials, at many sites, believe the plans won't work, along with the public. It is reasonable to assume that County Leaders take annual certification of evacuation plans for Indian Point seriously, and therefore, refusal to certify the plan is quite significant.

Examples:

- Indian Point: Since 2003, the Counties of Westchester, Rockland, and Orange have refused to provide the annual certification for the emergency plans.14

- Pilgrim: The Towns of Duxbury and Kingston Massachusetts have refused to certify the radiological plans and procedures for Pilgrim. In order to ascertain local responder's honest views it is necessary to have anonymous questionnaires because responders fear losing their jobs if they give the "wrong answer" and want to avoid missing out on additional pay provided.

- Vermont Yankee: Through most of this decade, the towns of Brattleboro, Dummerston, Guilford, Halifax and Marlboro declined to certify the RERP.

[[14] New York State Notice of Intention to Participate and Petition to Intervene, Contention 29, NRC Docket Nos. 50-247-LR and 50-286-LR, November 30, 2007, at 267.]

Public Believes Plans Won't Work: The State of New York's Attorney General's Office described in NYS's Motion to Intervene a survey to determine the opinion of local responders and officials around Indian Point. The survey was conducted by Ecology and Environment, Inc. for the New York State Emergency Management Office in July 2004 and February 2005 to provide a baseline, and again in July 2006 to determine changes. In 2004, 69 percent of respondents indicated that they would not follow advice from public authorities. The follow-on survey conducted in 2006 saw that number drastically increase to 91 percent. First responder intentions and attitudes found among the general populace work together[15]. NYS summarized

their assessment and said that, "The population and transportation constraints unique to Indian Point likely will result in failure of the evacuation plan."

[[15] Ibid, at 264, 267]

Prior to the NYS Attorney General's filing, the Witt Report at Indian Point concluded that local responders and the public lacked confidence in the plan.

More recently, public speakers at public meetings held during license renewal at Pilgrim, Vermont Yankee, Millstone, and Indian Point repeatedly stated that emergency plans would not work. For example: The Town of Plymouth's appointed Nuclear Affairs Committee's Recommendations to the Board of Selectmen, Town of Plymouth, January 2006 said that, "from many perspectives, it is clear that current evacuation plans, well-conceived and well-intended as they are, stand little chance of working in case of a rapidly evolving event."

Sandia Survey − Methodologically Unsound: Despite the foregoing, NRC commissioned Sandia to determine how people will respond in a radiological disaster at a nuclear reactor, 2008. The results of the survey were published in NUREG/CR 6953. Vol. 2. The purpose of the study was to determine if people within the EPZs knew what to do in a radiological disaster at a nuclear reactor and whether they would implement protective actions if asked to do so. Generally the study concluded that respondents were well informed about what to do in an emergency and would follow directions. However, the study was methodologically weak and its results unreliable.

What's wrong with the survey? Examples:

- Sample Size: The telephone survey randomly administered to 821 households in communities located within 10 miles of nuclear power plants across the country. At that time 4,873,774 persons lived within the 10-mile EPZs of the 104 operating nuclear reactors. NRC received 800 replies to the survey that represents 0.016414384417496586% of the EPZ populations of the 104 operating reactors – a not impressive sample.

- Demographics of Survey Respondents: The report does not break down respondents by reactor site, only by Region. It is clear that the demographic characteristics and history surrounding each reactor will affect response. Surveys to be meaningful must be site specific. For example: James Lee Witt Associates analysis of preparedness and planning for Indian Point[16], at 11.2.1.3, pointed out that each reactor site was unique; therefore each reactor should be surveyed and surveyed every two years in order to gain realistic expectations of public behavior. At Indian Point, "Having lost many lives in the 9/11 tragedy, they may be especially vulnerable to concerns about terrorism;

accordingly, their behavior may be markedly different from what may be expected at other regions and locations." Also it is reasonable to expect that public behavior and attitudes living in EPZs will vary if the EPZs are located in sparsely populated versus more congested areas; areas with higher education levels versus less educated; and EPZs with larger transportation dependent populations. Further as the Witt Report pointed out, "The survey should not be confined to those within the 10 mile EPZ because there are significant health and safety issues related to public behaviors beyond that zone."

[[16] *Review of Emergency Preparedness of Areas Adjacent to Indian Point and Millstone* James Lee Witt Associates, 2003]

Reasons why local/state officials, at many sites, and the public believe the plans won't work, examples[17].

[[17] See: Pilgrim Watch's October 19, 2009 Comments Regarding NRC 10 CFR Parts 50 and 52 RIN 3150-A110 (NRC-2008-0122) Enhancements to Emergency Preparedness Regulations and to Pilgrim Watch's Comments Regarding Draft Released for Public Comment, May 18, 2009: Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG 0654/FEMA-REP-1 Supplement 4, October 18, 2009]

- Planning is based on false assumptions:

  The biological impact and amount of radiation likely to be released is minimized in planning. PAGS are not based on BEIR VII; plans ignore releases from large accidents-e.g., spent fuel pool fires; accident interaction between the pool and reactor; and TMI releases continue to be misrepresented.

  The Affected Area: Airborne emissions are assumed to only affect 2 miles around the site, and a "key hole" from 2-10 miles. This is wrong because it is based on a simplistic straight-line Gaussian plume model not suited for complex sites. It is non-temporal and non-spatial. Local officials and the public know that advanced variable models are needed along with met towers placed off site in surrounding communities to provide real-time data.

  Dispersion: The plans assume that airborne radioactive releases rapidly disperse to "safe" levels, limiting the EPZ to 10-miles when the impact is likely to be much larger. This is because we know that local meteorology/geography (e.g., sea breeze, plume concentration as it travels over water, gravity drainage, stagnations and reversals − are likely to contain, not disperse, a plume.

- Notification, sirens primary system: Notification is a key component in emergency preparedness and planning. Sirens are essentially simply outdoor warning systems, we do not sleep or many do not work outside; worse backup power is not required. This does not provide reasonable assurance. The public knows that redundancy is required, such as requiring rapid dialing systems, electronic roadside signboards etc. Emergency responders often lack compatible communications equipment.

- Evacuation Time Estimates: ETE's are not currently required to be updated. The proposed change to require updates does not include important variables such as an increase in the percent of children (transportation dependent), changes in the infrastructure and shadow evacuation. of ETE's prepared by KLD are based on "best case scenarios, e.g., not peak traffic periods.

- Reception Centers: are not equipped to monitor 100% of the population within 12 hours as *required* by NUREG 0654, J-12; instead they are only required to service 20 percent of the population.

- Biennial Exercises: Exercises are predictable and do not reflect a wide range of challenging events that can occur such as: fast breaking events; infrastructure failures, such as LOOPs, damage to evacuation routes, attack on another reactor impacting the state; exercises held in the evenings, during holidays, and announced; exercises involving the ingestion pathway. Exercises do not all require progression to a General Emergency so that offsite response is tested.

b. Emergency Planning − Category 2 Issue: Site specific variables affect emergency planning. For example new information regarding local demographic characteristics and egress routes would affect environmental impacts. These deserve an opportunity for hearing. (PW-6-19)

Response: *Emergency preparedness and planning are part of the current operating license and are outside the scope of the environmental analysis for license renewal. Emergency preparedness programs are required at all nuclear power plants and require specified levels of protection from each licensee regardless of plant design, construction, or license date. Requirements related to emergency planning are in the regulations at 10 CFR 50.47 and Appendix E to 10 CFR Part 50. These requirements apply to all operating licenses and will continue to apply to facilities with renewed licenses. The NRC has regulations in place to ensure that existing emergency preparedness plans are updated throughout the life of all plants. For example, nuclear power plant operators are required to update their evacuation time estimates after every U.S. Census, or when changes in population would increase the estimate by either 25 percent or 30 minutes, whichever is less. Additionally, the NRC assesses the capabilities of the nuclear power plant operator to protect the public by requiring the*

performance of a full-scale exercise—that includes the participation of various Federal, State, and local government agencies—at least once every two years. These exercises are performed in order to maintain the skills of the emergency responders and to identify and correct weaknesses. Within the context of license renewal, the Commission considered the need for a review of emergency planning issues during the 1991 rulemaking proceedings on 10 CFR Part 54, which included public notice and comment. As discussed in the statement of consideration for rulemaking (56 FR 64943, 64966-67; December 13, 1991), the programs for emergency preparedness at nuclear power facilities apply to all nuclear power facility licensees and require the specified levels of protection from each licensee regardless of plant design, construction, or license date. As a result, the Commission determined that, "[t]here is no need for a licensing review of emergency planning issues in the context of license renewal" (56 FR 64966-67).

Where the comments deal with standards for new nuclear power plants, the NRC believes that its safeguards and security requirements for operating licenses are comprehensive and robust to assure continued safe operation. The safe operation of nuclear power plants is not limited to license renewal but is dealt with on an ongoing basis as a part of the current operating licenses. Safety issues and concerns are addressed by the NRC on an ongoing basis at every nuclear power plant. Safety inspections are and will be conducted throughout the operating life of the plant, whether during the original or renewed operating license term. If safety issues are discovered at a nuclear power plant, they are addressed immediately, and any necessary changes are incorporated into the current operating license. As such, the regulatory safety oversight operating reactors is ongoing and outside the regulatory scope of license renewal.

No change was made to the GEIS as a result of this comment.

Economics and Need for Power

Comment: We were asking that these most important considerations on the list and so forth not only be retained in the area of public participation because that's the most important thing to most of us right now. Is that we have the transparency and the -- what's the word? Accountability. We have to get accountability now on the money thing because that was kind of a joke. Somebody said about -- what about the billion -- millions of dollars that they're putting in their pockets there on this?

But, it isn't. Because when the California Public Utilities Commission was deliberating this, they asked specific things from Edison. What the money was going to buy and they asked to have a list of what remuneration was for the top levels of the administration and the owners and so forth and Edison declined to provide it. Declined to provide it.

And to me, that one fact was just final proof that our California Public Utilities Commission wasn't in charge. They weren't running it. They had to let that go because in all levels of our Government the people who are running it and making the decisions and giving themselves the money make sure they have the laws with them before they do it. They make it so that they didn't break any law. Okay. So, I think we have to pursue that right away.

But, what I needed to say here is that we want these things to be made prerequisites for the ability of Edison or any other in the country to put our money into making their 600-page documents and in this hearing, in the testimony that was given on this, Edison's asked for four years of money to put together that document and you know that it's the same pattern on the national level. Coming into Congress with a bill like that. A lot of times they don't even have time to read it.

Well, in this case, the Division of Ratepayer Advocates didn't have time to look into it enough that they could protect us and they know it and we know it.

But, anyway, if it were a prerequisite, we wouldn't be giving 4.4 million of our money to Edison to make us live under the terrible stress on our minds. I live two miles from that plant. That we live on all these years. That they're making us pay so that they can put the information on the paper enough that they can get it through and if we aren't pretty active, they'll get it through because they're in charge. They're running it.

Okay. So, the prerequisite. If a few good people here who have anything to say about it at all can get that in there, any of these things, the prerequisites and I'm not even going to read them. But, we have five here that we've suggested. (DPCA-CREED4-47)

Comment: And we studied -- the League studied energy two or three years ago and we found it extremely complex and that's kind of how I would like to begin my comments.

I think it's pretty hard for most residents to understand energy and all the complexities of it.

I have a letter that the Mayor of San Clemente wrote to CPUC Commissioner and it talks about being grateful for having workshops in San Clemente, but how little they felt informed at the end. That they didn’t feel that they really had a good understanding of what they needed to know and I feel that transparency is part of the problem.

I don't understand the budget process. I'm not sure how many of you understand the budget process, but I would like to know how these things are factored in. One other gentleman tonight mentioned those. I don't understand the cost of delivery for our electricity. I don't know what is factored in. I don't know if the storage of waste is. If the security and the -- I did go to one of

the NRC meetings where they had teams from different agencies coming up and reporting on their activities and their plans. I don't know if that's factored in.

I would like to know how much the CEOs of Edison make. I just -- I would like to know the mitigating costs of the reef. I believe it was, somebody can probably correct me, 500 million or something to build the reef off of our coastline here very close to us and I don't know whether that's factored in and I don't know whether the problem that caused it has been fixed. That is a concern I'm sure.

These are things that I bring up as comments because they're things that I'm not sure of and I think most of us would like to know a little bit more about that. (DPCA-Exelby-28)

Comment: I have given the Nuclear Regulatory Commission people here copies of article and I'd like to just add a few words.

If one considers the cost of the whole nuclear fuel cycle from the mining of uranium to the thousands of years of waste storage, it becomes obvious that nuclear power is the most expensive, uses the most fossil fuel to produce and store and is the most polluting and most dangerous of possible energy sources.

I get information to verify this from a report of Dr. Helen Caldicott which I gave a copy to some of you. (DPCA-UNASFV-2)

Comment: Helen Caldicott, J. W. Storm Van Leone and Philip Smith are three of the few scientists who have analyzed the balance between the amount of fossil fuel energy needed to produce the nuclear energy fuel cycle for one 10,000 megawatt nuclear reactor. It may be impossible for most laymen to consider a petro joule of energy, one million billion joules and the several hundred of petro joules of fossil fuels needed for the nuclear fuel cycle, but it is not impossible to accept the obvious concept that it takes more fossil fuel expenditures for one reactor than the reactor can produce in its lifetime.

Dr. Caldicott reports that it takes 162 tons of natural uranium each year from the most productive ore in sandstone and shales for one nuclear plant. If the uranium is from granite ore, 40 million tons must be mined or 80 million tons after providing for chemical treatment of the ore. The extraction of uranium from this granite rock would consume over 30 times the energy generated from the uranium.

Uranium is in short supply. If all electricity worldwide were to be generated from nuclear power, all the uranium would last nine years. In the case, uranium from high-grade ore would last three years.

In addition to the truth of negative energy from nuclear power after using fossil fuels to produce it, the monetary costs have not been honestly reported. What is the cost to the public of the 13 billion in subsidies in the 2005 energy bill? What is the cost of the stranded investments paid by customers of nuclear energy when a plant lasts only 28 of the promised 40 years of life and then they pay again to rebuild such plants as San Onofre 1 and 2?

What does the price -- Anderson Insurance Companies, what do they protect from loss from the cost to taxpayers? How much do taxpayers pay for Homeland Security which has done little or nothing to secure the existing 103 nuclear plants? What are the medical costs for the hundreds of individuals who have contracted cancer, leukemia and injured DNA from the operation and accidents of nuclear plants especially Three Mile Island, Simi Valley and Idaho Lab S1? (DPCA-Scott-11)

Response: *The regulatory authority over licensee economics, including utility employee compensation and rates charged to consumers, falls within the jurisdiction of the States and, to some extent, the FERC, and is therefore outside the scope of the license renewal environmental review. NRC regulation 10 CFR 51.95(c)(2) states:*

> *The supplemental environmental impact statement for license renewal is not required to include discussion of the need for power or the economic costs and economic benefits of the proposed action except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation.*

CEO salary information of publicly traded corporations should be disclosed in their annual reports, and costs included in the rate base for electricity generation should be available from State or Federal regulatory rate-making authorities. No change was made to the GEIS as a result of this comment.

Comment: The other thing is the financial status of people when they apply to the NRC for things. We had PG&E applying for being able to have dry cask storage at the time they were going to be filing for bankruptcy. It didn't really make sense. (PBCA-Pinard-21)

Response: *The financial qualifications of a license renewal applicant to safely operate the plant is outside the regulatory scope of the GEIS because the financial qualifications are considered as part of NRC's oversight of all power plant licensees whether or not they have applied for license renewal. An applicant to construct and operate a nuclear power plant must demonstrate its financial qualifications at the time of initial licensing.*

The NRC does not systematically review the financial qualifications of power reactor licensees once it has issued an operating license, other than for transfers under 10 CFR 50.80.

No change was made to the GEIS in response to this comment.

Comment: And so I will not take any time to add to the comments specifically relating to these issues of concern with the GEIS, except to say that there's one very interesting paragraph in the GEIS, and I say it's an interesting paragraph because of the many things we think the NRC is not giving us, and I point to those people who look at the things they do give.

Here's one that we found of particular interest. Section S1 from the Generic Environmental Impact Statement. And it goes like this.

"Unless there are findings in the safety or the environmental reviews that would lead the NRC to reject a license renewal application -- I will add, parenthetically, no license renewal application has ever been rejected, to date, close parentheses. Back to the document.

"The NRC has no role in energy-planning decisions. State regulatory agencies, system operators, power plant owners, and, in some cases, other federal agencies, ultimately decide whether the plant should continue to operate."

A very important paragraph and clause. In other words, all the very important comments made about this document here tonight may be moot, and irrelevant, if the state decides, in advance of PG&E's application, that the state does not find it in the ratepayer's best interest, that the state does not find it economic, or, in terms of reliability, reliable to rely on nuclear power 20 years hence.

