
***Proposed Resource Management Plan and
Final Environmental Impact Statement***

Bighorn Basin Resource Management Plan Revision Project

Appendix U

Technical Support Document for Air Quality

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APPENDIX U

TECHNICAL SUPPORT DOCUMENT FOR AIR QUALITY

1.0 INTRODUCTION

This technical support document describes the air quality impact analysis for the Proposed Bighorn Basin Resource Management Plan (RMP) revision, Final Environmental Impact Statement (EIS). This appendix is divided into the following five sections:

- 2.0 Regulatory Framework
- 3.0 Thresholds of Significance
- 4.0 Air Quality Impact Analysis
- 5.0 Emission Calculations
- 6.0 References

Copies of this technical support document and accompanying data files are available upon request from the Bureau of Land Management (BLM) Cody or Worland Field Offices.

2.0 REGULATORY FRAMEWORK

The basic framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act (CAA) and its amendments, Environmental Protection Agency (EPA) regulations, including the 1999 Regional Haze Regulations, and state and local air quality regulations. The CAA addresses criteria air pollutants, state and national ambient air quality standards for criteria air pollutants, and the Prevention of Significant Deterioration (PSD) program. The Regional Haze Regulations address visibility impairment. EPA regulations address ambient air quality standards for criteria pollutants, emission control technology, air quality monitoring, and State Implementation Plan (SIP) development (which may include air quality modeling), and air quality related value (AQRV) analyses related to regional haze.

2.1 Ambient Air Quality Constituents

Air pollutants addressed in this study include criteria pollutants, hazardous air pollutants (HAP), sulfur and nitrogen compounds, which could cause visibility impairment (regional haze) or atmospheric deposition impacts, and greenhouse gases.

2.1.1 Criteria Pollutants

Criteria pollutants are those for which national standards of concentration have been established. Ambient air concentrations of these constituents greater than the standards represent a risk to human health. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), particulate matter (PM₁₀, PM_{2.5}), and lead, each of which is listed below.

Carbon Monoxide. CO is an odorless, colorless gas formed during any combustion process, such as operation of engines, fireplaces, and furnaces. High concentrations of CO affect the oxygen-carrying capacity of the blood and can lead to unconsciousness and asphyxiation. Wildfires are natural sources of CO.

Nitrogen Dioxide. NO₂ is a red-brown gas formed during the operation of internal combustion engines or other burning processes. Such processes emit a mixture of nitrogen gases, collectively called nitrogen oxides (NO_x). NO_x can contribute to brown cloud conditions and can convert to ammonium nitrate particles and nitric acid, which can cause visibility impairment and acid rain. Bacterial action in soil can be a natural source of nitrogen compounds.

Sulfur Dioxide. SO₂ forms during combustion from trace levels of sulfur in coal or diesel fuel. It can convert to ammonium sulfate and sulfuric acid, which can cause visibility impairment and acid rain. Volcanoes are natural sources of SO₂. Anthropogenic sources include refineries and power plants.

Ozone. O₃ is a gas that generally is not emitted directly into the atmosphere, but is formed from the chemical reactions of NO_x and volatile organic compound (VOC) emissions. As stated above, internal combustion engines are the main source of NO_x, while sources of VOCs include, but are not limited to, leaks from oil and gas development operations (“fugitive” emissions), paint, varnish, and various types of vegetation. The faint acrid smell common after thunderstorms is caused by ozone formation caused by lightning. Ozone is a strong oxidizing chemical that can burn lungs and eyes, as well as damage plants.

Particulate Matter. Particulate matter (e.g., soil particles, hair, pollen) are essentially small particles suspended in the air that settle to the ground slowly and may be re-suspended if disturbed. Separate allowable concentration levels for particulate matter are based on the relative size of the particle:

- PM₁₀ particles, particles with diameters of less than 10 micrometers, are small enough to be inhaled and can cause adverse health impacts.
- PM_{2.5} particles, particles with diameters of less than 2.5 micrometers, are so small that they can be drawn deeply into the lungs and cause serious health problems. Particles of this size also are the main cause of visibility impairment.

Lead. Before the widespread use of unleaded fuel in automobiles, lead particles were emitted from automobile tailpipes. Lead is not considered in this RMP and EIS because no proposed projects are expected to emit lead. The lead standard also will not be addressed in this appendix because lead is not a current concern; it will, however, be considered in future projects. Lead is also generally not considered in site specific environmental analysis for similar reasons.

2.1.2 Hazardous Air Pollutants

Although HAPs, including N-hexane, ethylbenzene, toluene, xylene, formaldehyde, and benzene, do not have ambient air quality standards, the EPA has issued reference concentrations for evaluating the inhalation risk for cancerous and noncancerous health impacts, known as reference concentrations for chronic inhalation.