The state Public Utilities Commission, and the state Energy Commission, can simply decide that the utility shall not be allowed to relicense the plant. Therefore, the concerns of this Generic Environmental Impact Statement, and even the required subsequent visits of the members of the Nuclear Regulatory Commission to our state and county would be completely irrelevant and unnecessary. (PBCA-Weisman-22)

Response: *The commenter is correct that, although a licensee must renew its license to operate a reactor beyond the term of the existing license, the possession of a renewed license is just one of a number of conditions that must be met to continue operation. This is because the NRC does not have a role in the energy-planning decisions of State regulators and licensee officials. Once a license is renewed, other factors and entities such as State regulatory agencies and the owners of the nuclear power facility will ultimately decide whether the facility will continue to operate. This final decision will be based on economics, energy reliability goals, and other objectives over which the other entities may have jurisdiction. Moreover, given the absence of the NRC's authority in the general area of energy planning, the NRC's identification of a superior alternative does not guarantee that such an alternative will be used. See the*

response to comment ANR-11-13 for additional discussion. No change was made to the GEIS in response to this comment.

Comment: The need for power is not the NRC's mandate. Regulating nuclear power and protecting the publics' health and safety are its mandate. As appear to be indicated in the language of this section, there should be no consideration of need for power in the GEIS or any other NRC decision this is a state decision. (A4NR-11-10)

Comment: GEIS Should Not Exclude Need for Power: The California Public Utilities Commission (CPUC) is in the process of determining whether or not continued reliance on nuclear energy is in the best economic interests of the people of California. PG&E's decision to apply for license extensions 15 years in advance of the expiration of the current licenses raises questions regarding its intentions toward the coming CPUC conclusion.

Again, the GEIS excludes the issue of the need for power. Before asking ratepayers to further invest in the continued operation of a nuclear facility, the NRC must require data-driven answers to the question of cost vs. benefit. This must be a Category 2 issue. (SLOMFP-13-3)

Response: *The need for power is outside the scope of the GEIS. As stated in GEIS Section 1.7.5, the NRC will not make a decision or any recommendations on the basis of information presented in this GEIS regarding the need for power at nuclear power plants. The NRC regulates the civilian use of radioactive materials; it does not promote their use. As such, the purpose and need for the proposed action (i.e., license renewal) has been defined in the revised GEIS as follows:*

The purpose and need for the proposed action (renewal of an operating license) is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, licensee, and, where authorized, Federal (other than NRC) decision makers.

10 CFR Part 51.95(c)(2) states:

> *The supplemental environmental impact statement (SEIS) for license renewal is not required to include discussion of need for power or the economic costs and economic benefits of the proposed action or of alternatives to the proposed action except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation.*

No change was made to the GEIS as a result of this comment.

Comment: Someone needs to point out that we are failing. We're failing on many levels. Let me give you your report card to the nuclear industry, the NRC, and nuclear technology, in general.

Insurance and risk management. F minus. Worse than F here. PG&E filed for bankruptcy. They're down the road. We're left "high and dry." This happened already, as an example, a few years ago. There is no insurance provision to cover losses from a catastrophe at Diablo, and if we became Chernobylized, what would that -- how would that play out?

That means we may lose our homes, our community, our dreams, and PG&E and the U.S. Government get to walk away without paying for their mistakes. (PBCA-Biesek-45)

Response: *The financial qualifications of license renewal applicants are outside the regulatory scope of the GEIS. See the response to comment PBCA-PINARD-21 for additional information about financial qualifications.*

Costs associated with nuclear incidents are governed by the Price-Anderson Nuclear Industries Indemnity Act (Price-Anderson Act; 42 USC 2210). The Price-Anderson Act is a Federal law that governs liability-related issues for all nonmilitary nuclear facilities constructed in the United States before 2026. The main purpose of the Act is to provide prompt and orderly compensation to the public who may incur damages from a nuclear incident, no matter who might be liable.

The Act provides "omnibus" coverage—the same protection available for a covered licensee or contractor indemnifies any persons who may be legally liable, regardless of their identity or relationship to the licensed activity. Because the Act channels the obligation to pay compensation for damages to the licensee, any party with a claim only needs to bring its claim to the licensee or contractor.

Power reactor licensees are required to have the maximum level of primary insurance available from private sources (currently $375 million) and are also required to participate in a Secondary Financial Protection. Under this program, should an accident at any participating power reactor result in injury or damage in excess of the $375 million layer, all power reactor operators will be charged a retrospective premium, up to a maximum of $111,900,000 per reactor per incident. These insurance levels are subject to adjustments due to inflation at five-year intervals. The last adjustment was made in August 2009.

There currently are 104 power reactors that participate in the Secondary Financial Protection program, creating a combined level of protection under both the primary and secondary layers of approximately $12 billion.

In the event of a nuclear incident involving damages in excess of the limits established in the Act, Price Anderson does include a specific provision that obligates Congress to take appropriate action to assure full compensation for all unresolved public liability claims.

Aging Management

Comment: Section 2 – Procedural Issues: A. Public Involvement & Input Restricted – Recommended: The Honorable Gregory Jaczko's said in a speech entitled, "A Regulator's Perspective on New Nuclear Reactor License Applications," September 24, 2009 that, "NRC is built upon a solid foundation of a talented workforce dedicated to the safety and security mission of the agency, and guided by sound safety regulations. This solid foundation is *strengthened by public involvement and input,* and by our being open and transparent about what we do and why. I am confident that we can successfully meet these challenges in an effective way, with safety at the heart of our decisions. "[Emphasis added]

5. Commitments: NRC has "resolved" issues brought forward in license renewal proceedings by issuing commitments. The Cumulative Usage Factor (CUF) is an example brought forward at Vermont Yankee, Oyster Creek, Indian Point and Pilgrim's proceedings. Unless commitments are resolved prior to granting a license to Renew, the public has no ability to review the Applicant's actions in regard to the commitments and issue a timely response. In order for NRC to comply with Chairman Jaczko's wise counsel that NRC staff "is strengthened by public involvement and input, and by our being open and transparent about what we do and why" — all commitments must be resolved first before a license renewal is issued. (PW-6-25)

Response: *Applicant commitments made with regard to safety matters such as CUF, "cumulative usage factor," a concept associated with the fatigue analyses of certain components, are addressed in the license renewal safety review and are outside the scope of the environmental review for license renewal. Renewed licenses are typically issued several years or more before the period of extended operation (the time after the original operating license would have expired) begins. During the safety review of a license renewal, it is not uncommon for the applicant to make commitments to the NRC that it will implement required aging management or maintenance programs, procedures, inspections, or reviews prior to entering the period of extended operation or by a specified date. Since the renewed license is issued some time before the period of extended operation begins, it is not necessary that all of the applicant's commitments be implemented at the time the renewed license is issued. However, prior to entering the period of operation, the NRC performs an inspection to verify that any license conditions that were added to the renewed license, such as requiring the licensee to update its FSAR, or specific testing requirements deemed necessary for license renewal, commitments made by applicants during the license renewal process, selected aging*

management programs, and license renewal commitments revised after the renewed license was granted, are implemented in accordance with 10 CFR Part 54. No change was made to the GEIS in response to this comment.

Comment: The GEIS fails to account for the added radioactivity and added stress on the facility and its components due to extending the operating license for a nuclear reactor. Plus, the destination of all spent fuel, mixed waste, low-level waste, and other kinds must be clear in order to *have* a reputable and thorough environmental impact statement on this long-lived issue. (Campbell-31-22)

Comment: Seeing that there is deterioration of the equipment of a nuclear power facility during its operation, seeing that there is already serious refurbishing and replacement of components (sometimes replaced by substandard or even counterfeit equipment) of such facilities even a decade before the expiration of some of their operating licenses, and seeing that imperfect humans operate such facilities, please explain the logic which would renew operating licenses for nuclear power facilities since there seem to be increasing problems when there is aging of components at nuclear power facilities? (Campbell-31-13)

Comment: "Current regulations require a licensee to demonstrate that reactor pressure vessel embrittlement does not exceed a screening limit corresponding to a 1 in 200,000 year probability of a through-wall crack formation."

NRC has a proposed new regulation which would expand this requirement to a one in a million year probability, but would allow for use of a less conservative methodology for assessing that probability.

The NRC reports that under current methodology, ten reactors, including Diablo Canyon Unit 1, are likely to exceed the screening limit during the course of a 20 years license renewal, and therefore, would not be eligible for license renewal unless they could reduce the embrittlement rate, or demonstrate that operating the reactor would not pose any undue public risk. Wow! When were we going to find out about that?

So, in other words, if it won't make it for a 20 year relicense, you don't make it safer, you just change the standard, which so far apparently has been good, and was good enough to apply to all these other reactors. (PBCA-Weisman-23)

Comment: Aging Plant Issues: The draft GEIS appropriately requires licensees to have aging management programs for plant components, but it neglects to describe how these programs will be evaluated and how quality assurance programs will be maintained. In the license renewal proceeding for the Pilgrim Nuclear Station the NRC judged the adequacy of the plant's Aging Management Program simply on whether it provided "reasonable assurance" that the components would perform the functions outlined in 10 C.F.R. Section 54.4(a)(1)−(3). This standard is insufficient to ensure reactor safety over a 20-year license renewal period. For example, the problem of substandard or counterfeit plant replacement parts should be addressed within a plant's aging management plans. SONGS faced such a problem with its new steam generator, which had defective welds. Aging management plans should include plans for guarding against the procurement of substandard or counterfeit parts and for detailed inspections of all new parts.

In addition, as we enter an era of large numbers of aging and refurbished nuclear power plants, it is important that the NRC begin developing additional proactive methods for identifying age-related safety problems before they become significant. In license renewal application proceedings, individual plants should be evaluated in detail for aging issues and trends to identify preliminary or potential "anticipatory indicators" of safety problems related to plant aging. Trends could include steam generator tube cracking, vessel head corrosion, embrittlement, repeated unplanned reactor shutdowns, long-term problems, and/or repeated failures in safety-related equipment. These issues must be considered Category 2 issues and evaluated on a plant-specific basis.

In the case of California reactors, which are located in seismically active regions, the combined effects of age-related degradation and the risk and potential impacts of an earthquake should be evaluated. For example, earthquakes are considered possible initiating events for the development of through-wall cracks that could challenge the integrity of a reactor pressure vessel. In addition, the cumulative effects of marine salt spray corrosion should be evaluated for coastal plants, such as California's nuclear power plants.

Given the plant-specific nature of these issues, age-related plant degradation issues must be reconsidered as Category 2 plant-specific items in site-specific license extension proceedings. (CEC-9(1)-5)

Comment: The most dangerous times for any nuclear power plant are: Initial start-up or during a restart, and during a shut-down, especially an emergency shut-down.

Three Mile Island Unit II, for instance, had been in commercial operation for less than three months when it partially melted down. It was only slightly different from, slightly more powerful than, Unit 1, which, today, was relicensed by the same careless Nuclear Regulatory Commission we seek redress from today as well – for another 20 years – until April 19, 2034.

Some of Three Mile Island Unit I's parts will be 60 years old when it is finally "retired"- irradiated, thermally heated, pressurized, chemically embrittled, and cycled on and off hundreds or even thousands of times.

The Emergency Core Cooling Systems, mandatory for all commercial reactors, have never actually been tested, and many scientists have asserted that their calculations have indicated the ECCSs may not work when needed. Not only that, but several ECCSs, such as Monticello's, were found to be completely inoperative several decades after installation, and would definitely not have worked. Control rods have jammed, fuel rods have been bent, plutonium has escaped... and one reactor, Davis-Besse, nearly corroded all the way through before anyone noticed! Except maybe the filter salesman.

Many of San Onofre's sea-encrusted, rusted, dilapidated parts will be 60 years old, too, if it makes it to retirement age.

And with all the NEW parts they are installing at San Onofre right now – miles of pipes, dozens of pumps, scores of valves, hundreds of new sensors, drum after drum of electrical cables – there will be new pressures and fluid flows throughout the system, new control mechanisms, and even relatively new, or completely new, operators. People quite a bit younger than the plant itself, who don't know how hard people fought to stop it in the first place. Who don't know that almost all our fears have ALREADY been realized, from cancers in the community because of the plant, to fraud at the plant, to piling nuclear waste problems, to threats of terrorism. Yes, it was all foreseen.

Right now, one by one, each of San Onofre's two remaining operable reactors are being rebuilt, top to bottom. That is, pieces of them are being replaced, top to bottom (even the fog lights, and certainly the sump pumps). But despite the retrofit, vastly more pieces are never being touched, never even being inspected.

How much inspection can such a small crew as the NRC leaves "'on site" really do? There is only one inspector for every couple of hundred workers.

Furthermore, a climate of cover-up still exists at the plant, according to whistleblowers this author has talked to. And no doubt no one from The Shaw Group wants to expose their mistakes, since they are all new at the site and the last group o[f] operators – Bechtel and their subcontractors – were fired en masse after about 40 years of running the most dangerous thing on earth, on August 30th, 2009.

During the retrofit – a different division of Bechtel is doing that work – the danger is probably a lot less than during an average day the plant is running. Criticality is not occurring at the shut-down reactor. Water isn't screaming through the system at enormous velocities and pressures.

Lazy, sleepy operators on mood-altering cardiac beta blockers for health problems due to sitting all day long aren't using inaccurate and faulty instrumentation to monitor the whole thing and stop it from melting down.

So I'm less scared when the plant is shut down than at any other time. But the restart AFTER this major retrofit will be an especially dangerous time.

And then, the continued operation of the plant for 20 more years may well spell doom for SoCal at some point – for any of a million different reasons. The old welds might start failing, let alone all the new ones that weren't done right, or were done right in Japan or elsewhere in the world, but didn't get shipped properly to America, or broke during installation. And nobody reported anything, because of the climate of cover-up.

During the actual retrofit, at least the reactor that is being refitted is not increasing the quantity of spent fuel with nowhere to put it by an average of 250 pounds per day per reactor, as happens each day the reactor is operating (500 lbs per day for San Onofre altogether, when both reactors are running). That's in addition to the tritium which is released and poorly tracked, and the hundreds of pounds per year of noble gases which are not tracked or stopped in any way at all, and the daily releases of radioactive isotopes of all known elements, in varying quantities, as allowed by ALARA. (Hoffman-30-1)

Comment: At minimum, all underground pipes and tanks should be inspected and their condition verified. AII capsules implanted in reactor vessel walls to indicate embrittlement should be pulled and evaluated before relicensing proceeds. (Shaw-15-4)

Comment: And then also San Onofre also needs to be considered unique in that I understand, I'm not too enthused about replacing the steam generators here, and what they're doing to the facility, but San Onofre apparently have to open up the entire reactor vessel and sort of put caulking on it or whatever to – it'll be safe, you can be assured. (PBCA-Campbell-34)

Response: *The NRC's environmental review for license renewal is confined to environmental impacts associated with the extended period of operation for nuclear power plants. These comments which concern aging management issues provide no specific information about environmental issues or the environmental review, and are, therefore, outside the scope of the environmental review.*

As part of the license renewal process, the NRC performs a safety review to determine whether there is reasonable assurance that activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis (CLB). The CLB is the particular set of NRC requirements applicable to a licensed operating nuclear power facility. The CLB includes the applicant's written regulatory commitments for ensuring compliance with and

operation within the applicable NRC requirements and the plant-specific design basis. See response to A4NR-11-4 for a detailed list of what the CLB includes. The intent of the NRC's safety review is to determine if the applicant has adequately demonstrated that the effects of aging will not adversely affect any systems, structures, or components, as identified in 10 CFR 54.4. When the plant was designed, certain assumptions were made about the length of time the plant would be operated. During the renewal process, the applicant must also confirm whether these design assumptions will continue to be valid throughout the period of extended operation or whether aging effects will be adequately managed. The applicant must demonstrate that the effects of aging will be managed in such a way that the intended functions of "passive" and "long-lived" structures and components (such as the reactor vessel, reactor coolant system, piping, steam generators, pressurizer, pump casings, and valves) will be maintained during extended operation. For active components (such as motors, diesel generators, cooling fans, batteries, relays, and switches), surveillance and maintenance programs will continue throughout the period of extended operation.

If additional aging management activities are needed, the applicant may be required to establish new monitoring programs or increase inspections. For instance, applicants should specify activities that need to be performed (such as water chemistry and inspections) to prevent and mitigate age-related degradation. These activities increase the likelihood that the program will be effective in minimizing degradation and that a component is replaced if specified thresholds are exceeded. No change was made to the GEIS as a result of these comments.

Comment: The General Accountability Office has documented the widespread use of counterfeit and substandard parts in nuclear reactors. That's a problem and something to be concerned about.

At one of the Diablo Canyon independent safety committee meetings, Per Peterson, one of the commissioners, said to this effect, that having an old power plant is like driving an old car. That it drives but it doesn't have any airbags and it's not as safe.

And this means that there's old parts in there. One of the things I'm concerned about are the aging parts, and we don't know how many are in there. This is one that was discovered because there was a problem. This is a buried firewater pipe break. You can see how corroded and horrible it looks.

When I asked how many more are down there, they said we don't know, and we won't know until one of them has a problem. If we have one, we know that there are more.

The other disturbing picture that I have is the damage to a corner spent fuel rod, and basically they didn't know what the root cause analysis was. They only had a probable cause which was

debris fretting, which means that debris was floating around there but they don't know what debris. That's pretty disturbing also.

So the escalating potential for accidents in aging reactors has received nationwide attention, and derogatory audits from the NRC's own Office of Inspector General.

The General Accountability Office has documented the widespread use of counterfeit and substandard parts, like I said, in nuclear reactors. So that's pretty disturbing. (PBCA-Cochran-4)

Comment: The issue of these parts, it was made earlier about them not being up to standard, to what we would have put in an original plant.

You know, we take better care of our cars than that. My husband won't buy a replacement part if it's not manufactured original, cause they're more reliable. And that's just for a car.

I would suggest that as national security policy, parts for these nuclear reactors need to be made in America. The parts, the pieces need to be made in America and the parts need to be made in America, so that they are always readily and immediately available. That should be national security. (PBCA-Pinard-17)

Comment: In 2003, the only member of the public to comment at the NRC's GEIS meeting on license renewal submitted the following comments:

- components have been identified as substandard or counterfeit − making it impossible to judge expected lifespan;

- Federal oversight has been lacking, allowing undiscovered degradation, i.e. Davis-Besse plant.

The problem of substandard parts, or in this case defective large components, was recently demonstrated at the San Onofre Nuclear Station (NRC meeting with Southern California Edison, ADAMS No. ML092440095 dated 09/02/09). The NRC's GEIS acknowledges on page 4 -127, "...the majority of construction materials and technology components are expected to be imported." What is unclear is if by "imported" the GEIS is referencing "imported" to mean from outside the town/county of the reactor, or "imported" as from a foreign location.

The NRC should investigate the potential liability and reduction in safety margins from counterfeit and/or substandard large component replacements at aging reactors and incorporate their findings in the final GEIS.

If the international push for constructing new reactors proceeds, then the problem of counterfeit and substandard parts will be exacerbated.

The escalating potential for accidents at aging reactors has received nationwide attention and derogatory audits by the NRC's own Office of Inspector General. Additionally, the General Accounting Office (GAO) has documented the widespread use of counterfeit and substandard parts in nuclear reactors. Finally, in a deregulated electric market, or a hybrid such as currently exists in California, the licensee is motivated to cut costs by delaying expensive repairs. There is thus an economic disincentive to find and remedy problems. Hence, the GEIS must require that site-specific issues be performed by the NRC, not the licensee.[1]
[[1] Federal Register Notice.] (A4NR-11-16)

Response: *The issue of substandard and counterfeit parts is an ongoing safety issue, and thus outside the scope of the environmental review for license renewal. However, the NRC has long recognized that the issue of substandard or counterfeit parts raises potential safety questions that licensees must effectively address through their 10 CFR Part 50, Appendix B, quality assurance programs. As early as 1989 in NRC Generic Letter (GL) 89-02, "Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products" (NRC 1989), the NRC described its perspective on good practices in procurement and dedication that licensees should follow. This letter also provided the NRC's conditional endorsement of an industry standard (EPRI 1988) on methods of commercial-grade procurement and dedication. These efforts have been ongoing and continue today. For example, on September 1–3, 2009, the NRC participated in the Electric Power Research Institute Joint Utility Task Group Procurement Forum in Denver, Colorado. The Joint Utility Task Group Procurement Forum provides an opportunity for nuclear procurement personnel to exchange information and to work together to address common industry issues related to procurement of materials and services. The forum included discussion of the potential for counterfeit parts entering the supply chain. Section 4.8.2 of the revised GEIS was updated to clarify that the majority of construction materials and technology components are expected to be purchased in other parts of the United States or overseas.*

Other

Comment: If you have seen this article, please say so. I don't want to take time. It's in the New York, was in the New York Times about three days ago. I'm going to do something very bad. I'm going to make the NRC look good.

And if I can just read parts of it, I found it interesting. In the first place, I did not know that Westinghouse, that has been known for building the worst plants, had been purchased by Toshiba, maybe a long time ago. I don't know.

But looking up Toshiba, their vision, and the Japanese are known for their vision, that by the year 2050, we will have a very blessed land, environmentally, that will include all forms of energy, which means they will also have our nuclear plants as part of that mix.

I personally don't plan on being here, and I'm thinking any of you will either, but I found that very interesting in this article, and I'm just going to pick out a few things here.

But one of the things the NRC did is reject the design by Westinghouse for a new reactor, because a key component might not withstand events like an earthquake or a tornado.

This could cause delays in building 14 planned reactors in the United States, including Georgia and South Carolina.

And I am thinking this is pertinent because June Cochran, another June, made mention, briefly, of the smaller plants, and today, going over this, I wondered if -- are they going to have new regulations for them? It seems they're being approached a little bit differently.

One of the things they're doing--it says the staffs, agency--is a glitch in the move towards licensing changes adopted by the Commission in 1990, and so forth, and their buildings will be different in order to protect them from external events like earthquakes, tornados and high wind.

They will have a shield that's 35 inches of concrete, sandwiched between two sheets of steel, each of which is an inch thick. The existing Westinghouse reactors, designed in '60 and '70, do not have shield buildings.

In another shift, the new design puts the emergency cooling water on the roof -- you probably already know this -- so that no pumps will be needed if power goes out. They will have the water that they need in case of an accident, and so forth.

They also believe that the shield wall will protect them from the impact of an airliner. The part I found disturbing is something that we're all so used to, and it's the arrogance of the companies involved. In spite of the fact that they say they're going to fix this very fast, which scares me, don't fix it fast, take your time with the faults that – with the part that is not considered to be good.

They are already clearing the land and ruining the environment in, I believe it's Georgia and South Carolina, and they don't expect there to be a problem. And yet they have now determined what kind of work they need to do to demonstrate the structure’s safety.

So I see, having followed the plant there since before it was built, that my wish is that the NRC continues to do a good job. It sounds like they're looking at these plants like we wish they would have looked at ours.

I'm a little disturbed, the land's all cleared, the plants are all gone, the animals are probably all dead, and they still haven't come up with the right piece for the plant, and approved is so – I guess I'm comparing the two, hoping that we, being the "dinosaur plants," will get the same oversight as the 14 smaller new plants are supposedly going to have. (PBCA-SLOMFP2-13)

Response: *New reactor designs and licensing are outside the regulatory scope of license renewal. However, the NRC believes that its license renewal process is comprehensive and robust to assure continued safe operation. NRC's review of an application for license renewal has four components: a safety review, an environmental review, inspections, and an independent review by the ACRS.*

The NRC performs a safety review of the information provided in the application (as supplemented with additional information provided by the applicant at the NRC's request). The results of the NRC's safety review are documented in a publicly available safety evaluation report.

The result of the license renewal environmental review is published in a publicly available plant-specific draft SEIS, and the public is invited to comment on the draft SEIS. Then, after considering all public comments, the NRC issues the final SEIS.

Teams of inspectors with experience in nuclear plant safety visit the site and verify that the applicant has implemented its aging management plans as committed to in the application. The results of plant inspections conducted as part of the license renewal are documented in inspection reports and are made publicly available. The results are also included in the safety evaluation report. (These inspections are in addition to NRC's ongoing regulatory oversight program for all operating reactors, which also includes inspections.)

The ACRS is an independent panel of experts that advises the Commission on matters related to nuclear safety. The ACRS reviews the applicant's safety analysis report, the NRC's safety evaluation report, and the results of the onsite inspections and makes its recommendation to the Commission regarding issuance of the renewed license.

No change was made to the GEIS as a result of this comment.

Comment: I wanted to just make a brief comment for the guy that was commenting on my document. Oh, what did I do with my document now? Well, anyway, here -- here we go. Yes.

The careless Nuclear Regulatory Commission. Well, in the next paragraph, two incidents are mentioned which I think indicate a careless Nuclear Regulatory Commission. The emergency core cooling system at Monticello was unavailable for 30 years. Thirty years because the shipping bolts had not been removed when they installed it. So, who knows whether it would have worked and who knows who should have figured that one out, but my guess is the Nuclear Regulatory Commission should have.

And then the other one is the Davis-Besse reactor. The comment about except maybe the filter salesman which makes no sense unless you know what actually happened there and what actually happened is the reactor pressure vessel had got a hole about as big as a football and over they estimate I think it was about three months it took for that hole to develop what happened? Well, the filters kept getting clogged and they kept replacing them, but nobody figured out why except maybe the filter salesman. (DPCA-AHoffman-25)

Comment: I'm the Chairman of the Patrick Henry Democratic Club of America. A club that has members from California to New York. The Patrick Henry Democratic Club is also part of a coalition for nuclear safety.

Several things have come to my attention. One is a list of concerns of a number of professionals regarding what's going on in San Onofre. Most of this has been documented in various articles you can find in your newspapers.

One, officials at San Onofre were caught falsifying five years of hourly safety logs, fabricating five years of safety patrols that never took place. Real -- right?

Two, Edison has a history of putting unqualified workers into positions where public safety could be endangered.

Three, San Onofre has been repeatedly caught leaking radioactivity into the water and air.

Four, San Onofre [came] close to a Chernobyl level meltdown when the safety systems were offline during the wildfire that almost hit the plant in 2007.

Six, there is an epidemic of -- oh, excuse. Five, certain types of cancer such as breast cancer and leukemia are at a national high in Orange County. Think of it, Orange County gets to be number one in something. Cancer. Think about it and there are especially cancer pockets as you get closer to the plant.

The other night, I was talking to a young woman from Dana Point who had breast cancer. Genetically, she said it was impossible. Her doctor was absolutely shocked. She knew of a

number of other people who had -- because it wasn't in their genes or in her lineage. She knew of a number of other people who had impossible cancers.

You know, it's amazing these cancer pockets that pop up and nobody from the NRC seems to have noticed this.

Six, there is an epidemic of cancer among small animals. What's really interesting about these cancers among the small animals is that a lot of them don't fit the traditional modes. Our little seven pound Eskie died at six years of age, it should have lived to 20, of a cancer similar to bone cancer, but not quite that the doctors couldn't even identify it was so bizarre and we've heard of other small animals receiving similar types of cancer here in Orange County.

Seven, radioactive kittens were found near San Onofre.

Eight, San Onofre is expensive to operate and run. The PUC has agreed to pass off costs of renovation to the public.

Nine, Edison officials have repeatedly denied past radiation leaks despite documented findings of those leaks.

Ten, on October 14th, 2009, citizen watchdogs observed readings of 180 times the normal level of radiation in Mission Viejo approximately 18 miles from San Onofre on a gamma-fed radiation detector. Neither San Onofre officials nor any public agency notified the public nor warned the public with -- or supplied them with potassium iodine pills. Schools were not warned. Santa Ana levels 29 miles away were elevated seven to ten times normal level.

Now, you know, if somebody tells me something about a radiation detector, I'd want to see it. Right? Wouldn't you?

Well, you know, this -- on Saturday, last Saturday, a radiation detector was connected up in Santa Ana and the gamma-fed -- the normal level for the gamma-fed is one flash per every 60 seconds. That's normal. This is seconds not minutes. I mean so, instead of getting one flash for every 60 seconds, you have multiple flashes per second.

The average seems to be what I would say would be about 120 times the normal level and in this section, you can see it's about 360 times the normal level of radiation.

We are not informed when we have major increases. Nobody cares and when we were at the disaster preparedness meeting in Orange County we found that they're waiting for somebody in San Onofre to pick up a little yellow phone. These guys who faked five years of safety reports.

Eleven, Orange, Los Angeles, San Diego County residents are not notified when radioactive waste travels through their community. For example, recently a truck took radioactive waste from San Onofre to the Port of Long Beach where it was turned away because it was radioactive. It set off the radiation detectors there. Okay. Then it drove back to San Onofre. The only reason it made news is that it was turned away.

Twelve, which matters more? Edison's profits or your kids' lives. Thank you. (DPCA-PHDCA-41)

Response: *The specific issues contained in these comments address operational events and issues associated with the operation of nuclear power plants. The evaluation of operational events and issues associated with the operation of the San Onofre nuclear generating station is outside the scope of the review of the revised GEIS and will not be considered for changes to the revised GEIS. In addition, the economics of operating San Onofre, including the licensee's profits, are also outside the scope of license renewal and would be addressed by the State rate-making authority.*

However, the staff offers the following about the NRC's oversight of nuclear power plants. To ensure that nuclear power plants are operated safely, the NRC licenses the plants to operate, licenses the plant operators, and establishes license conditions for the safe operation of each plant. Every NRC licensed nuclear power plant must comply with all health, safety, and environmental requirements contained within its license as well as comply with all other Federal, State, and local requirements for continued operation. The NRC provides continuous oversight of nuclear power plants through its Reactor Oversight Process (ROP) to verify that they are being operated in accordance with NRC regulations. This oversight includes having full-time NRC inspectors located at the plant and periodic safety inspections conducted by NRC inspectors based in an NRC Regional Office. The inspections look at a plant's compliance with NRC's regulations that include the following: plant safety (routine and accident scenarios), radiation protection of plant workers and members of the public, radioactive effluent releases, radiological environmental monitoring, emergency preparedness, radioactive waste storage and transportation, quality assurance, and training.

No changes were made to the GEIS in response to these comments.

Comment: I'm a previous resident of San Clemente for six years and I actually lived pretty close to San Onofre for a long time.

Anyway, I have several comments. One, Attorney General Jerry Brown on the NRC. The NRC is continuing to piece by piece cut out public participation and expanding its state's agreement authority to prohibit state protective agencies and commissions from consideration of radiation related issues. NRC is approving the retention of the lethal wastes onsite where they are

generated first for 30 years and now 60 years without even site specific safety proceedings. That's one. (DPCA-Scott-10)

Response: *This comment relates to the NRC's Agreement State program and storage of nuclear waste. The NRC provides assistance to States expressing an interest in establishing programs to assume NRC regulatory authority under the Atomic Energy Act of 1954, as amended. Section 274 of the Act allows the NRC to relinquish to a State part of its regulatory authority to license and regulate byproduct materials, source materials (uranium and thorium), and certain quantities of special nuclear materials. The mechanism for the transfer of NRC's authority to a State is an agreement signed by the Governor of the State and the Chairman of the Commission, in accordance with Section 274b of the Act. The Agreement State program is outside of the scope of nuclear power plant license renewal and as such, the GEIS.*

Comments relating to the storage of nuclear waste are addressed in Section A.2.1.10 of this appendix.

No changes were made to the GEIS as a result of this comment.

A.2.1.17 Editorial Comments

Comment: General Comment: Additional language should be added to make it clear that facilities with hybrid or combination cooling, (e.g., facilities using both once-through and closed-cycle cooling systems or helper towers) fall under the more stringent once-through cooling system portions of the document, and not just the closed-cycle cooling system. (EPA-3(1)-1)

Response: *The stringency of an NPDES permit depends on various factors, such as the cooling system type (as noted in the comment) and the characteristics of the receiving body of water. No distinction is made in the GEIS regarding specific permit requirements, which are set by EPA or State offices (if EPA has delegated its Clean Water Act authority to the State). No change was made to the GEIS in response to this comment.*

Comment: Page 2-1, lines 25 to 38: A box appears having the title "Alternatives to the Proposed Action Considered in the GEIS." Three bullets appear in the box. The text of the 3rd bullet reads as follows:

- Offsetting generation capacity using conservation and energy efficiency (demand-side management) or purchased power.

  To clarify that "Purchased power" is a stand-alone alternative to the proposed action of license renewal, consider modifying the 3rd bullet and adding a 4th bullet as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

- Offsetting generation capacity using conservation and energy efficiency (demand-side management) ~~or purchased power~~.
- Purchasing sufficient power to replace the capacity supplied by the existing nuclear power plant. (NEI1-7(4)-29)

Response: *The NRC agrees that adding a separate bullet clarifies that purchasing replacement power is considered a separate alternative; therefore, the suggested change has been made to the introduction to Chapter 2 of the GEIS.*

Comment: Page 2-5, line 41: The draft updated GEIS states that Table 2.1-1 presents a summary of the environmental impacts of the proposed action.

Consider adding a reference at the end of the sentence on line 41 indicating that the bases for the impacts summarized in Table 2.1-1 are discussed in Section 4.12.1. (NEI1-7(4)-30)

Response: *The text in Section 2.1.4 has been modified to indicate that the basis for the impact determinations presented in the Table 2.1-1 is found in Chapter 4 of the GEIS in Sections 4.2 through 4.13.*

Comment: Page 2-30, lines 20 to 22: Consider changing the sentence in lines 20 to 22 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

The proposed action and new nuclear energy alternatives all may have low-probability but potentially high-consequence accidents in comparison to the non-nuclear alternatives *under certain specific conditions*. (NEI1-7(4)-31)

Response: *The NRC disagrees with the comment. Since an initiating event is required for any accident to occur, and those events occur only under certain conditions, the addition of "under certain specific conditions" at the end of the referenced sentence as suggested by the commenter was not deemed necessary. No change was made to the GEIS in response to this comment.*

Comment: Page 2-35, Table 2.4-5, (2nd header row): For consistency with text (page 2-28, line 16) and Table 2.4-4 (page 2-34), the heading for the 7th column should be changed from "Energy Conservation" to "Demand-Side Management". (NEI1-7(4)-33)

Response: *The column referenced by the commenter was already titled "Demand-Side Management." For consistency with the text in Chapter 2, the column was renamed "Energy Conservation."*

Comment: And then, lastly, we have to make the staff aware of a number of factual corrections in Table 3.1-1 and also Appendix C. These are tables and an appendix that talks about specific characteristics of the various utilities involved with the plants themselves, but more recent information may be available, we feel, that points out the various characteristics that are included in these, both table and the appendix.

We would also like to point out the information that needs factual correction does not affect any of the assessments that have been undertaken by the staff. (NMA-NEI-3)

Response: *The text in Table 3.1-1 and Appendix C of the GEIS has been updated based on more recent information to reflect any changes in the characteristics of individual nuclear power plants.*

Comment: Page 3-3, lines 21 to 23: Sentence reads as follows:

However, five facilities with once-through cooling also have cooling towers that are used to reduce the temperature of the water before it is released to the environment.