The EIS associated with the Bighorn Basin RMP is a National Environmental Policy Act (NEPA) document and not a regulatory document. However, there are regulatory issues that should be taken into account in preparing this EIS and ensuing project-specific EISs. Actual regulation of HAPs is achieved through compliance with the applicable maximum achievable control technology (MACT) standards and not through ambient air quality standards. Regulatory agencies implement control through Section 112

programs, specifically Section 112(g) case-by-case MACT determinations based on 40 CFR Part 63, Subpart B, and Section 112(d) MACT emission standards.

Any source that emits or has the potential to emit 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs is considered a major source and will require a Title V, Part 70, operating permit review and permit. This may include either a case-by-case 112(g) MACT determination, if the source is new or has had major modifications and no applicable MACT emission standard has been promulgated, or compliance with an applicable MACT emission standard. Specific regulations that may apply in the Planning Area include 40 CFR Part 63 Subpart HH, National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities; 40 CFR Part 63 Subpart HHH, National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities; and 40 CFR Part 63 Subpart ZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. This last regulation, new in 2004, affects source categories using reciprocating engines for gas compression. HAP emissions are associated with industrial activities, such as oil and gas operations, refineries, paint shops, dry cleaning facilities, and woodworking shops. Because this analysis is qualitative, no specific analyses of either short- or long-term HAP impacts are made.

2.1.3 Atmospheric Deposition Constituents

Sulfur and nitrogen compounds that can be deposited in terrestrial and aquatic ecosystems include nitric acid, nitrate, ammonium, and sulfate. Nitric acid and nitrate are not emitted directly into the air, but form in the atmosphere from industrial and automotive emissions of NO_x. Sulfate is formed in the atmosphere from industrial emission of SO₂. Deposition of nitric acid, nitrate, and sulfate can adversely affect plant growth, soil chemistry, lichens, aquatic environments, and petroglyphs. Ammonium is primarily associated with feedlots and agricultural fertilization. Ammonium deposits can affect terrestrial and aquatic vegetation. Although deposition may be beneficial as a fertilizer, it can adversely affect the timing of plant growth and dormancy. Although this analysis will be qualitative, future specific projects will require quantitative analyses using the criteria listed below.

Greenhouse Gases

Greenhouse gases (GHGs) are pollutants that are effective in preventing heat from escaping the earth's atmosphere and have been attributed to altering components of the earth's climate. These include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Other identified GHGs, including hydroflourocarbons, perflourocarbons, and sulfur hexafluoride were not included in the analysis because proposed activities are not sources of these pollutants and emissions are expected to be insignificant or zero.

3.0 THRESHOLDS OF SIGNIFICANCE

Criteria Pollutants

National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS) are health-based standards that identify maximum limits for criteria air pollutant concentrations at all locations to which the public has access. The NAAQS and WAAQS are legally enforceable standards. Concentrations that are above the NAAQS and WAAQS represent a risk to human health and by law, require public safeguards be implemented. State standards must be at least as protective of human health as federal standards, and may be more restrictive than the federal standards as allowed by the CAA. The EPA has developed standards for each pollutant for a specific averaging time. Short averaging times (1, 8, and 24 hours) address short-term exposure, while the annual standards address long-term exposure.

Chapter 3 of the Proposed RMP and Final EIS presented the national primary air quality standards and the Wyoming primary air quality standards. Analyses of proposed alternatives for project-specific EISs compare cumulative concentrations of air pollutants to the NAAQS and WAAQS. The BLM requires that all authorized activities comply with applicable local, state, tribal, and federal air quality laws, regulations, and standards.

3.1.1 Prevention of Significant Deterioration

The goal of the PSD program is to ensure that air quality in areas with clean air does not significantly deteriorate, while a margin for future industrial growth is maintained. Major stationary sources are governed by the PSD program, which is unlikely to apply to BLM sources in the Planning Area with the exception of gas compressor stations. Under the PSD program, each area in the United States is classified by the air quality in that region according to the following system:

- **PSD Class I Areas.** Areas with pristine air quality, such as wilderness areas, national parks, and some Native American reservations, are accorded the strictest protection. Only very small incremental increases in pollutant concentrations are allowed in order to maintain the very clean air quality in these areas.
- **PSD Class II Areas.** Essentially, all areas that are not designated as Class I are designated as Class II. Moderate incremental increases in pollutant concentrations are allowed, although the concentrations are not allowed to reach the concentrations set by Wyoming and federal standards (WAAQS and NAAQS).
- **PSD Class III Areas.** No areas have been designated yet as Class III. A larger incremental increase in pollutant concentrations would be allowed, up to the applicable WAAQS and NAAQS.