The above-quoted statement appears to be in error because Appendix C to the draft updated GEIS lists six once-through cooling facilities with cooling towers as follows: Browns Ferry, Monticello, Peach Bottom, Prairie Island, Sequoyah and Vermont Yankee. Consider changing the sentence to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

However, ~~five~~*six* facilities with once-through cooling also have cooling towers that are used to reduce the temperature of the water before it is released to the environment. (NEI1-7(4)-34)

Response: *Section 3.1.1 of the GEIS was corrected as a result of this comment.*

Comment: Page 3-6, Table 3.1-1, Arkansas Nuclear One, Unit 2: The entry in Table 3.1-1, column labeled "Condenser Flow Rate (10^3 gpm)," is "16" for Arkansas Nuclear One, Unit 2. Verify that the "Condenser Flow Rate" for Arkansas Nuclear One Unit 2 is 16,000 gpm. According to the ANO Unit 2 license renewal application, the flow rate for makeup water to the cooling tower(s), which is different from and should be much less than the condenser flow rate, is 16,000 gpm. (NEI1-7(4)-35)

Response: *The entry for the condenser flow rate for Arkansas Nuclear One, Unit 2 in Table 3.1-1 of the draft revised GEIS was incorrect. Table 3.1-1 has been modified in response to this comment.*

Comment: Vol. 1, Page 3-8, Table 3.1-1: Based on the renewed license for the Oyster Creek Nuclear Generating Station, change the entry in the Table 3.1-1 column labeled "Year License Expires" from "2009" to "2029" (ML090980482). (Exelon-17-1)

Response: *Table 3.1-1 of the GEIS has been updated to reflect current license status for those plants with recently renewed licenses.*

Comment: Vol. 1, Page 3-8, Table 3.1-1: In the Table 3.1-1 column labeled "Nearest City," the entry for Oyster Creek Nuclear Generating Station should be changed from "Atlantic City, PA" to "Atlantic City, NJ." (Exelon-17-2)

Response: *Table 3.1-1 of the GEIS has been corrected based on this comment.*

Comment: Pages 3-13 to 3-15, Table 3.1-2 and page 3-16, Figure 3.1-4: Table 3.1-2 lists all U.S. commercial nuclear power plant sites and reports the type of cooling system used at each site. Three schematic diagrams are provided in Figure 3.1-4 to illustrate the types of cooling systems listed in Table 3.1-2.

Not all entries in the Table 3.1-2 column labeled "Cooling System" correspond to a schematic in Figure 3.1-4. For example, "closed-cycle cooling pond," which is the entry in Table 3.1-2 for the "Cooling System" at the South Texas plant, is not depicted on any of the three schematics in Figure 3.1-4. Similarly, no schematic in Figure 3.1-4 shows a cooling system consisting of "natural draft cooling towers and cooling pond," which is the entry in Table 3.1-2 for the "Cooling System" at the Fermi plant. Furthermore, the distinction between a "closed-cycle cooling pond" and a "once-through cooling pond" is not illustrated in Figure 3.1-4.

To address the issues mentioned above, consider changing the "Cooling System" column in Table 3.1-2 by making the entries for plants with cooling ponds more consistent with one another. Alternatively, Figure 3.1-4 could be modified to better illustrate the differences between the following three cooling system types: (1) cooling pond [Braidwood, LaSalle, Wolf Creek]; (2) closed-cycle cooling pond [South Texas]; and (3) once-through (cooling pond) [Clinton, H.B. Robinson, Summer]. (NEI1-7(4)-36)

Response: *Table 3.1-2 of the GEIS was modified to provide more consistent descriptions of cooling systems that use cooling ponds. Figure 3.1-4 is intended to provide a conceptual overview of cooling systems; it is not designed to show every variation or to illustrate site-specific features.*

Comment: Page 3-17, lines 30 to 33: The text indicates that NPDES permits for nuclear power plants limit thermal changes, concentrations of biocides and other chemicals that have been mixed with condenser cooling water, and flow rates of condenser cooling water discharges.

To clarify that NPDES permits control pollutants in discharges to surface waters from nuclear power plants, whether they use once-through cooling water systems or closed-cycle cooling water systems with blow down, consider modifying the sentence in lines 30 to 33 on page 3-17 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Discharges of condenser cooling water (once-through systems) and blow down water (closed-cycle systems) containing ~~B~~*b*iocides and other chemicals used for corrosion control and other water treatment purposes are ~~mixed with the condenser cooling water and discharged from the system, with limits on flow, concentrations, and thermal changes~~ authorized by the States under ~~the appropriate~~ NPDES permit*s, which establish limits as necessary on flow rate, chemical constituent concentrations, and thermal changes.* (NEI1-7(4)-37)

Response: *The NRC staff agrees that the suggested changes clarify the NPDES discussion; therefore, Section 3.1.3 of the GEIS was modified in response to these comments.*

Comment: Page 3-21, lines 16 to 19: Sentence reads as follows:

All activities related to hazardous wastes – including storage, treatment, shipment, and disposal – are conducted pursuant to permits issued by the EPA or the State, if authorized, per the regulations issued under RCRA (see Section 3.11.2).

Because a permit is not necessarily required if hazardous waste is stored on-site for less than 90 days or if the facility is a small quantity generator, consider making the following change in the above-quoted sentence (~~strikethrough~~ font = deletion; *italics* font = addition):

All activities related to hazardous wastes – including storage, treatment, shipment, and disposal – are conducted pursuant to ~~*permits issued by the EPA or the State, if authorized, per*~~ the regulations issued *by the EPA or the State, if authorized,* under RCRA (see Section 3.11.2). (NEI1-7(4)-38)

Comment: Page 3-21. lines 21 to 26: Sentence reads as follows:

There are also some routine or nonroutine releases from power plants that may have hazardous components, including boiler blowdown (continual or periodic purging of impurities from plant boilers), water treatment wastes (sludges and high-saline streams whose residues are disposed of as solid waste and biocides), boiler metal cleaning wastes, floor and yard drains, and stormwater runoff. Principal chemical and biocide waste sources include the following: …

Because releases of wastewaters from nuclear power plants are regulated under NPDES permits, consider changing the above-quoted sentence as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

There are also some routine or nonroutine releases from power plants that may have hazardous components, including boiler blowdown (continual or periodic purging of impurities from plant boilers), water treatment wastes (sludges and high-saline streams whose residues are disposed of as solid waste and biocides), boiler metal cleaning wastes, floor and yard drains, and stormwater runoff. *With the exception of water treatment wastes, these releases would be regulated in accordance with each plant's NPDES permit.* Principal chemical and biocide waste sources include the following: …(NEI1-7(4)-39)

Comment: Page 3-22, lines 13 to 15: Sentences read as follows:

If the treatment plant is offsite, the sanitary waste is collected in underground tanks, tested for radioactivity, and sent offsite periodically. Any releases to surface water from onsite sewage plants are subject to NPDES permit limits.

Because some sites send sanitary wastewaters directly to a publicly owned treatment works ("POTW") without first collecting it in tanks, consider changing the above-quoted sentences as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

If the treatment plant is offsite, the sanitary waste is *either* collected in *septic* ~~*underground*~~ tanks, tested for radioactivity, and sent offsite periodically, *or the sanitary waste may be tested for radioactivity and discharged directly to a POTW*. Any *effluent* releases to surface water from onsite sewage plants are subject to NPDES permit limits. (NEI1-7(4)-40)

Response: *Section 3.1.5 of the GEIS was modified in response to these comments.*

Comment: Page 3-23, lines 25 to 27: Sentence reads as follows:

As described in Section 3.11.4, sanitary waste is either treated onsite or collected in underground tanks and then shipped offsite to be treated at a local sewage treatment plant.

Because some sites send sanitary wastewaters directly to a publicly owned treatment works ("POTW") without first collecting it in tanks, consider changing the above-quoted sentence as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

As described in Section 3.11.4, sanitary waste is either treated onsite, ~~or~~ collected in *septic* ~~*underground*~~ tanks and then shipped offsite to be treated at a local sewage treatment plant*, or discharged directly to a POTW.* (NEI1-7(4)-41)

Response: *Section 3.1.6.3 of the GEIS was modified in response to this comment.*

Comment: Page 3-35, lines 13 and 14: Text in lines 13 and 14 on page 3-35 reads as follows:

However, special permit conditions may be applicable under various regulatory jurisdictions for facilities located in EPA-designated nonattainment areas.

Because the conditions in all permits are intended to ensure that impacts are minimized, consider changing the above-quoted text to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

However, special permit conditions may be applicable under various regulatory jurisdictions for facilities located in EPA-designated nonattainment areas *to ensure that impacts to air quality are maintained at minimal levels.* (NEI1-7(4)-42)

Response: *Section 3.5.2 of the GEIS was revised as suggested.*

Comment: Page 3-53, box labeled "Clean Water Act": First bullet reads as follows:

• National Pollutant Discharge Elimination System (NPDES) permitting is required for wastewater discharge rate and chemical concentration limits.

Make the following changes in the first bullet to better reflect the requirements of the federal Clean Water Act NPDES permitting program, which are not uniformly implemented across all states (~~strikethrough~~ font = deletion; *italics* font = addition):

National Pollutant Discharge Elimination System (NPDES) ~~*permitting is*~~ *permits are* required ~~*for wastewater discharges rate*~~*, which impose controls on effluents, including cooling water from electricity generating plants that may include limits on flow rate* and chemical concentration~~*s limits*~~. (NEI1-7(4)-45)

Response: *The section and associated text box cited by the commenter have been revised and are now located in Section 3.5.1.2 of this revised GEIS. However, a discussion relevant to the scope of NPDES permits, consistent with the interpretation presented by the commenter, is provided in Section 3.5.1.2.*

Comment: Page 3-53, Lines 15-20: Delete sentence "AII. ... and individual states" and replace with: "Provisions of the Clean Water Act (CWA) regulate the discharge of pollutants into waters of the United States. The National Pollutant Discharge Elimination System (NPDES) requires that all facilities which discharge pollutants from any point source into waters of the United States obtain an NPDES permit. An NPDES permit is developed with two levels of controls:

technology-based limits and water quality-based limits. NPDES permit terms may not exceed 5 years, and the applicant must reapply at least 180 days prior to the permit expiration date. EPA is authorized under the CWA to directly implement the NPDES program; however, EPA has authorized many States to implement all or parts of the national program." (EPA-3(1)-5)

Response: *The NRC staff agrees that the suggested changes provide clarity to the requirements under the CWA and the NPDES permit process. Section 3.5.1.2 of the GEIS was updated in response to this comment.*

Comment: Page 3-53, lines 22 to 28: Sentences read as follows:

CWA Section 401 requires an applicant for a Federal license to conduct activities that produce discharge into navigable waters to provide the licensing agency with a certification from the State. This certification implies that discharges will comply with CWA requirements (33 USC 1341). If the applicant has not received Section 401 certification, the NRC cannot issue a license, including a renewed license (10 CFR 51.10(c)). NRC recognizes that some states include a 401 certification in the NPDES permit.

Make the following changes to the sentences in lines 22 to 28 on page 3-53 to more accurately reflect the 401 Water Quality Certification process and associated issuance (~~strikethrough~~ font = deletion; *italics* font = addition):

CWA Section 401 requires an applicant for a Federal license to conduct activities that *may cause a discharge of regulated pollutants* ~~*produce discharge*~~ into navigable waters to provide the licensing agency with a *water quality* certification from the State. This certification, *which typically has no expiration date associated with it,* implies that discharges *from the project to be licensed* will comply with *several* CWA requirements*, as applicable, including that the project will not cause or contribute to a violation of state water quality standards.* ~~*(33 USC 1341)*~~. If the applicant has not received *a* Section 401 certification, the NRC cannot issue a license *unless the State* ~~*regulatory agency*~~ *has waived the requirement. Waiver is automatic if the State does not respond to a certification request within one year (or less, if set by federal regulation. See 33 CFR Part 336.1(b)(8)(iii) (state waiver occurs after six months for projects awaiting Corps of Engineer permitting); 40 CFR 121.16 (waiver of state certification after "reasonable time" for processing, usually limited to six months). For facilities, seeking* ~~*including*~~ a renewed license (10 CFR 51.10(c)), the NRC *assumes that an NPDES Permit issued for the project (which, by law, must satisfy at least the same standards as a separate 401 Certification) implies new or continued certification by the state, unless state-specific regulations specify otherwise.* ~~*recognizes that some states include a 401 certification in the NPDES permit*~~*.* (NEI1-7(4)-43)

Response: *The NRC has revised Section 3.5.1.2 of the GEIS in response to this comment to more accurately clarify the Section 401 Water Quality Certification process, and to note that*

some NPDES-delegated States explicitly integrate their 401 certification process with NPDES permit issuance.

Comment: Page 3-53, lines 32 to 34: Sentence reads as follows:

NPDES permits for nuclear power plants may impose maximum temperature limits for effluents (which may vary by season) and/or a maximum temperature increase above the ambient water temperature (referred to as “delta-T,” which also may vary by season).

Make the following change because NPDES permits associated with nuclear plants may impose *either* specific limits *or* other conditions to control effluent temperature (~~strikethrough~~ font = deletion; *italics* font = addition):

NPDES permits for nuclear power plants may impose ~~*maximum*~~ temperature limits *or other specific conditions* for effluents (which may vary by season) and/or a maximum temperature increase above the ambient water temperature (referred to as "delta-T," which also may vary by season). (NEI1-7(4)-44)

Response: *Because the focus of Section 3.5.1.2 is thermal effluents, and other permit conditions are discussed prior in Section 3.5.1.2, the suggestion to include “or other specific conditions” was not made. However, the word “maximum” was deleted to be more broadly inclusive of temperature requirements.*

Comment: Page 3-53, Line 32: Delete "may" because NPDES permits need to include the proper water quality-based limits for temperature or the limit agreed upon via a thermal variance under section 316(a) of the Clean Water Act. (EPA-3(1)-6)

Response: *Section 3.5.1.2 of the GEIS was revised in response to this comment.*

Comment: Page 3-53, Line 35-36: Delete "Another approach ....and temperature" for accuracy, as this is an element of a 316(a) thermal variance (which is not being discussed in this paragraph) and not a water quality standard-based limit. (EPA-3(1)-7)

Response: *Section 3.5.1.2 of the GEIS was modified in response to this comment.*

Comment: Page 3-54, Lines 6-7: Replace sentence "Section 316(a)… with "Facilities may apply for a thermal variance from their NPDES temperature limitation under Section 316(a) of the CWA. The facility must be able to demonstrate that the requested variance is more stringent than necessary to assure the propagation of a balanced, indigenous population (40 CFR § 125 Subpart H) in order to receive an alternative thermal effluent limitation. The alternate thermal effluent limitation is only good for the term of the NPDES permit (5 years), and

the facility must reapply each permit term for the permitting authorities review and approval." (EPA-3(1)-8)

Response: *Section 3.5.1.2 of the GEIS was revised in response to this comment.*

Comment: Page 3-54, lines 7 to 9: Sentence reads as follows:

Section 316(b) deals with cooling water intakes and ensures that intake structures are designed with the best available technology to minimize impingement and entrainment of aquatic organisms.

To increase consistency of the text with the language in the CWA, change the phrase "minimize impingement and entrainment of aquatic organisms" at the end of the quoted sentence to "minimize adverse environmental impact." (NEI1-7(4)-47)

Comment: Page 3-54, Lines 7-10: Replace sentence "Section 316(b)…" with "Section 316(b) of the CWA requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact and is also regulated under the NPDES program." (EPA-3(1)-9)

Response: *Section 3.5.1.2 of the GEIS was revised in response to these comments.*

Comment: Page 3-54, Lines 9-16: Replace entire section beginning with "For ..." until the end of the paragraph with: "There are three rulemaking phases addressing cooling water intake structures. Phase I (enacted in December 2001) is for new facilities (see40 CFR § 125.83) with a design intake flow greater than 2 million gpd (7.6 million L/d) and that use at least 25% of water withdrawn used for cooling purposes (40 CFR § 125 Subpart I). Phase II (enacted in July 2004) applies to existing large, electric generating facilities with a design intake flow of 50 million gpd (189 million L/d) or more and that use at least 25% of the water withdrawn for cooling purposes (40 CFR § 125 Subpart J). The Phase II Rule was suspended on July 9, 2007. The latest information regarding this matter is located at:

http://www.epa.gov/waterscience/316b.

The Phase III Rule (enacted June 2006) established national standards for new offshore and coastal oil and gas extraction facilities with a design intake flow greater than 2 million gpd (7.6 million L/d) and that use at least 25% of water withdrawn used for cooling purposes (40 CPR § 125 Subpart N).

Existing facilities with a cooling water intake structure that are not currently subject to a national rule require Section 316(b) NPDES permit conditions that reflect best technology available for

minimizing adverse environmental impact on a case-by-case, best professional judgment (BPJ) basis (40 CFR. §§ 125.90(b) and 401.14).” (EPA-3(1)-10)

Comment: Page 3-54, Lines 18-25: Delete the entire paragraph discussing the Phase II of the rulemaking. The relevant portions are included in the previous comment. (EPA-3(1)-11)

Comment: Page 3-54, lines 21 and 22: Sentence reads as follows:

However, effective July 9, 2007, Phase II was suspended.