The incremental increases allowed for specific pollutants in Class I and Class II areas can be found in the Wyoming Air Quality Standards and Regulations (Wyoming DEQ 2004). Comparisons of potential PM₁₀, NO₂, and SO₂ concentrations with PSD increments are intended to evaluate a threshold of concern only and do not represent a regulatory PSD increment consumption analysis. Regulatory PSD increment consumption analyses are solely the responsibility of the State of Wyoming, which has been granted primacy (with EPA oversight) under the CAA. In project-specific EISs, the BLM does not expect that a PSD analysis will be performed; rather, the PSD standards are used as a reference only to give the public a better understanding of the level of potential impact.

Hazardous Air Pollutants

Section 112 of the CAA lists more than 180 chemicals as HAPs. In addition, Sections 112 (d) and 112(g) require regulatory agencies to establish MACT Standards for sources that emit HAPs. Any source that emits or has the potential to emit 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs is considered a major source and will require a Title V, Part 70, operating permit review and permit. In addition to MACT standards, EPA has listed (on its Air Toxics Database) Reference Exposure Levels (RELs) for many of the HAPs. RELs are defined as concentrations at or below which no adverse health effects are expected.

3.2 Regional Haze

Visibility impairment in the form of regional haze obscures the clarity, color, texture, and form of what we see. Haze-causing pollutants (mostly fine particles) are directly emitted into the atmosphere or are formed when gases emitted into the air form particles as they are carried downwind. Emissions from human-caused and natural sources can be carried great distances, contributing to regional haze. The current method for assessing impacts on visibility is described in the Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report—Revised 2010 and is hereafter referred to as the FLAG 2010 method (FLAG 2010). This method compares incremental changes in light extinction relative to estimated natural background to a 5-percent change in light extinction threshold and a 10-percent change in light extinction threshold. Using the 98th percentile values, a 5-percent change in light extinction (approximately equal to 0.5 deciview [dv]) is the threshold recommended in FLAG 2010 and is considered to contribute to regional haze visibility impairment. A 10-percent change in light extinction (approximately equal to 1.0 dv) is considered to cause visibility impairment when compared to background conditions.

The Wyoming Department of Environmental Quality (DEQ)—Air Quality Division (AQD) originally submitted its Regional Haze SIP in accordance with 40 CFR, Part 51.309, in December 2003. This SIP emphasized reductions in SO₂ emissions with a goal of improving visibility on the Colorado Plateau. Since its submission, EPA revised 40 CFR, Parts 51.308 and 309 based on legal actions, and a revised 309 SIP was submitted by Wyoming DEQ in November 2008. A draft supplemental revision to the 309 SIP was prepared in August 2009.

The EPA developed regional haze regulations in response to the CAA amendments of 1977 and 1990. These regulations are intended to maintain visibility on the least-impaired days and to improve visibility on the most-impaired days in mandatory federal Class I areas across the United States, so that visibility in these areas is returned to natural conditions by the year 2064. These regulations require states to submit a regional haze SIP and progress reports to demonstrate reasonable progress toward the 2064 goal.

Atmospheric Deposition

As described in the Federal Land Managers' AQRV Work Group (FLAG) Phase I Report – Revised 2010 (FLAG 2010), the National Park Service, the United States Forest Service (USFS), and the United States Fish and Wildlife Service (USFWS) have established thresholds to evaluate nitrogen and sulfur deposition within Class I areas. These deposition analysis thresholds (DATs) are defined as 0.005 kilogram per hectare per year (kg/ha/yr) in the western United States for both nitrogen and sulfur. These thresholds are typically used to analyze impacts of individual projects. Cumulative impacts are typically compared to the level of concern, which is defined by the National Park Service and USFWS as 3 kg/ha/yr for

nitrogen and 5 kg/ha/yr for sulfur in Rocky Mountain regions. Deposition rates that are below the level of concern are believed to cause no adverse impacts.

Lake Chemistry

The USFWS considers lake chemistry changes to be potentially significant if the screening methodology predicts decreases in acid neutralizing capacity (ANC) of more than defined limits of acceptable change (LAC). A lake's LAC depends on its background ANC value. The LAC is defined as a 10 percent change for lakes with ANC background values greater than 25 microequivalents per liter (eq/l) and is defined as a change of 1 eq/l for lakes with ANC background values less than 25 eq/l. If the ANC of a lake is predicted to decrease by more than the applicable LAC then potential changes to lake chemistry may cause adverse effects and a more detailed analysis of lake chemistry impacts would be required.

3.3 Applicability to the Planning Area

Air pollution impacts are limited by local, state, tribal, and federal air quality regulations, standards, and implementation plans established under the CAA and administered by the Wyoming DEQ AQD with oversight from the EPA. Air quality regulations require that proposed new, or modified existing, air pollutant emission stationary sources (including oil and gas compression facilities) undergo a permitting review before their construction can begin. Therefore, the Wyoming DEQ AQD has the primary authority and responsibility to review permit applications and to require emission permits, fees, and control devices before construction or start of operation. Fugitive dust and exhaust from construction activities, along with air pollutants emitted during operation (for example, well operations, booster and pipeline compressor engines associated with natural gas wells), are potential causes of air quality impacts. These issues are more likely to generate public concern where natural gas development activities occur near residential areas or near sensitive Class I and Class II areas.

The USFS, the National Park Service, and the USFWS, located throughout Wyoming, also have expressed concerns about potential atmospheric deposition (acid rain) and visibility impacts within downwind PSD Class I and PSD Class II sensitive areas under their administrations.

Table U-1 provides a summary of recent air quality conditions for NO₂, ozone, PM₁₀, and PM_{2.5}, taken from measurements for the period 2010-2012 from available monitors located within or nearby the planning area. These include maximum 24 hour and annual averages for PM_{2.5}, maximum 1 hour averages for NO₂, maximum annual averages for PM₁₀, and the 4th highest 8-hour average ozone concentration for each year, from which the ozone design value is derived. Except for a relatively high measured 24-hour average concentration of PM_{2.5} at the Lander site for 2010, located outside the Planning Area, most concentrations measured during this period are well within the applicable standards. Given the Planning Area's current attainment status, future development projects that have the potential to emit more than 250 tons per year of any criteria pollutant (or certain listed sources that have the potential to emit more than 100 tons per year) would be required to undergo a site-specific regulatory PSD increment consumption analysis under the federal New Source Review permitting regulations.

Development projects that require PSD permits also may be required by the applicable air quality regulatory agencies to incorporate additional emission control measures (including a best available control technology [BACT] analysis and determination) to ensure protection of air quality resources and to demonstrate that the combined impacts of all PSD sources will not exceed the allowable incremental air quality impacts for NO₂, PM₁₀, and SO₂. Minor sources having emissions below the cutoff rates

mentioned above do not require PSD permits; nevertheless, their emissions consume increment. A regulatory PSD increment consumption analysis may be conducted, either as part of a New Source Review or independently. The determination of PSD increment consumption is a responsibility of the applicable air quality regulatory agencies, with EPA oversight. In addition, an analysis of cumulative impacts due to all existing sources and the permit applicant’s sources is required during a New Source Review to demonstrate that applicable ambient air quality standards will be met during the operational lifetime of the permit applicant’s operations.

Sources subject to the PSD permit review procedure also are required to demonstrate potential impacts on AQRV. These include visibility impacts, degradation of mountain lakes due to atmospheric deposition (acid rain), and impacts on sensitive flora and fauna in Class I areas. The CAA also provides specific visibility protection procedures for the mandatory federal Class I areas designated by the United States Congress on August 7, 1977, which included wilderness areas greater than 5,000 acres in size, as well as national parks and national memorial parks greater than 6,000 acres in size as of that date.

Table U-1. Recently Observed NO₂, O₃, PM₁₀, and PM_{2.5} Concentrations Within and in the Vicinity of the Planning Area and Applicable Air Quality Standards

Pollutant/Monitoring Site (ID)	Average Time/Measurement	2010	2010	2012	NAAQS
Nitrogen Dioxide (NO₂) (ppb)					
Thunder Basin Grassland	1 hour (max)	15	16	25	100
Ozone (O₃) (ppb)					
Basin	8 hours (4th high)	55	56	57	75
Thunder Basin	8 hours (4th high)	63	61	71	75
PM₁₀ (µg/m³)					
Cody	24 hours (max)	25	46	45	150
Sheridan – Highland Park	24 hours (max)	36	48	25	150
Sheridan – Police Station	24 hours (max)	70	96	75	150
PM_{2.5} (µg/m³)					
Lander	Annual	9.3	7.8	7.8	15
Sheridan – Highland Park	Annual	8.8	5.5	4.3	15
Sheridan – Police Station	Annual	8.7	7.6	8.3	15
Lander	24 hours (98th %)	32.0	30.0	25.0	35
Sheridan – Highland Park	24 hours (98th %)	14.0	15.0	10.0	35
Sheridan – Police Station	24 hours (98th %)	27.0	23.0	19.0	35