To improve clarity, consider changing the sentence spanning lines 21 and 22 on page 3-54 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

However, effective July 9, 2007, Phase II was suspended *after several of its key provisions were remanded by the Second U.S. Court of Appeals*. (NEI1-7(4)-48)

Comment: Page 3-54, lines 22 and 23: Sentence reads as follows:

According to the Clean Water Act, intakes are to be designed by using the best technology available for minimizing any environmental impact.

To increase consistency of the text with the language in the CWA, change the phrase “minimizing any environmental impact” at the end of the quoted sentence to “minimizing adverse environmental impact.” (NEI1-7(4)-49)

Response: *Section 3.5.1.2 of the GEIS was revised in response to these comments.*

Comment: Page 3-54, Line 36: Replace "State regulatory agencies" with "EPA or authorized State authorities." (EPA-3(1)-12)

Response: *Section 3.5.1.2 of the GEIS was revised in response to this comment.*

Comment: Page 3-55, Line 1: States − "Actions may include reviewing the permit for appropriate parameter levels, setting and compliance schedule for the applicant, and, in a worse case scenario, withdrawing a permit and disallowing the legal ability to discharge." Change to "...setting a compliance schedule for the applicant, assessing fines... " (EPA-3(1)-13)

Response: *Section 3.5.1.2 of the GEIS was revised in response to this comment.*

Comment: Page 3-55, lines 28 and 29: Sentence reads as follows:

It may be injected at the intake or targeted at various points (such as the condensers) on an intermittent or continuous basis.

To more completely reflect plant operations from injection to discharge, consider adding language to the sentence quoted above, as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

It may be injected at the intake or targeted at various points (such as the condensers) on an intermittent or continuous basis *with a dechlorinating agent injected into the effluent prior to its discharge to the environment.* (NEI1-7(4)-50)

Response: *Section 3.5.1.2 of the GEIS was revised to state that dechlorination may occur prior to discharge.*

Comment: Page 3-56, lines 22 to 31: First sentence of the paragraph on lines 22 through 31 reads as follows:

The quality of groundwater may be affected by water from nuclear power plant cooling ponds that has seeping into the underlying surficial aquifer.

All remaining sentences in the paragraph discuss the potential for soil and groundwater contamination from leaks and spills during storage and use at plant sites of hydrocarbon fuels, solvents, and other chemicals.

Consider deleting or moving the sentence on lines 22 and 23 on page 3-56 to a new, separate paragraph. The new paragraph should discuss the source of concern about groundwater contamination from cooling pond seepage. As written, the paragraph fails to draw any relationship between the discussion of chemical leaks and spills and the potential for contamination from cooling pond seepage. (NEI1-7(4)-51)

Response: *Section 3.5.2 of the GEIS was revised to clarify that operations at nuclear power plants may affect groundwater quality, and that seepage from cooling ponds was just one example.*

Comment: Page 3-56, lines 26 to 31: Sentences in lines 26 to 31 read as follows:

Examples from plant-specific SEISs include leakages or spills of gasoline (with methyl tertiary butyl ether, or MTBE) at fuel tank storage areas, spills of fuel at transfer or filling stations, solvent leakages from storage area drums, spilled or sprayed solvents, and underground line leaks of hydraulic oil or diesel fuel (NRC 2006b, 2007c). These incidents have involved

regulatory oversight, with authority falling under State regulations for hydrocarbons and under RCRA for other chemicals.

To make the last sentence in lines 26 to 31 on page 3-56 more complete as it relates to the examples provided in the first sentence, consider changing the last sentence to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

These incidents ~~*have*~~ involved regulatory oversight~~*, with authority falling*~~ under State regulations for hydrocarbons and under RCRA for other chemicals, *and offsite aquifers were not affected*. (NEI1-7(4)-52)

Response: *NRC has revised the text as suggested by the commenter except that NRC has added the phrase "and offsite groundwater users were not affected" in lieu of "and offsite aquifers were not affected" as suggested by the commenter. The NRC revised the text in this manner because the former statement is consistent with the information and findings presented in the SEISs prepared for the Palisades and Oyster Creek plants, which were used as examples of past spills at nuclear power plants.*

Comment: Page 3-56, lines 33 to 40: Sentences on lines 33 to 40 read as follows:

Radionuclide releases, primarily tritium, to groundwater have become an issue in recent years because of incidents at the Indian Point, Braidwood, Callaway, Dresden, Byron, and Palo Verde plants (NRC 2007d). The NRC (2006c) has examined the issue and noted the leaks are generally not observable because they are underground and because many plants do not have on-site groundwater monitoring wells. Although the plants are not under any specific regulatory requirements to have on-site groundwater monitoring programs, they are required to perform surveys, evaluate, and document the event and the hazard of known spills or leaks of radioactive material.…

Because tritium releases are the subject of an ongoing initiative, consider changing the sentences quoted above as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Radionuclide releases, primarily tritium, to groundwater ~~*have become an issue*~~ *raised concern* in recent years because of incidents at the Indian Point, Braidwood, Callaway, Dresden, Byron, and Palo Verde plants (NRC 2007d). The NRC (2006c) has examined the ~~issue~~ *matter* and noted the leaks are generally not observable because they are underground and because ~~many~~ some plants ~~do not~~ have *not been required to have* on-site groundwater monitoring wells. ~~Although the plants are not under any specific regulatory requirements to have on-site groundwater monitoring programs, they~~ *Even so, NRC licensees* are required to ~~*perform*~~ survey~~*s*~~, evaluate, ~~and~~ document*, and report* ~~the event and~~ the hazard of known spills or leaks of radioactive material*. …*" (NEI1-7(4)-53)

Response: *The NRC agrees with the suggested changes, and Section 3.5.2 of the GEIS was revised in response to this comment; however, further clarification was added that onsite groundwater monitoring wells are not required unless an onsite well is used for drinking water or irrigation water.*

Comment: Page 3-57, lines 1 to 9: Sentences on lines 1 to 9 read as follows:

[Additionally it is important to note that] all plants are required to submit an annual report, which is publically [sic] available, to the NRC which summarizes the types and quantities of radioactive material released into the environment. In response to these groundwater events, the Nuclear Energy Institute (2007a), which represents the nuclear industry, committed to the NRC to have sites-specific groundwater protection programs in place at each site by July 31, 2006. These programs cover the assessment of plant systems and components, site hydrogeology, and implementation of groundwater monitoring programs, To monitor the actions of the nuclear industry, the NRC updated its inspection procedure to include this issue as part of its routine radiological inspection at all nuclear power plants.

To clarify the text on lines 1 to 9 on page 3-57, consider modifying the paragraph to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

[Additionally it is important to note that] all plants are required to submit an annual report, which is publically available, to the NRC that summarizes the types and quantities of radioactive material released into the environment.

[NEW Paragraph]In response to ~~these groundwater events~~ *discoveries of underground radionuclide releases at nuclear power plants*, the Nuclear Energy Institute (2007a), which represents the nuclear industry *on policy issues, developed the Ground Water Protection Initiative. Each plant voluntarily* committed ~~to the NRC~~ to have *an action plan to develop the* site-specific groundwater protection programs in place at *each commercial nuclear power plant* site by July 31, 2006. These programs cover the assessment of plant systems and components, site hydrogeology, and implementation of groundwater monitoring programs. To monitor the actions of the nuclear industry, the NRC updated its inspection procedure to include this issue as part of its routine radiological inspection at all nuclear power plants. (NEI1-7(4)-54)

Response: *Section 3.5.2 of the GEIS was revised in response to this comment.*

Comment: Page 3-76, lines 21 to 24: Text in lines 21 to 24 on page 3-76 reads as follows:

To date, EFH assessments have been completed as part of the license renewal process for three nuclear power plants (Pilgrim, Vermont Yankee, and Oyster Creek) and as part of the extended power uprate evaluation for the Hope Creek plant.

Because an EFH assessment has also been completed at Brunswick, make the following change to the text in lines 21 to 24 on page 3-76 (~~strikethrough~~ font = deletion; *italics* font = addition):

To date, EFH assessments have been completed as part of the license renewal process for ~~three~~ *four* nuclear power plants (*Brunswick*, Pilgrim, Vermont Yankee, and Oyster Creek) and as part of the extended power uprate evaluation for the Hope Creek plant. (NEI1-7(4)-61)

Response: *The text in Section 3.6.3.2 of the GEIS was revised to indicate that EFH assessments were performed at a number of plant sites, rather than serve as a comprehensive list of all EFH assessments performed.*

Comment: Vol. 1, Page 3-105, Table 3.9-7, Row labeled "LaSalle 1,2":

a. Column labeled "Annual Occupational Dose (rem) Maximum" reports a value of "0.16."
b. Column labeled "Annual Occupational Dose (rem) Minimum" reports a value of "0.11."

a. Based on annual reports submitted to the NRC by the LaSalle plant, the "Annual Occupational Dose (rem) Maximum" should be changed in Table 3.9-7 from "0.16" to “0.50.”

b. Based on annual reports submitted to the NRC by the LaSalle plant, the "Annual Occupational Dose (rem) Minimum" should be changed in Table 3.9-7 from "0.11" to "0.15." (Exelon-17-4)

Response: *The values in Table 3.9-7 of the GEIS were changed as requested.*

Comment: Vol. 1, Page 3-108, Table 3.9-8, Row labeled "Three Mile Island 1": Column labeled “Annual Collective Dose (person-rem/reactor)" for the year 2004 reports a value of "0."

Based on the 10 CFR 20.2206(b) Three Mile Island Personnel Radiation Exposure Report for 2004, submitted to NRC on March 17, 2005, the "Annual Collective Dose (person-rem/reactor)" for the year 2004 should be changed from "0" to "3." (Exelon-17-5)

Response: *The value in Table 3.9-8 of the GEIS was changed from “0” to “3” as requested.*

Comment: Vol. 1, Page 3-109, Table 3.9-8, Row labeled "Oyster Creek": Column labeled “Annual Collective Dose (person-rem/reactor)" for the year 2000 reports a value of "614."

Based on radiation protection records for the Oyster Creek plant, the "Annual Collective Dose (person-rem/reactor)" for the year 2000 should be changed from "614" to "625.” (Exelon-17-6)

Response: *The value in Table 3.9-8 of the GEIS was changed from "614" to "625" as requested.*

Comment: Vol. 1, Page 3-111, Table 3.9-9, Row labeled "Three Mile Island 1": Column labeled "Annual Measurable Occupational Dose (rem)" for the year 2004 reports a value of "0.00."

Based on the 10 CFR 20.2206(b) Three Mile Island Personnel Radiation Exposure Report for 2004, submitted to NRC on March 17, 2005, the "Annual Measurable Occupational Dose (rem)" for the year 2004 should be changed from "0.00" to "3.4." (Exelon-17-7)

Response: *The value in Table 3.9-8 of the GEIS was changed from "0.00" to "0.03" based on the staff's review of the personnel radiation exposure data for Three Mile Island, Unit 1 contained in NUREG-0713, Volume 31. The staff was unable to verify the value "3.4" in the licensee's occupational export report for 2004.*

Comment: Vol. 1, Page 3-112, Table 3.9-9, Row labeled "LaSalle": Column labeled "Annual Measurable Occupational Dose (rem)" for the year 1996 reports a value of "0.29."

Based on annual reports submitted to the NRC by the LaSalle plant, the "Annual Measurable Occupational Dose (rem)" for the year 1996 should be changed from "0.29" to "0.31." (Exelon-17-8)

Response: *The value in Table 3.9-9 of the GEIS was changed from "0.29" to "0.31" as requested.*

Comment: Page 3-120, lines 31 to 33: Text in lines 31 to 33 on page 3-120 reads as follows:

An annual survey (land census) identifies changes in the use of unrestricted areas to provide a basis for modifying the monitoring programs to reflect a new exposure pathway or a different site-specific dose calculation parameter.

Because some facilities conduct surveys at frequencies other than annual, consider making the following changes to the text in lines 31 to 33 on page 3-120 (~~strikethrough~~ font = deletion; *italics* font = addition):

~~An annual~~ *A periodic land use* survey ~~(land census)~~ identifies changes in the use of unrestricted areas to provide a basis for modifying the monitoring programs to reflect a new exposure pathway or a different site-specific dose calculation parameter. (NEI1-7(4)-63)

Response: *The suggested change has been made to Section 3.9.1.3 of the GEIS.*

Comment: Page 3-121 and 3-122, Table 3.9-14: Four columns in Table 3.9-14 provide annual dose information for selected nuclear plants. The columns are labeled "Total Body," "Gamma," "Beta," and "Critical Organ."

In Table 3.9-14, consider adding an explanatory note, or modifying the column titles, to clarify that the entries in the columns labeled "Gamma" and "Beta" represent "ground-level air dose," as the sentence in lines 39 through 41 on page 3-120 states. (NEI1-7(4)-64)

Response: *The suggested change has been made to Table 3.9-14 of the GEIS.*

Comment: Page 3-126, Table 3.9-18: In the Table 3.9-18 column labeled "Radionuclides Detected," the entry for the Callaway Plant reads as follows:

Tritium, cobalt-58, cobalt-60, cesium-134, and cesium-137

The NRC is encouraged to change the above-quoted entry for Callaway from "tritium, cobalt-58, cobalt-60, cesium-134, and cesium-137" to "tritium." Tritium was the only radionuclide found outside the monitoring wells in the numerous samples conducted near the well location. The other radionuclides were found in the French drain of the manhole but not found outside the well. Therefore, the mentioned radionuclides other than tritium were not released to the environment. (NEI1-7(4)-66)

Response: *The table referenced in the comment was adapted from the Task Force Report (NRC 2006). This table shows the inadvertent release of radioactive liquids and includes the radionuclides listed. Radioactive cobalt and cesium were detected in the surface soil inside the manholes where the valves are located. The detection in the surface soil implies release of activity. No change was made to the GEIS in response to this comment.*

Comment: Page 3-126, Table 3.9-18: In the Table 3.9-18 column labeled "Source of Release," the entry for the Callaway Plant reads as follows:

Vacuum breaker valves on the circulating water blowdown line

The NRC is encouraged to change the above-quoted entry for Callaway from "vacuum breaker valves" to "air release valves." (NEI1-7(4)-65)

Response: *The suggested change has been made to Section 3.9.1.3 of the GEIS.*

Comment: Page 3-128, Table 3.9-19: Four columns in Table 3.9-19 provide information about doses from inadvertent releases of radioactive liquids at nuclear power plants.

To clarify the nature of the dose calculation for Indian Point that is reported in the Table 3.9-19 column labeled “Maximum Water Contamination (pCi/L) at Offsite Locations,” consider changing the entry to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition): ~~Approximation made in dose calculations~~ *Dose calculated conservatively* (NEI1-7(4)-67)

Response: *The suggested change has been made to Section 3.9.1.3 of the GEIS.*

Comment: Page 3-130, lines 14 to 16: The text in lines 14 to 16 on page 3-130 reads as follows:

The coefficients used (Table 3.9-20) are the same as those recently published by ICRP in connection with a revision of its recommendations (ICRP 1991).

Because the date of the cited reference (1991) is not recent, consider revising the sentence in lines 14 through 16 on page 3-130 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

The coefficients used (Table 3.9-20) are the same as those ~~recently~~ published by ICRP in connection with a revision of its recommendations (ICRP 1991). (NEI1-7(4)-68)

Response: *For accuracy, the suggested change has been made to Section 3.9.1.4 of the GEIS.*

Comment: Page 3-133, Lines12-17: add "Clean Water Act" (EPA-3(1)-14)

Response: *Section 3.9.2 of the GEIS has been modified to add the CWA to the list of Federal Acts that the EPA administers.*

Comment: Page 3-133, lines 19 to 25: The text in lines 19 to 25 on page 3-133 reads as follows:

Nuclear power plants are required to submit to the EPA and the State annual reports of the environmental releases of listed toxic chemicals manufactured, processed, or otherwise used above Federally and State-identified threshold quantities. Disposal of essentially all of the hazardous chemicals used at nuclear power plants is regulated by RCRA or NPDES permits. Nuclear power plants are required by the NRC to operate in compliance with all permits, therefore minimizing the impact on the environment, workers, and the public. Therefore, the health impacts from chemicals on workers and the public are considered small.