- % percent
- NAAQS National Ambient Air Quality Standards
- NO₂ nitrogen dioxide
- O₃ ozone
- PM_{2.5} particulate matter less than 2.5 microns in diameter
- PM₁₀ particulate matter less than 10 microns in diameter
- ppb parts per billion
- ppm parts per million
- µg/m³ micrograms per cubic meter

4.0 AIR QUALITY IMPACT ANALYSIS

As described in Chapter 4, a qualitative emission comparison approach was used for this assessment. A qualitative method was selected because of a lack of specific project information on location, types, and magnitude of potential projects. Emissions calculations (see 5.0 *Emission Calculations*) were based on the best available engineering data and assumptions, emission inventory procedures, and professional and scientific judgment. For any future projects, significance criteria for potential air quality impacts will include local, state, tribal, and federally enforced legal requirements to ensure that air pollutant concentrations remain within specific allowable levels.

It is important to note that before actual development could occur, the applicable air quality regulatory agencies (including the state, tribe, or the EPA) would need to review specific air pollutant emissions preconstruction permit applications that examine potential project-specific air quality impacts. As part of these permit reviews (depending on source size), the air quality regulatory agencies could require additional quantitative air quality impact analyses or mitigation measures. Thus, before development occurred, additional site-specific air quality analyses may need to be performed to ensure protection of air quality. Federal land managers may require a demonstration that potential impacts from proposed projects would not adversely affect AQRV (including visibility) in sensitive Class I and Class II areas.

5.0 EMISSION CALCULATIONS

For this analysis, emissions of PM₁₀, PM_{2.5}, NO_x, SO₂, CO, VOC, and HAPs were estimated for a 20-year period, beginning with 2008 as the base year, 2018 as the mid-point interim year, and 2027 as the end of this period. Emissions were estimated for the six alternatives: Alternative A (Current Management), Alternative B (Least Resource Use), Alternative C (More Resource Use), Alternative D (Preferred Alternative), Alternative E (Sage-Grouse Key Habitat Areas ACEC), and Alternative F (Sage-Grouse Priority Habitat Management Areas ACEC). Emissions were estimated for the base year 2008 corresponding to Alternative A while emissions for all alternatives were estimated for 2018 and 2027. A set of spreadsheets, originally developed for use in preparing emissions for the Casper RMP revision (BLM 2007), were updated and adapted for use in estimating emissions for the Planning Area for these years. The spreadsheets were updated with the latest emission factors for motor vehicles, off-road engine types, and other activities corresponding to the base year (2008), and the out years, 2018 and 2027. Emission factors used to estimate emissions for various categories were obtained from (1) the EPA NONROAD2008a Emissions Model (EPA 2008), (2) Wyoming DEQ AQD BACT levels for natural gas-fired internal combustion engines (Wyoming DEQ 2011), and (3) the MOBILE6.2.03 emission factor model for on-road vehicles (EPA 2003). Information regarding equipment types, numbers, activity, etc., for the various emission categories/activities was provided by specialists in the BLM Cody (CYFO) and Worland (WFO) Field Offices.

When reviewing the emission inventory, it is important to understand that assumptions were made regarding development. For example, there is uncertainty regarding ultimate development of energy resources (e.g., number of wells, equipment used, specific locations of wells, etc.). In general, the assumptions that were made would tend to result in a conservatively high estimate of emissions. For instance, given the number of sources included in this analysis, the likelihood that all emission sources would actually operate at their reasonable, foreseeable maximum emission rates over an entire year (or even 24 hours) is small. A summary of total emissions for each pollutant species from all BLM activities is presented in Chapter 4, *Air Quality* section. Detailed emission totals for each category/planning year are presented at the end of this section.

The analysis includes emissions estimates for the following activities: (1) oil development, (2) natural gas development, (3) salable minerals development, (4) locatable minerals development, (5) renewable energy development, (6) livestock management activities, (7) vegetation management, (8) vegetation management of invasive species, (9) fire management (including prescribed fire), (10) forest and woodlands activities, (11) rights-of-way (ROW) and corridors, (12) off-highway vehicle (OHV) use, and (13) resource road maintenance. Because of the difficulty in accurately estimating emission factors for fugitive VOC emissions from oil and gas development operations, and emissions from any prescribed fire activities conducted on BLM land within the Planning Area, these types of emissions have not been estimated in this analysis. Also, activities related to cultural resources, paleontology, recreation, and wildlife and fish would produce inconsequential amounts of air emissions and are not included in the emission summaries.