The first sentence in the above-quoted text (lines 19 to 21 on page 3-133) refers to reporting required under Section 313 of the Emergency Planning and Community Right-to-Know Act

(EPCRA) as implemented by U.S. Environmental Protection Agency regulations (40 CFR [Part] 372). The statement is somewhat misleading, however, because many nuclear power plants manufacture, process, or otherwise use such small quantities of toxic chemicals that the threshold quantities for reporting under 40 CFR [Part] 372 are not triggered. Also, many nuclear power plants are not required to obtain RCRA permits since they neither dispose of hazardous wastes on site nor store hazardous wastes for longer than RCRA allows without a permit (90 days for large quantity generators or 120 days for other generator types under most conditions). Therefore, the last three sentences in the above quoted text (lines 21 to 25 on page 3-133) are also somewhat misleading. Accordingly, consider changing the text in lines 19 to 25 on page 3-133 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Nuclear power plants *may be* ~~are~~ required *in some instances* to submit ~~to the EPA and the State~~ annual reports of the environmental releases of listed toxic chemicals manufactured, processed, or otherwise used *that are* above ~~Federally and State~~identified threshold quantities, *depending on state regulations or other specific circumstances.* ~~Disposal of~~ *In addition, management, including treatment, storage, disposal, and release to the environment, of* ~~essentially all of the~~ hazardous chemicals used at nuclear power plants is regulated by RCRA*, FIFRA, TSCA,* or ~~NPDES permits~~*the Clean Water Act. In the case of releases to state and federal waters, the Clean Water Act requires that nuclear power plants obtain NPDES permits, which establish protective release limits and controls as well as monitoring and reporting requirements. RCRA, FIFRA, and TSCA also establish reporting requirements that frequently apply to management of nonradioactive hazardous chemicals at nuclear power plants, and some nuclear power plants may undertake activities that require a RCRA permit.* Nuclear power plants are required by the NRC to operate in compliance with all ~~permits~~*applicable environmental laws, regulation, and permits*, ~~therefore~~*thereby* minimizing the impact on the environment, workers, and the public. Therefore, the health impacts from chemicals on workers and the public are considered small. (NEI1-7(4)-69)

Response: *To more clearly state the requirements for the management of hazardous materials under various Federal statutes, the suggested changes have been made to Section 3.9.2 of the GEIS.*

Comment: Page 3-136, lines 17 to 26: The paragraph in lines 17 to 26 on page 3-136 describes a study published in 2006 that discovered *Legionella*-like amoebal pathogens to be 16 times more likely to occur in samples from cooling towers located at industrial, hospital, municipal, university, and public building sites that in samples from natural environments such as rivers, creeks, lakes, and ponds. The last sentence in the paragraph states that this discovery "justifies the need for monitoring."

The cooling towers tested during the study described in lines 17 to 26 on page 3-136 were not comparable with those used for condenser cooling at nuclear power stations. Therefore, it is

unclear what monitoring at any nuclear power plant might be "justified" by the referenced study. Consider changing the last sentence in the paragraph (lines 25 and 26) to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

According to this study, the probability of infected amoebae occurring in cooling towers is 16 times higher than in natural environments.~~, which justifies the need for monitoring.~~ (NEI1-7(4)-70)

Response: *The suggested change has been made to Section 3.9.3.2 of the GEIS.*

Comment: Vol. 1, Page 3-137, lines 33 to 35: Text in lines 33 to 35 on page 3-137 reads as follows:

For some plants, such as Hatch, Quad Cities, Peach Bottom, and Monticello, NPDES permits set limits on the maximum daily temperature for the discharge.

The current NPDES permit (issued December 1, 2000) for the Peach Bottom Atomic Power Station does not contain a maximum daily discharge temperature limit. Rather, the permit requires that the discharge water temperature be monitored and reported. Accordingly, the following modification is suggested to the text in lines 33 to 35 on page 3-137 (~~strikethrough~~ font = deletion; *italics* font = addition):

For some plants, such as Hatch, Quad Cities, ~~Peach Bottom~~, and Monticello, NPDES permits set limits on the maximum daily temperature for the discharge. (Exelon-17-9)

Response: *The suggested change has been made to Section 3.9.3.4 of the GEIS.*

Comment: Page 3-150, Table 3.11-1: Three columns in Table 3.11-1 on page 3-150 provide volume, activity, and number of shipments of the solid low-level radioactive waste shipped offsite from each of ten nuclear power plants during 2006. A fourth column in Table 3.11-1 indicates the number of reactors at each nuclear power plant site. For the Indian Point and San Onofre plants, the number of reactors is given as "3 (Units 1, 2, and 3)." Footnote (b) explains that at both of these sites, Unit 1 is shut down.

Because the closed units at Indian Point and San Onofre generated none of the low-level radioactive waste quantities reported in Table 3.11-1, consider changing the entries in the column labeled "Number of Reactors" for both Indian Point and San Onofre from "3 (Units 1, 2, and 3)" to "2 (Units 2 and 3)." Table 3.11-1 appears to be intended to provide information on LLRW disposed of from operating units. The quantity of waste reported for SONGS Units 1, 2, and 3 is the total volume of LLRW from Unit 1 that was undergoing active decommissioning in

2006 and the LLRW from Units 2 and 3 that are operating units. For further clarity, retain footnote (b) explaining that at both sites, Unit 1 is shut down. (NEI1-7(4)-73)

Response: *To clarify the status of Unit 1 at Indian Point and San Onofre with respect to decommissioning, text describing the status of those reactors has been added to footnote (b) in Table 3.11-1 of the GEIS; however, the entries in Table 3.11-1 were not changed.*

Comment: Page 153, Figure 3.11-2: Figure 3.11-2 contains a map showing the locations of Independent Spent Fuel Storage Installations (ISFSIs) that are licensed by the NRC.

Consider updating Figure 3.11-2, to show the licensed ISFSIs at the Indian Point, Vermont Yankee, and Limerick nuclear power plant sites. (NEI1-7(4)-74)

Response: *Figure 3.11-2 of the GEIS has been updated as suggested in the comment.*

Comment: Page 3-154, lines 28 to 29: Text in lines 28 and 29 on page 3-154 reads as follows:

"The types of hazardous waste that nuclear power plants generate include waste paints, lab packs, solvents, and lead batteries."

Because "batteries" are not hazardous waste if they are reclaimed or managed as universal waste, consider changing the text in lines 28 and 29 on page 3-154 to read as follows (~~strikethrough font~~ = deletion; *italics* font = addition):

The types of hazardous waste that nuclear power plants *typically* generate include waste paints, lab packs, and solvents~~, and lead batteries~~. (NEI1-7(4)-75)

Response: *Section 3.11.2 of the GEIS has been revised as suggested in the comment.*

Comment: Page 3-155, lines 21 to 23: Text in lines 21 to 23 on page 3-155 reads as follows:

"The only disposal facility that is authorized to receive mixed LLW for disposal at present is the EnergySolutions facility discussed under Section 3.11.1.1 on LLW."

The validity of the statement in lines 21 to 23 on page 3-155 should be verified before publication of the final updated GEIS because on September 10, 2009, the Texas Commission on Environmental Quality issued a Radioactive Material License for disposal of low-level radioactive waste in a unit to be constructed at the Waste Control Specialists, LLC facility in Andrews County, Texas. (NEI1-7(4)-76)

Response: *The text in Section 3.11.3 of the GEIS has been revised to clarify that the WCS facility in Texas has also been authorized to receive mixed LLW.*

Comment: Page 3-155, lines 36 to 38: Text in lines 36 to 38 on page 3-155 reads as follows:

"Some power plants collect their sanitary waste in septic tanks and empty the tanks periodically, shipping the pumped sewage to a local sanitary waste treatment plant."

Because some nuclear power plants discharge sanitary waste directly to a POTW, consider changing the text in lines 36 to 38 on page 3-155 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Some power plants *discharge directly to a POTW while others* collect their sanitary waste in septic tanks and empty the tanks periodically, shipping the pumped sewage to a local sanitary waste treatment plant. (NEI1-7(4)-77)

Response: *Section 3.11.4 of the GEIS has been revised as suggested in the comment.*

Comment: For each environmental resource identified in the draft updated GEIS, Chapter 4 in the GEIS identifies and evaluates environmental consequences of the proposed action and the environmental consequences of alternatives to the proposed action. However, industry notes that a parallel structure for presenting the analysis in each section has not been adopted. For example, the discussions of environmental consequences of the proposed action are explicitly divided for some but not all resources into separate sections for continued operations and refurbishment activities. Also, these discussions are divided for some but not all resources into separate sections for operations and construction.

Similarly, the discussions of environmental consequences of alternatives to the proposed action are explicitly divided for some but not all resources into separate sections for fossil energy alternatives, new nuclear alternatives and renewable energy alternatives. Also, the section on environmental consequences of renewable energy alternatives addresses different renewable energy sources for some resources than for others. These inconsistencies in format and content reduce the clarity and transparency of the draft updated GEIS by making it difficult to make comparisons among the conclusions in the various sections. Industry encourages the NRC to adopt and apply a clear and consistent format for discussing environmental consequences in Chapter 4 of the final updated GEIS (OBIL-NEI-8)

Comment: Page 4-9, lines 16 to 41 and Page 4-10, lines 1 to 7: Text in section 4.2.2, "Environmental Consequences of Alternatives to the Proposed Action," is divided into two subsections labeled "Construction" and "Operations."

The purpose and scope of the text in Section 4.2.2 is not clear. Consider whether better clarity could be achieved by structuring Sections 4.2.1 (Proposed Action) and 4.2.2 (Alternatives to the Proposed Action) with parallel formats. That is, with numbered subsections labeled consistently in both sections, for example – "4.2.1.1 Land Use" and "4.2.2.1 Land Use"; "4.2.1.2 Visual Resources" and "4.2.2.2 Visual Resources." In subsection 4.2.1.1, land use impacts of the proposed action would be addressed, and in subsection 4.2.2.1, land use impacts of the alternatives could be discussed. If constructional and operational impacts will be presented separately for the proposed action, they should be presented separately for each alternative to the proposed action (or for each category of alternatives—Fossil Energy; New Nuclear; Renewable Energy). At minimum, consider clarifying which alternatives to the proposed action are expected to cause the impacts described by the introductory text in Section 4.2.2 on page 4-9, lines 16 to 41 and page 4-10, lines 1 to 7.

Please generalize this comment and also apply it, as appropriate, in the following sections of the draft updated GEIS:

- 4.3, "Air Quality and Noise"
- 4.4, "Geology and Soils"
- 4.5, "Hydrology"
- 4.6, "Ecology"
- 4.7, "Historic and Cultural Resources"
- 4.8, "Socioeconomics"
- 4.9, "Human Health"
- 4.10, "Environmental Justice"
- 4.11, "Waste Management and Pollution Prevention"

(NEI1-7(4)-82)

Response: *The discussion of alternatives in Chapter 4 of the GEIS has been revised to provide a consistent treatment for each resource area and alternative to license renewal.*

Comment: Page 4-10, lines 16 to 20: Text in lines 16 to 20 on page 4-10 is labeled "*Construction – …"*

Although the text in lines 16 to 20 on page 4-10 of the draft updated GEIS is labeled "*Construction* – …" it appears to address both construction and operations impacts. Consider creating a separate paragraph labeled "*Operations* – …*"* (NEI1-7(4)-84)

Response: *The text in Section 4.2.2.1 of the GEIS was modified as suggested in the comment.*

Comment: Page 4-13, lines 25 and 26: Text in lines 25 and 26 on page 4-13 reads as follows:

Emergency diesel generators and fire pumps typically require State or local operating permits.

Because emergency diesel generators and fire pumps are typically listed as insignificant activities in permits based on their minimal operational run times, as the draft updated GEIS states in lines 37 to 40 on page 4-13, consider changing the above quoted text in lines 25 and 26 on page 4-13 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Emergency diesel generators and fire pumps *are* typically *listed as insignificant activities in* ~~*require*~~ State or local operating permits *as discussed below*. (NEI1-7(4)-85)

Response: *Permits are required in most jurisdictions, and, under the recently promulgated Federal National Emissions Standards for Hazardous Air Pollutants for reciprocating internal combustion engines, which will generally be administered by the States, additional emergency generators and fire pumps may require permits and may no longer be considered insignificant. No changes were made to the GEIS in response to this comment*.

Comment: Page 4-13, line 37: Text in lines 37 and 38 on page 4-13 reads as follows:

Most, if not all, State air pollution regulations provide exemptions for air pollution sources that are not routinely operated, …

Delete the term “, if not all,” in line 37 on page 4-13 of the draft updated GEIS. (NEI1-7(4)-86)

Response: *Section 4.3.1.1 of the GEIS was revised as suggested.*

Comment: Page 4-30, lines 3 to 7: Text in lines 3 to 7 on page 4-30 read as follows:

Hydrologic conditions at all nuclear power plants and associated transmission lines have been well established during the current licensing term. However, continued operations and refurbishment activities could have an impact on water resources during the license renewal term. This section describes the potential impact of these activities on surface water and groundwater resources.

For completeness, consider changing the last sentence (lines 6 and 7 on page 4-30) in the above-quoted paragraph to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

This section describes the potential impact of these *proposed* activities *and alternatives to these proposed activities* on surface water and groundwater resources. (NEI1-7(4)-90)

Response: *Section 4.5 of the GEIS was revised in response to this comment.*

Comment: Page 4-31, lines 17 and 18: Text in lines 17 and 18 on page 4-31, which is one bullet in a list of issues related to impacts on surface water that may occur during the license renewal term, reads as follows:

• Water use conflicts for plants with cooling ponds or cooling towers using makeup water from a river with low flow (evaluated in the 1996 GEIS)

The draft updated GEIS provides no definition for the phrase "river with low flow," which is used in line 18 on page 4-31. To clarify the meaning of the phrase "river with low flow" throughout the draft updated GEIS, consider providing a definition on page 4-31 of the draft and also in chapter 2 (Table 2.1-1). (NEI1-7(4)-91)

Response: *A definition of a river with low flow had been added to Section 4.5.1.1 of the draft revised GEIS, which was based on the 1996 GEIS. The term "low flow" was used in the 1996 GEIS to define the difference between plants located on "small" rivers versus those on "large" rivers as related to annual river flow. This was discussed in Section 4.5.1.1 of the draft revised GEIS. Nevertheless, NRC has subsequently determined that the use of the terms in categorizing river flow is of little value as any river, regardless of size, can experience low flow conditions of varying severity during periods of drought and as further influenced by specific conditions in the affected watershed. Thus, the term "low flow" has been deleted from use as a qualifier in describing environmental issues in this revised GEIS.*

Comment: Page 4-35, lines 33 to 37: Text in lines 33 to 37 on page 4-35 reads as follows:

Discharge of cooling water is monitored through individual State NPDES programs. The flow rate and chemical content of the water at discharge outfalls are regulated by State oversight in accordance with the NPDES permit. Wastewater discharge is also covered through NPDES permitting, and it includes biochemical monitoring parameters. Discharge from building drains is also addressed in the NPDES permit.

To more accurately describe the NPDES permit program, consider changing the text in lines 33 to 37 on page 4-35 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition): Discharge*s* of cooling water *and other plant wastewaters are* ~~is~~ monitored through individual State NPDES programs *via NPDES permits. The NPDES permit for a nuclear power plant contains requirements that limit the amount of pollutants that may be discharged at permitted outfalls. The permit also typically contains biological monitoring parameters that are primarily associated with the discharge of cooling water.* ~~The flow rate and chemical content of the water at discharge outfalls are regulated by State oversight in accordance with the NPDES permit. Wastewater discharge is also covered through NPDES permitting, and it includes biochemical monitoring parameters. Discharge from building drains is also addressed in the NPDES permit~~. (NEI1-7(4)-92)

Response: *Section 4.5.1.1 of the GEIS was revised in response to this comment.*

Comment: Page 4-37, lines 12 and 13: Text in lines 12 and 13 on page 4-37 reads as follows:

Cooling ponds will also require makeup water as a result of naturally occurring evaporation, evaporation of the warm effluent, and possible seepage to groundwater.

Because seepage would only be expected to occur in an unlined pond, consider changing the text in lines 12 and 13 on page 4-37 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Cooling ponds will also require makeup water as a result of naturally occurring evaporation, evaporation of the warm effluent, and *if the pond is unlined,* possible seepage to groundwater. (NEI1-7(4)-93)

Response: *NRC disagrees with this comment. While installation of a liner for cooling ponds is an effective mitigation measure, seepage to groundwater is still possible due to liner degradation over time, direct physical damage that causes leakage, or via overtopping of the cooling pond itself. Use of the term "possible" covers all possible contingencies. No change was made to the GEIS in response to this comment.*

Comment: Page 4-37, lines 35 to 40: Text in lines 35 to 40 on page 4-37 reads as follows:

The SEIS for the Wolf Creek plant in Kansas identified a site-specific water use conflict with a small to moderate impact (NRC 2008a). Makeup water for the Wolf Creek cooling lake (Coffee County Lake) is withdrawn from the Neosho River downstream of John Redmond Reservoir. The ecosystem downstream of this reservoir includes an endangered fish species, the Neosho madtom (Noturus placidus), which may be affected by the plant's water use during periods when the lake level is low and makeup water is obtained from the Neosho River.

Because the discussion in the subsection containing lines 35 to 40 on page 4-37 of the draft updated GEIS focuses on water use conflicts among municipal, agricultural and industrial users of surface water resources, the above-quoted paragraph does not provide a pertinent example. Rather, it is an example of a water use conflict between a nuclear power plant user and aquatic communities that rely on surface water for their livelihood. Water use conflicts of the latter type are discussed in Section 4.6.1.2 of the draft updated GEIS (page 4-102), and this example is repeated there. Accordingly, consider deleting all of the text in lines 35 to 40 on page 4-37. (NEI1-7(4)-94)

Response: *Section 4.5.1.1 of the GEIS was revised in response to this comment to remove the text requested by the commenter.*

Comment: Page 4-38, lines 5 and 6: Text in lines 5 and 6 on pager 4-38 reads as follows:

Availability problems for downstream habitat and users have also been identified as a conflict at the Palo Verde plant in Arizona and may be anticipated at other plants.

Based on the recent Palo Verde license renewal application, the above-quoted sentence referring to Palo Verde water use conflicts should be deleted from lines 5 and 6 on page 4-38 because, given the constant rate of use of recycled water by Palo Verde and the projections for increase of treated effluent in the area, water use conflicts with respect to the Gila River are expected to be much less influenced by Palo Verde than by decisions of municipalities to either discharge or reuse portions of their effluent. (NEI1-7(4)-95)

Response: *Based on the finding in the Palo Verde SEIS of SMALL impact relative to water use conflicts, the text in question was revised to remove the reference to Palo Verde.*

Comment: Page 4-38, lines 23 to 41 and Page 4-39, lines 1 to 5: Text in lines 23 to 41 on page 4-38 and lines 1 to 5 on page 4-39 consists of a subsection titled "Effects of Dredging on Water Quality."

The discussion in the subsection titled "Effects of Dredging on Water Quality" should be modified to acknowledge that the process for obtaining a permit from the U.S. Army Corps of Engineers (USACE) to dredge pursuant to Section 404 of the Clean Water Act includes an environmental review pursuant to NEPA. If the dredging might affect threatened or endangered species or Critical Habitat, as established under the Endangered Species Act, the USACE must consult with the National Marine Fisheries Service and/or the U.S. Fish and Wildlife Service before it makes a permit decision. In issuing any permit under the Section 404 permitting process, the USACE also considers other aquatic impacts, archeological resources, tribal concerns, and the permitting requirements of state and local agencies.

This comment should also be applied to other sections in the draft updated GEIS that discuss the effects of dredging on water quality. (NEI1-7(4)-96)

Response: *Section 4.5.1.1 of the GEIS was modified to better clarify the requirements under the CWA for dredging and the related permitting process.*

Comment: Page 4-38, lines 27 to 30: Text in lines 27 to 30 on page 4-38 reads as follows:

Whether accomplished by mechanical, suction, or other methods, dredging disturbs sediments in the surface water body and affects surface water quality. In pristine locations, the impact will affect the turbidity of the water column.

The intent of the above-quoted statement is to say that in clear water conditions, the turbidity will be more noticeable. But, dredging may affect turbidity in any water. Accordingly, consider changing the text in lines 27 to 30 on page 4-38 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Whether accomplished by mechanical, suction, or other methods, dredging disturbs sediments in the surface water body and affects surface water quality. ~~In pristine locations, t~~The impact will temporarily affect the turbidity of the water column. (NEI1-7(4)-97)

Response: *The staff agrees with the proposed changes, and Section 4.5.1.1 of the GEIS was revised to state that dredging disturbs sediments in the surface water body and affects surface water quality by temporarily increasing the turbidity of the water column.*

Comment: Page 4-39, lines 31 and 32: Text in lines 31 and 32 on page 4-39 reads as follows:

"Operational activities during the license renewal term would be similar to those occurring during the current license term and would not affect groundwater resources."

Because several groundwater impact issues have been determined in the draft updated GEIS to be Category 2 issues, which suggests that operational activities do have some effect on groundwater resources, consider revising the sentence in lines 31 and 32 on page 4-39 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Operational activities during the license renewal term would be similar to those occurring during the current license term ~~and would not affect groundwater resources~~. (NEI1-7(4)-98)

Response: *Section 4.5.1.2 of the GEIS was revised in response to this comment.*

Comment: Page 4-45, lines 33 and 34: Text in lines 33 and 34 on page 4-45 reads as follows:

Furthermore, contaminants present in the soil can act as long-term sources of contamination to underlying groundwater.

Because some spills are incidental or minor and are immediately remediated so that no contaminants are remaining in the soil, consider changing the text in lines 33 and 34 on page 4-45 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Furthermore, contaminants present in the soil can act as long-term sources of contamination to underlying groundwater*, depending on the severity of the spill.* (NEI1-7(4)-99)

Response: *Section 4.5.1.2 of the GEIS was revised in response to this comment.*

Comment: Page 4-45, lines 36 and 37: Text in lines 36 and 37 on page 4-45 reads as follows:

Based on previous plant-specific reviews, these types of groundwater and soil contamination problems have occurred at many operating plants.

To improve consistency between the contents of previous Supplemental Environmental Impact Statements for Nuclear Plant License Renewal prepared by the NRC and the draft updated GEIS, consider changing the sentence in lines 36 and 37 on page 4-45 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Based on previous plant-specific reviews, these types of groundwater and soil contamination problems have occurred at *some* ~~many~~ operating plants. (NEI1-7(4)-100)

Response: *Section 4.5.1.2 of the GEIS was revised in response to this comment.*

Comment: Page 4-47, lines 33-36: Text reads as follows:

On the basis of occurrences at several nuclear plants, the impact of radionuclide releases to groundwater quality could be small or moderate, depending on the occurrence and frequency of leaks and the ability to respond to leaks in a timely fashion. The issue is considered a Category 2 issue.

The above-quoted statement appears to conflict with the conclusion from the NRC's Liquid Release Lessons Learned Task Force Final Report issued on Sept. 1. 2006: "*Although there have been a number of industry events where radioactive liquid was released to the environment in an unplanned and unmonitored fashion, based on the data available, the task force did not identify any instances where the health of the public was impacted*."

The NRC is encouraged to revise the potential impact classification of radionuclides released to groundwater to Category 1 and to amend the language on lines 33-35 as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

On the basis of occurrences at several nuclear plants, the impact of radionuclide releases to groundwater quality ~~could be~~ *is expected to be* small ~~or moderate, depending on the occurrence and frequency of~~ *given the improved onsite groundwater monitoring for* leaks and the *enhanced* ability to respond to leaks in a timely fashion. *The NRC does not consider these inadvertent*

releases of radionuclides to groundwater to be a health risk to the public or workers. The issue is considered a Category ~~2~~ *1* (NEI1-7(4)-15)

Response: *This new Category 2 issue evaluates the potential contamination and degradation of groundwater resources resulting from inadvertent discharges of radionuclides into groundwater from nuclear power plants. Within the past several years, there have been numerous events at power reactor sites which involved unknown, uncontrolled, and unmonitored releases of radionuclides into the groundwater. As described in the revised GEIS, the majority of these inadvertent radionuclide releases have involved tritium. However, other radionuclides, such as cesium and strontium, have also been inadvertently released. These inadvertent releases have been caused by leakage from spent fuel pools and buried piping, and in one case, the failure of pressure relief valves on a liquid effluent discharge line.*

On the basis of the available information and experience with these leaks, the NRC concludes that the impact to groundwater quality from the release of radionuclides could be SMALL or MODERATE, depending on the magnitude of the leak, the radionuclides involved, and the response time of plant personnel to identify and stop the leak. As there are currently no NRC regulations that would require the timely identification and termination of an inadvertent leak of radionuclides, there is no information available which would enable NRC to make a generic assessment. Therefore, the issue will remain as Category 2, and each applicant for license renewal will be required to submit site-specific information on its groundwater protection program in its environmental report. No change was made in response to this comment.

Comment: Page 4-47, lines 40 and 41: Text in lines 40 and 41 on page 4-47 reads as follows:

Construction - Construction-related impacts on hydrology (land clearing during and impervious pavements) would alter surface drainage patterns and groundwater recharge zones.

To better clarify the meaning of the above-quoted sentence, consider changing the text in lines 40 and 41 on page 4-47 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Construction - Construction-related impacts on hydrology (land clearing ~~during~~ and impervious pavements) would alter surface drainage patterns and groundwater recharge zones*.*
(NEI1-7(4)-101)

Response: *Section 4.5.2 of the GEIS was revised in response to this comment.*

Comment: Page 4-47, Section 4.5.2 (Environmental Consequences of Alternatives to the Proposed Action): Throughout Section 4.5.2, "Environmental Consequences of Alternatives to the Proposed Action," including subsections 4.5.2.1 through 4.5.2.3, potential surface water impacts and potential groundwater impacts should be distinguished. Also, for consistency, it

would be helpful if conclusions about potential impacts from construction and potential impacts from operations were presented in each subsection, even if the conclusion consists only of a cross reference to an earlier subsection, or indicates that the technology involves no activities creating a source of impacts to surface water or groundwater. (NEI1-7(4)-102)

Response: *Surface water and groundwater discussions are combined in the brief alternatives descriptions. Clarification was added to Section 4.5.2 of the GEIS that the construction discussion applies generally to each alternative.*

Comment: Page 4-60, Line 17: Revise sentence "The NPDES permits... " to read "The effluent guideline relevant to nuclear power plants allows a maximum chlorine effluent limitation of 0.2 mg/L, which is less than those concentrations reported to have no adverse effects on laboratory animals. A facility may have a more stringent effluent limitation for chlorine depending on relevant water quality standards, and thus an NPDES permit may require a more stringent limit." (EPA-3(1)-16)

Response: *In order to clarify the chlorine effluent limits and NPDES permits, the suggested change has been made to Section 4.6.1.1 of the GEIS.*

Comment: Page 4-60, Line 8: States, "Although water screening guidelines have not been established for terrestrial biota, compliance with NPDES permits ensures that nonradioactive contaminant concentrations discharged from the cooling system are low enough to have only small impacts on water quality and aquatic communities," Change to−"…compliance with NPDES permits should ensure that nonradioactive contamination concentrations discharged from the cooling system ... " (EPA-3(1)-15)

Response: *The suggested change has been made to Section 4.6.1.1 of the GEIS.*

Comment: Page 4-61, lines 19 to 23: Text in lines 19 to 23 on page 4-61 reads as follows:

In the past, the use of copper alloy condenser tubes in the cooling systems at the H.B Robinson plant in South Carolina and Diablo Canyon plant in California resulted in the discharge of copper in the liquid effluent, which was observed to have adverse effects on the morphology and reproduction of resident bluegill populations.

Because Diablo Canyon is located on the ocean and bluegill is a freshwater species that would not occur there, consider changing the above quoted text in lines 19 to 23 on page 4-61 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

In the past, the use of copper alloy condenser tubes in the cooling systems at the H.B. Robinson plant in South Carolina and Diablo Canyon plant in California resulted in the

discharge of copper in the liquid effluent, which *at the Robinson plant* was observed to have adverse effects on the morphology and reproduction of resident bluegill populations (Harrison 1985). (NEI1-7(4)-103)

Response: *Section 4.6.1.1 of the GEIS was updated to differentiate that bluegill populations were affected at H.B. Robinson and abalone were affected at Diablo Canyon.*

Comment: Page 4-80, Line 34: States − "Entrainment occurs when planktonic organisms pass through the intake screens and travel through the condenser, cooling system." Delete "planktonic" because all life stages of aquatic organisms are subject to entrainment, not just planktonic life stages or organisms. (EPA-3(1)-17)

Response: *Section 4.6.1.2 of the GEIS has been modified in response to this comment.*

Comment: Page 4-80, Lines 35-37: Edit sentence beginning "Aquatic organisms..." to read "Aquatic organisms that can be entrained include all life stages of fish, shellfish, macroinvertebrates, zooplankton, and phytoplankton." (EPA-3(1)-18)

Response: *Section 4.6.1.2 of the GEIS has been modified to better explain entrainment in response to this comment.*

Comment: Page 4-83, lines 4 to 9: Text in lines 4 to 9 on page 4-83 reads as follows:
For the Wolf Creek plant in Kansas, the NRC concluded that impingement during continued operation of the plant could have small to moderate impacts at the makeup water screen house during periods when river water levels were low, because fish would have less available habitat to use as a refuge and would likely be exposed to greater pumping frequency and volume removals from the Neosho River (NRC 2008a). During most of the license renewal term, the impacts of impingement would be small (NRC 2007d).

Because the above quoted text discusses the Wolf Creek plant in Kansas, it does not make sense to use the Reference “NRC 2007d,” which refers to World Wide Web URL http://www.nrc.gov/reactors/new-licensing/col.html, to support the conclusion in lines 8 and 9 on page 4-83. Please verify the validity of the citation. (NEI1-7(4)-104)

Response: *Section 4.6.1.2 of the GEIS has been modified to reference the Wolf Creek SEIS in response to this comment.*

Comment: Page 4-84, Line 9: Change to − "Physical stresses presented during impingement are affected by screen wash frequency, spray pressure, screen rotation speed, and screen modifications intended to reduce stress associated with fish separation and handling." Low pressure spray is often used to return fish to a waterbody, whereas a high pressure spray is

used for debris removal. (U.S. EPA. *Technical Development Document for the Final Section 316(b) Phase II Existing Facilities Rule* (EPA 821-R-04-007). Chapter 4. February 2004) (EPA 3(1)-19)

Response: *Section 4.6.1.2 of the GEIS has been modified in response to this comment.*

Comment: Page 4-86, Lines 6-21: Replace paragraph with the following: "Section 316(b) of the CWA requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact and is regulated under the NPDES program. There are two rulemaking phases relevant to nuclear power plant cooling water intake structures. Phase I (enacted in December 2001) is for new facilities (see 40 CFR § 125.83) with a design intake flow greater than 2 million gpd (7.6 million L/d) and that use at least 25% of water withdrawn used for cooling purposes (40 CFR § 125 Subpart I). Phase II (enacted in July 2004) applies to existing large, electric generating facilities with a design intake flow of 50 million gpd (189 million L/d) or more and that use at least 25% of the water withdrawn for cooling purposes (40 CFR § 125 Subpart J). The Phase II Rule was suspended on July 9, 2007. The latest information regarding this matter is located at: http://www.epa.gov/waterscience/316b. Existing nuclear power plant facilities with a cooling water intake structure that are not currently subject to a national rule require Section 316(b) NPDES permit conditions that reflect best technology available for minimizing adverse environmental impact on a case-by-case, best professional judgment (BPJ) basis (40 CFR. §§ 125.90(b) and 401.14). Any site-specific mitigation required under the NPDES permitting process should result in a reduction in the impacts of continued plant operations." (EPA-3(1)-20)

Response: *Section 4.6.1.2 of the GEIS has been modified in response to this comment.*

Comment: Vol. 1, Page 4-90, lines 35 to 37: Text in lines 35 to 37 on page 4-90 reads as follows: The heated discharges from the Oyster Creek plant in New Jersey increased the distribution and abundance of a nonnative, tropical-subtropical, wood-boring shipworm species (*Teredo bartschi*).

Because all causes of the increase in shipworm distribution and abundance in Barnegat Bay were not definitively identified, the following modification is suggested to the text in lines 35 to 37 on page 4-90 (~~strikethrough~~ font = deletion; *italics* font = addition):

The heated discharges from the Oyster Creek plant in New Jersey *contributed to an increase in* ~~*increased*~~ the distribution and abundance of a nonnative, tropical-subtropical, wood-boring shipworm species (*Teredo bartschi*). (Exelon-17-10)

Response: *Section 4.6.1.2 of the GEIS has been modified in response to this comment.*

Comment: Vol. 1, Page 4-101, lines 28 to 30: Text in lines 28 to 30 on page 4-101 reads as follows:

The intake and discharge canals at the Oyster Creek Nuclear Generating Station in New Jersey have been dredged approximately every 3 to 10 years (NRC 2007b),…

Based on the dredging frequencies reported for Oyster Creek Generating Station in the NRC's site-specific environmental impact statement for Oyster Creek license renewal (NUREG-1437,Supplement 28 [January 2007], page 2-18), and the fact that in the years when dredging occurred only part of either the intake canal or the discharge canal, but not both, was dredged, the following modification is suggested to the text in lines 28 to 30 on page 4-10 (~~strikeout~~ font = deletion; *italics* font = addition):

Portions of either the~~The~~ intake *canal*~~ and~~ *or the discharge canals at the Oyst*er Creek Nuclear Generating Station in New Jersey have been dredged approximately every~~ 3 to~~ 10 years (NRC 2007b)... (Exelon-17-11)

Response: *Section 4.6.1.2 of the GEIS has been modified in response to this comment.*

Comment: Page 4-116. Use Historic Properties for title. (BIA-19-13)

Response: *The term "historic properties" is used when discussing Section 106 compliance activities and "cultural resources" is used when generically referencing the resource. The terminology in the text discusses historic and cultural resources in general. This subject matter is consistent with NRC regulations. The NRC considers historic and cultural resources as an all-inclusive term that includes prehistoric, historic, and cultural properties. No changes were made to the GEIS in response to this comment.*

Comment: Page 4-117, lines 30-40; page 4-118, lines 1-41; page 4-119, lines 1-41; page 1-20, lines 1-36: Would these paragraphs or portions of these paragraphs fit better in the Affected Environment chapter? (BIA-19-15)

Response: *The referenced text relates to the types of information that would be used in plant-specific assessments of the impacts of license renewal on cultural resources. The text does not describe the affected environment of plant sites. No changes were made to the GEIS in response to this comment.*

Comment: Page 4-139, Table 4.9.1.1-3: Table 4.9.1.1-3 contains information about dose to the maximally exposed individual (MEI) from gaseous and liquid effluent releases during the years 1999 through 2003 for three nuclear power plants that recently replaced steam

generators. Included is information for Arkansas Unit 2, except during the year 2000 for which the site's annual effluent release report was not available.

Consider adding the following information from the 2000 Annual Radioactive Effluent Release Report for Arkansas Nuclear One, Units 1 and 2 to Table 4.9.1.1-3 on page 4-139 because the current draft updated GEIS data are inaccurate:

Gaseous Effluents				Liquid Effluents	
Total Body (mrem)	Gamma (mrad)	Beta (mrad)	Critical Organ (mrem)	Total Body (mrem)	Critical Organ (mrem)
3.15×10^{-2}	2.70×10^{-3}	2.21×10^{-3}	3.15×10^{-2}	3.00×10^{-3}	3.90×10^{-3}

(NEI1-7(4)-107)

Response: *The referenced table entries in Section 4.9.1.1 of the GEIS have been modified to reflect current data for Arkansas Nuclear One, Unit 2.*

Comment: Page 4-142, lines 32 to 34: Text in lines 32 to 34 on page 4-142 reads as follows:

Nuclear power plants are required to submit to the Federal EPA and the State in which they are located annual reports on the environmental releases of listed toxic chemicals manufactured, processed, or otherwise used that are above Federally and State-identified threshold quantities.