5.1.1 Assumptions Used in Developing Emissions for the Bighorn Basin RMP

The following assumptions were used in the emission calculations:

- All emission sources operated at their reasonably foreseeable maximum emission rates (as identified in the other resource sections of this document) simultaneously throughout the area.
- All conventional oil and gas wells existing currently and projected in the reasonably foreseeable development (RFD) scenario, were assumed to be fully operational and to remain operating, except for normal projected well closures throughout the area. Well numbers were provided by the CYFO and the WFO.
- Activity data associated with management actions other than those related to conventional natural gas and oil wells were averaged over the entire analysis period to produce annual average emissions. Oil and gas activity follows RFD projections both in time and duration.
- Induced or secondary growth related to increases in vehicle miles traveled is not included in the emissions inventory. Only activities directly related to BLM actions are considered.
- Stationary sources associated with oil and gas development would operate at emission levels based on currently observed BACT levels, and compressor stations for natural gas would be equipped with nonselective catalytic reduction (NSCR) catalyst. Also, it is assumed that conventional natural gas well fields would use gas gathering systems and process gas through centralized dehydration units.
- Activity data associated with management actions other than those related to conventional natural gas wells were averaged over the entire analysis period to produce annual average emissions, except for renewable energy development, where the single development activity was assumed to occur in one year (2018).
- EPA off-road emission standards were used to estimate emissions for non-road sources in project years 2008, 2018, and 2027. This approach simulates the replacement of existing sources by new lower-emitting equipment with future EPA off-road engine emission standards.
- Use of water application as a best management practice (BMP) would reduce fugitive dust emissions from ground-disturbing activities during construction and reclamation activities and maintenance of roads at project sites by 50 percent from uncontrolled levels.
- BMPs for surface-disturbing activities are applied under all alternatives. Appendix H lists standard mitigation guidelines that are used in the Planning Area to mitigate adverse impacts caused by surface-disturbing activities. These BMPs provide protection to soil resources and minimize adverse impacts to soil stability, compaction, and productivity.

Detailed descriptions for emissions estimation for each activity follow. Individual tables of air emissions for all BLM activities were calculated in spreadsheets for each activity.

5.1.2 Oil and Natural Gas Wells Emissions Estimation

Criteria pollutant emissions from oil and conventional natural gas wells development were calculated based on data provided by the CYFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions from conventional natural gas wells include the following:

- Fugitive dust and combustive emissions from well pad construction activities
- Fugitive dust and combustive emissions from road traffic
- Combustive emissions from natural gas-fired compressors
- Fugitive dust and combustive emissions from separators, dehydrators, and water-tank heater operations
- Fugitive dust and combustive emissions from compressor station visits
- Fugitive dust and combustive emissions from well workover operations
- Fugitive dust and combustive emissions from well and pipeline visits for inspection and repair
- VOC emissions from tank condensate and truck loadout (for natural gas wells only)
- Fugitive dust and combustive emissions from road-maintenance activities
- Fugitive dust and combustive emissions from road and well reclamation activities

Estimated emissions from oil wells include the following:

- Fugitive dust and combustive emissions from well pad construction activities
- Fugitive dust and combustive emissions from road traffic
- Fugitive dust and combustive emissions from well workover operations
- Fugitive dust and combustive emissions from well and pipeline visits for inspection and repair
- Fugitive dust and combustive emissions from road maintenance activities

5.1.3 Salable and Locatable Minerals Emissions Estimation

Criteria pollutant emissions from salable and locatable minerals operations were calculated based on data provided by the CYFO and used best available information, BACT, AP-42, and emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust emissions from sand and gravel or mineral processing
- Emissions from truck traffic on unpaved roads at the sand and gravel or mineral processing plant
- Emissions from batch-drop operations
- Fugitive dust and combustive emissions from development and reclamation activities

5.1.4 Renewable Energy Development Emissions Estimation

Criteria pollutant emissions from renewable energy activities were calculated based on data provided by the CYFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from wind-energy development
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.5 Livestock Management Emissions Estimation

Criteria pollutant emissions from livestock management projects were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from construction of springs, reservoirs and pits, wells, pipelines, fences, and reservoir maintenance
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.6 Vegetation Emissions Estimation

Criteria pollutant emissions from vegetation operations including management of invasive species were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from vegetative mechanical treatments (excluding hand work)
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.7 Fire Management Emissions Estimation

Criteria pollutant emissions from fire management activities were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from mechanical treatments (hand work) and prescribed fire
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.8 Forest and Woodlands Emissions Estimation

Criteria pollutant emissions from forest and woodlands activities were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from silviculture treatments, forest products, weed treatments, and insect control
- Fugitive dust emissions from commuting vehicles on unpaved roads
- Combustive emissions from commuting vehicles on unpaved and paved roads

5.1.9 Rights-of-Way Corridor Emissions Estimation

Criteria pollutant emissions from ROW corridor operations were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include the following:

- Fugitive dust and combustive emissions from construction of roads, telephone and fiber optics, powerlines, pipelines (mineral/water), communication sites, and other facilities
- Fugitive dust and combustive emissions for commuting vehicle road traffic

5.1.10 Off-Highway Vehicles Emissions Estimation

Criteria pollutant emissions from OHVs were calculated using the EPA's NONROAD2008a emissions model for Park, Hot Springs, Big Horn, and Washakie Counties for 2008, 2018, and 2027. OHVs for this category include all-terrain vehicles (ATVs), off-road motorcycles (dirt bikes), and snowmobiles. It was assumed in this analysis that activity (and resulting emissions) for this category would be the same for all alternatives for 2018 and 2027. As a check of the estimates from the NONROAD2008 model, Table U-2 provides estimates for "nonroad recreational equipment" for 2002 for these counties obtained from the Western Regional Air Partnership (WRAP) web site (WRAP 2009). It is assumed that ATVs, off-road motorcycles, and snowmobiles make up the majority of the recreational equipment category. The estimates prepared by WRAP are comparable to those provided by the NONROAD2008 model for 2005 for these counties.

Table U-2. 2002 Annual Nonroad Emission Estimates for Recreational Equipment for the Planning Area Prepared by WRAP

County	Emissions					
	VOC (tpy)	NO _x (tpy)	CO (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)	SO ₂ (tpy)
Big Horn County	231.97	3.36	837.81	5.35	4.93	0.49
Hot Springs County	504.68	3.80	1,281.48	11.62	10.69	0.93
Park County	192.09	7.47	754.66	5.86	5.43	0.77
Washakie County	284.28	2.35	730.65	6.59	6.07	0.54
Total	1,213.03	16.98	3,604.60	29.43	27.12	2.72

Source: WRAP 2009

Note: Totals may not add up due to rounding

CO	carbon monoxide	SO ₂	sulfur dioxide
NO _x	nitrogen oxide	tpy	tons per year
PM _{2.5}	particulate matter less than 2.5 microns in diameter	VOC	volatile organic compound
PM ₁₀	particulate matter less than 10 microns in diameter	WRAP	Western Regional Air Partnership

5.1.11 Road Maintenance Emissions Estimation

Criteria pollutant emissions from road maintenance activities (excluding well road maintenance) were calculated based on data provided by the WFO and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Estimated emissions include fugitive dust and combustive emissions resulting from the use of a grader. It was assumed that the majority of road maintenance activities would occur in the summer and only once in the winter.

5.1.12 Summary of Emissions for All BLM Activities

Tables U-3 through U-189 summarize the projected total annual emissions by resource for 2008, 2018, and 2027. Air quality impacts would primarily result from minerals development and production and oil and natural gas development activities; emissions associated with these actions would outweigh those produced from other proposed activities. Alternative E would result in the lowest levels of emissions in 2018 and 2027 for all pollutants, while Alternative C would result in the highest levels of emissions for these two years, and except for volatile organic compound (VOC) emissions, higher emissions than in the 2008 base year. Alternative C would have the greatest potential to contribute to exceedances of the NAAQS or WAAQS of any alternative. Alternatives D and F would result in comparable impacts to the base line year (i.e., 2008), except that VOC emissions are expected to decrease slightly in 2018 and further by 2027; projected emissions are, therefore, unlikely to contribute to an exceedance of a NAAQS or WAAQS. As noted above in Section 2, Alternative E is essentially the same as Alternative B, except that it designates BLM-administered lands within greater sage-grouse Key Habitat Areas as Areas of Critical Environmental Concern (ACECs), which would limit resource development and other activities in these areas, and result in the least amount of emissions of all the alternatives. Alternative F is the nearly the same as Alternative D, except it designates certain areas as Greater Sage-Grouse Priority Habitat Management Areas, which would also limit resource development and other activities, but not as much as those identified in Alternative E.

**Table U-3. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	99	21	244	5	63	18	2	26,416	0	0	26,508	23,977
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	40	4	0	0	8	0	0	163	0		163	148
Sub-total: Operations	42	5	7	0	10	1	0	668	0	0	670	606
Road Maintenance	5	1	2	0	1	0	0	199	0		199	181
Sub-total: Maintenance	5	1	2	0	1	0	0	199	0	0	199	181
Total Emissions	146	26	253	5	74	19	2	27,283	0	0	27,377	24,764