The above-quoted text (lines 32 to 34 on page 4-142) refers to reporting required under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) as implemented by U.S. Environmental Protection Agency regulations (40 CFR [Part] 372). The statement is somewhat misleading, however, because many nuclear power plants manufacture, process, or otherwise use such small quantities of toxic chemicals that the threshold quantities for reporting under 40 CFR [Part] 372 are not triggered. Accordingly, consider changing the text in lines 32 to 34 on page 4-142 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Nuclear power plants *may be* are required *in some instances* to submit ~~to the Federal EPA and the State in which they are located~~ annual reports on the environmental releases of listed toxic chemicals manufactured, processed, or otherwise used that are above ~~Federally and State~~ identified threshold quantities, *depending on state regulations or other specific circumstances.* (NEI1-7(4)-108)

Response: *The suggested changes have been made to Section 4.9.1.1 of the GEIS.*

Comment: Page 4-172, Lines 19-20: Replace "Liquid effluents" with "Wastes discharged to a waters of the United States" (EPA-3(1)-22)

Response: *To clarify what would be regulated by a NPDES permit, the suggested change has been made to Section 4.11.2.2 of the GEIS.*

Comment: Page 4-201, lines 16 to 19: Text in lines 16 to 19 on page 4-201 reads as follows:

Potential impingement and entrainment losses of special status fish species could also decrease. Reactor shutdown could also decrease impacts on EFH, although only minimal adverse effects have been identified for the operating plants for which EFH assessments have been prepared (i.e., Pilgrim, Vermont Yankee, and Oyster Creek plants).

The above-quoted sentences from lines 16 to 19 on page 4-201 appear to be out of place within the paragraph that spans lines 8 to 24 on page 4-201. Consider moving the above-quoted sentences to the end of the paragraph.

Also, because EFH assessments have been prepared at nuclear power plants other than Pilgrim, Vermont Yankee, and Oyster Creek, consider changing the text in lines 16 to 19 on page 4-201 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Potential impingement and entrainment losses of special status fish species could also decrease. Reactor shutdown could also decrease impacts on EFH, although only minimal adverse effects have been identified for the operating plants for which EFH assessments have been prepared (~~i.e~~*e.g*., Pilgrim, Vermont Yankee, and Oyster Creek plants). (NEI1-7(4)-109)

Response: *Section 4.12.2.1 of the GEIS has been revised in response to this comment.*

Comment: To be consistent and accurate, the definitions in the glossary for *entrainment* and *impingement* should be the same as presented in the text box on page 4-80. See Draft Generic EIS, p 7-18; lines 6-7 & p 7-24; lines 33-34, respectively. (NYS DEC-12-11)

Response: *The suggested change has been made to Chapter 7 (Glossary) of the GEIS.*

Comment: Page 7-1: Advisory Council for Historic Preservation is actually Advisory Council on Historic Preservation. Do you want to define Area of Potential Effect (APE) and Historic Property? (BIA-19-20)

Response: *Chapter 7 (Glossary) of the GEIS has been modified to correct the title for the Advisory Council on Historic Preservation, and to add the definitions "area of potential effect" and "historic property."*

Comment: Page 7-22: Global Warming. Definition should indicate that the predictions are based on models similar to those climatologists use for predicting temperature and weather patterns. (BIA-19-21)

Response: *The NRC disagrees that the suggested addition is necessary for the definition of global warming. No change was made to the GEIS in response to this comment.*

Comment: Page 7-36, lines 17 and 18: Text in lines 17 and 18 on page 7-36 reads as follows:

Reference reactor year (RRY): Refers to one year of operation of a 1000-MW electric capacity nuclear power plant.

For consistency with the draft updated GEIS text in lines 30 to 33 on page 4-176, consider changing the definition of Reference reactor year (RRY) in lines 17 and 18 on page 7-36 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

Refers to one year of operation of a 1000-MW electric capacity nuclear power plant *operating at an 80% availability factor to produce about 800 MW-yr (0.8 GW-yr) of electricity*.
(NEI1-7(4)-111)

Response: *The suggested change has been made to Chapter 7 (Glossary) of the GEIS.*

Comment: Vol. 2, Page C-6, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled “Licensee” from “Commonwealth Edison Company” to “Exelon Generation Company". (Exelon-17-13)

Comment: Vol. 2, Page C-12, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled “Licensee” from “Exelon Corporation” to “Exelon Generation Company". (Exelon-17-14)

Comment: Vol. 2, Page C-20, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled “Licensee” from “AmerGen Energy Co.” to “Exelon Generation Company”. (Exelon-17-15)

Comment: Vol. 2, Page C-60, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled “Licensee” from “Exelon Corporation” to “Exelon Generation Company”. (Exelon-17-16)

Comment: Vol. 2, Page C-62, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled "Licensee" from "Exelon Corporation" to "Exelon Generation Company". (Exelon-17-17)

Comment: Vol. 2, Page C-76, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled "Licensee" from "AmerGen Energy, LLC" to "Exelon Generation Company". (Exelon-17-18)

Comment: Vol. 2, Page C-76, line 14: Based on the renewed license for the Oyster Creek Nuclear Generating Station, change the entry in the row labeled "License Expiration" from "2009" to "2029". (Exelon-17-19)

Comment: Vol. 2, Page C-82, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled "Licensee" from "Exelon Co." to "Exelon Generation Company". (Exelon-17-20)

Comment: Vol. 2, Page C-116, line 6: Based on the NRC List of Power Reactor Units [http://www.nrc.gov/reactors/operating/list-power-reactor-units.html], change the entry in the row labeled "Licensee" from "Exelon Corporation" to "Exelon Generation Company". (Exelon-17-21)

Response: *The suggested changes have been made to Appendix C of the GEIS.*

Comment: How about inserting an introductory paragraph discussing the technical bases for the GEIS analyses? (BIA-19-22)

Response: *Appendix D serves as the technical basis for GEIS analysis, broken down by resource area. For each resource area, there is a description of the bases used by the NRC in its analysis of impact. For a discussion of the technical basis for a particular resource area, please refer to the appropriate section in Appendix D. No change was made to the GEIS as a result of this comment.*

Comment: Page D-13, lines 18 to 26: Text in lines 18 to 26 on page D-13 describes the contents of the maintenance plan that a State must implement in an area that has been redesignated under the Clean Air Act from "nonattainment" status to "attainment maintenance" status. In lines 24 to 26 on page D-13, the text reads as follows:

The NRC will ensure coordination of licensee with the appropriate EPA Regional Office and/or State air quality office before any plants begin major construction or refurbishment activities.

To more accurately reflect the interaction among the licensee, the NRC, and the EPA Regional Office in the event that major construction or refurbishment activities are conducted at a nuclear power plant to support license renewal, consider changing the above-quoted statement in lines 24 to 26 on page D-13 to read as follows (~~strikethrough~~ font = deletion; *italics* font = addition):

The NRC will ~~ensure coordination of~~ *assure that the* licensee *has coordinated* with the appropriate EPA Regional Office and/or State air quality office *prior to beginning* ~~before any plants begin~~ major construction or refurbishment activities *in a non-attainment maintenance area*. (NEI1-7(4)-112)

Response: *Section D.2.2.2 of the GEIS has been revised.*

Comment: Page F-4, Lines 19-30: Replace paragraph with:

"As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point source that discharge pollutants into waters of the United States. The NPDES program requires that all facilities which discharge pollutants from any point source into waters of the United States obtain an NPDES permit. An NPDES permit is developed with two levels of controls: technology-based limits and water quality based limits. NPDES permit terms may not exceed 5 years, and the applicant must reapply at least 180 days prior to the permit expiration date. A nuclear power plant may also participate in the NPDES General Permit for Industrial Storm Water, due to storm water runoff from industrial or commercial facilities to waters of the United States. EPA is authorized under the CWA to directly implement the NPDES program; however, EPA has authorized many States to implement all or parts of the national program. Section 401 of the CWA requires States to certify that the permitted discharge would comply with all limitations necessary to meet established State water-quality standards, treatment standards, or schedule of compliance." (EPA-3(1)-23)

Response: *Section F.3 of the GEIS has been modified in response to this comment.*

Comment: National Pollutant Discharge Elimination System Permits [Section F.6.1]: Replace language with:

"Requires a permit prior to the discharge of pollutants from any point source into waters of the United States or State. Each permit holder must comply with authorized discharge levels, monitoring requirements, and other appropriate requirements in the permit."

Water Quality Standards: Add to the end of paragraph "Water quality standards are enforced through the NPDES permit." (EPA-3(1)-24)

Response: *Table F.6-1 in Section F.6 of the GEIS has been modified in response to this comment.*

A.2.1.18 Miscellaneous Comments

Comment: Pilgrim Watch supports and incorporates herein comments submitted by Riverkeeper Inc., Tarrytown, New York and the Alliance for Nuclear Responsibility, California. (PW-6-31)

Comment: We have made comments at previous meetings, as I mentioned. Because we – we do understand that the comments provided at the public meetings are being documented, we don't see any reason – to repeat those here today. We do have a few additional comments we are making today. We will be making additional comments at the remaining two public meetings. Of necessity, these comments are somewhat at a high level, and I just wanted to clarify. I – do appreciate that as – as one who has put out draft documents before, when you see the high level document, you initially have the reaction of well, what are you talking about, specifically? You know, give me some examples. Show me what you've got.

Our issue is just simply timing. We want to be sure we've thoroughly vetted the comments that we've drafted before we begin to drop into the details and share those. So – so I ask that you not be disappointed that we might go through the next two public meetings still without delving down into those details. What I – what I would suggest is that we will make sure that we are very clear with our examples and details in our written comments that we provide. And, in fact, we would welcome an – an opportunity, either near the end of the comment period or following closure of the comment period, whichever is more appropriate, at that time, to meet with you and to discuss even further the comments that we provide. That's not atypical from what we have done in the past, particularly where there are very, very extensive comments. So we – we'd be happy to discuss that possibility with you. And again, timing would be the simple issue. (RMD-NEI1-3)

Comment: I would like to add my support for the comments made by Mary Lampert of Pilgrim Watch on the revision of the GEIS for license renewal, and I refer to the new information footnoted in her commentary as the basis for my comments. (Shaw-15-1)

Response: *These comments are general in nature. The NRC's responses to the referred-to specific comments are addressed elsewhere in Section A.2 of the GEIS. No change was made to the GEIS in response to these comments.*

Comment: The first comment is that the – we appreciate that the staff has rearranged the issues along the lines of resources; we think this actually adds better transparency to the process for members of the public and members of the industry as well, in that we think it much

better correlates what the issue is with where the potential impacts might arise, so we're very supportive of that.

At the same time, though, we see that the staff has aggregated some issues of similar nature together, and the caution that we would offer is that, in doing so, there was some aggregation of issues that were previously Category 1 with issues that were Category 2.

And as they're conveyed in the Table B-1 that's in the proposed rule, absent additional detail at the level of the rule, it creates at least the appearance that some issues have been actually moved from being Category 1 to Category 2.

Reading the other materials, I don't think that's the intent, but we express the caution about the unintended consequence that, in any formal challenge, intervention, or other type of process, boards, courts, and others tend to focus on the rule itself rather than supporting guidance or supporting technical documents.

They're going to do their own plain reading of the rule and make their own interpretation, and so we would be concerned that questions might arise later associated with sufficiency on the previously Cat 1 issues that were simply grouped in with an overall reading of Cat 2.

I'll add as a comment, though, that in reading the handout that you have, which provides more detail than the Table B-1 that is actually in the proposed rule, it's much more clear what the pedigree is for the various issues, but again, I think some of that is lost with the way that it's summarized in the actual table that's in the proposed rule. So that's a caution.

Our suggestion is that if the comment, once we provide it with more supporting information, seems to have some validity, it would seem to us and now I draw heavily on the handout that you had – that in effect you already have a template by which you could break the issues out in somewhat more detail; still listed adjacent to each other to connote their similarity, but in a way where it's much more clear that Cat 1 issues have actually remained as Cat 1 issues. But that distinction I think now is lost in the table that's actually in the rule.

That could have the effect, then, of reducing not only the burden and what the licensee might feel they need to submit, but also could obviate certain follow-on processes to the license renewal process where there would have to be some form of adjudication to reach a decision.

Another comment is that we also see that – oh, by the way, I did intend to give an example of that. The example I note that's illustrated excellently in the proposed rule versus your handout is on the impingement and entrainment of aquatic organisms.

In your handout you very clearly show what was a 2 and what was a 1, but in the actual Table B-1 that's all rolled up and is simply listed as a 2. So that would be a good example to look at. We probably use your handout, as matter of fact, for aiding and developing our comments to show an example of how we think you could resolve the issue. (AGA-NEI-1)

Response: *No Category 1 issues are consolidated with any Category 2 issues in the final rule or revised GEIS. The proposed rule and draft revised GEIS had consolidated two Category 2 issues, "Entrainment of fish and shellfish in early life stages (for plants with once-through cooling and cooling pond heat dissipation systems)" and "Impingement of fish and shellfish (for plants with once-through cooling and cooling pond heat dissipation systems)" with the Category 1 issue, "Entrainment of phytoplankton and zooplankton (for all plants)" (74 FR 38124, 38136). Under the proposed rule and draft revised GEIS, the consolidated issue would have been a Category 2 issue, with an impact range of SMALL to LARGE. Subsequent to the publication of the proposed rule and draft revised GEIS, the NRC determined that such consolidation would have the effect of making "Entrainment of phytoplankton and zooplankton (all plants)," which is an issue generic to all plants (Category 1), a site-specific issue (Category 2). As there is no basis to support making the "Entrainment of phytoplankton and zooplankton (all plants)" a site-specific issue, the NRC determined not to adopt the proposed change. Similarly, the proposed rule and draft revised GEIS had consolidated the Category 2 issue, "Heat shock (for plants with once-through and cooling pond heat dissipation systems)" with four Category 1 issues, "Cold shock (for all plants)," "Thermal plume barrier to migrating fish (for all plants)," "Distribution of aquatic organisms (for all plants)," and "Premature emergence of aquatic insects (for all plants)" (74 FR 38124, 38136). These issues were proposed for consolidation to facilitate the environmental review process because they are all caused by thermal effects. The final rule and revised GEIS reorganize the two "Thermal impacts on aquatic organisms" issues to separate out these Category 1 issues, which are consolidated into a new Category 1 issue, "Infrequently reported thermal impacts (all plants)."*

No changes were made to the revised GEIS as a result of this comment.

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NRC FORM 335
(12-2010)
NRCMD 3.7

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER
(Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.)
NUREG-1437, Volume 2, Revision 1

2. TITLE AND SUBTITLE
Generic Environmental Impact Statement for License Renewal of Nuclear Plants
Public Comments
Final Report

3. DATE REPORT PUBLISHED

MONTH	YEAR
June	2013

4. FIN OR GRANT NUMBER

5. AUTHOR(S)
See Chapter 5 of NUREG-1437, Volume 1

6. TYPE OF REPORT
Technical

7. PERIOD COVERED (Inclusive Dates)

8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.)
Same as 8 above

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)
U.S. Nuclear Regulatory Commission (NRC) regulations allow for the renewal of commercial nuclear power plant operating licenses. To support the license renewal environmental review process, the NRC published the Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS) in 1996. The proposed action considered in the GEIS is the renewal of nuclear power plant operating licenses.

Since publication of the GEIS, approximately 40 plant sites (70 reactor units) have applied for license renewal and undergone environmental reviews, the results of which were published as supplements to the 1996 GEIS. This GEIS revision reviews and reevaluates the issues and findings of the 1996 GEIS. Lessons learned and knowledge gained during previous license renewal reviews provide a significant source of new information for this assessment. In addition, new research, findings, public comments, and other information were considered in evaluating the significance of impacts associated with license renewal.

The intent of the GEIS is to determine which issues would result in the same impact at all nuclear power plants and which issues could result in different levels of impact at different plants and thus require a plant-specific analysis for impact determinations. The GEIS revision identifies 78 environmental impact issues for consideration in license renewal environmental reviews, 59 of which have been determined to be generic to all plant sites. The GEIS also evaluates a full range of alternatives to the proposed action. For most impact areas, the proposed action would have impacts that would be similar to or less than impacts of the alternatives, in large part because most alternatives would require new power plant construction, whereas the proposed action would not.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)
Generic Environmental Impact Statement for License Renewal of Nuclear Plants
GEIS
Generic-1437. Revision 1
National Environmental Policy Act
NEPA
License Renewal

13. AVAILABILITY STATEMENT
unlimited

14. SECURITY CLASSIFICATION
(This Page)
unclassified
(This Report)
unclassified

15. NUMBER OF PAGES

16. PRICE

Printed
on recycled
paper

Federal Recycling Program

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

OFFICIAL BUSINESS

NUREG-1437, Vol. 2
Revision 1

Generic Environmental Impact Statement for
License Renewal of Nuclear Plants

June 2013