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-4. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	99	21	244	5	63	18	2	26,416	0	0	26,508	23,976
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	42	4	0	0	8	0	0	168	0		168	153
Sub-total: Operations	43	5	7	0	11	1	0	673	0	0	675	611
Road Maintenance	6	1	2	0	1	0	0	206	0		206	187
Sub-total: Maintenance	6	1	2	0	1	0	0	206	0	0	206	187
Total Emissions	148	27	253	5	75	19	2	27,294	0	0	27,388	24,774

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-5. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	99	21	244	5	63	18	2	26,416	0	0	26,508	23,977
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	43	4	0	0	9	0	0	173	0		173	157
Sub-total: Operations	45	5	7	0	11	1	0	678	0	0	680	616
Road Maintenance	5	1	1	0	1	0	0	176	0		176	160
Sub-total: Maintenance	5	1	1	0	1	0	0	176	0	0	176	160
Total Emissions	148	27	252	5	75	19	2	27,270	0	0	27,364	24,753

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-6. Summary of Output - Alternative B
Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,422	0	0	11,462	10,367
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	43	9	106	2	28	8	1	11,493	0	0	11,532	10,431
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	219	0	0	220	199
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	28	3	0	0	6	0	0	112	0		112	101
Sub-total: Operations	28	3	3	0	7	0	0	331	0	0	332	301
Road Maintenance	4	0	1	0	0	0	0	137	0		137	124
Sub-total: Maintenance	4	0	1	0	0	0	0	137	0	0	137	124
Total Emissions	75	13	110	2	34	8	1	11,960	0	0	12,001	10,856

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-7. Summary of Output - Alternative B
Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,422	0	0	11,462	10,367
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	43	9	106	2	28	8	1	11,493	0	0	11,532	10,431
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	219	0	0	220	199
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	36	4	0	0	7	0	0	146	0		146	133
Sub-total: Operations	37	4	3	0	8	1	0	365	0	0	366	332
Road Maintenance	4	0	1	0	0	0	0	149	0		149	135
Sub-total: Maintenance	4	0	1	0	0	0	0	149	0	0	149	135
Total Emissions	84	14	111	2	36	8	1	12,006	0	0	12,047	10,898

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-8. Summary of Output - Alternative C
Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	14	14	267	6	69	19	2	28,734	0	0	28,833	26,080
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	87	9	1	0	1	0	0	178	0		178	162
Sub-total: Construction	108	23	267	6	69	20	2	28,912	0	0	29,012	26,241
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	7	0	2	1	0	551	0	0	553	500
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	1
Well Visits for Inspection & Repair - Operations	32	3	0	0	6	0	0	127	0		128	116
Sub-total: Operations	34	4	7	0	9	1	0	680	0	0	682	617
Road Maintenance	4	0	1	0	0	0	0	156	0		156	142
Sub-total: Maintenance	4	0	1	0	0	0	0	156	0	0	156	142
Total Emissions	146	27	276	6	79	21	2	29,748	0	0	29,850	27,000

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-9. Summary of Output - Alternative C
Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	14	14	267	6	69	19	2	28,734	0	0	28,833	26,080
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	87	9	1	0	1	0	0	178	0		178	162
Sub-total: Construction	108	23	267	6	69	20	2	28,912	0	0	29,012	26,242
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	7	0	2	1	0	551	0	0	553	500
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	1
Well Visits for Inspection & Repair - Operations	44	4	0	0	9	0	0	177	0		178	162
Sub-total: Operations	46	5	7	0	11	1	0	730	0	0	732	663
Road Maintenance	5	1	1	0	1	0	0	181	0		181	164
Sub-total: Maintenance	5	1	1	0	1	0	0	181	0	0	181	164
Total Emissions	159	29	276	6	81	21	2	29,822	0	0	29,925	27,069

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-10. Summary of Output - Alternative D
Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	12	12	235	5	60	17	2	25,371	0	0	25,460	23,028
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	76	8	1	0	1	0	0	157	0		157	143
Sub-total: Construction	95	21	236	5	61	17	2	25,529	0	0	25,617	23,171
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	486	0	0	488	441
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	31	3	0	0	6	0	0	124	0		125	113
Sub-total: Operations	33	4	6	0	8	1	0	612	0	0	614	556
Road Maintenance	4	0	1	0	0	0	0	152	0		152	138
Sub-total: Maintenance	4	0	1	0	0	0	0	152	0	0	152	138
Total Emissions	132	25	244	5	70	18	2	26,293	0	0	26,383	23,865

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-11. Summary of Output - Alternative D
Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,398	0	0	11,438	10,345
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	43	9	106	2	27	8	1	11,469	0	0	11,508	10,409
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	218	0	0	219	198
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	28	3	0	0	6	0	0	111	0		112	101
Sub-total: Operations	28	3	3	0	7	0	0	331	0	0	332	300
Road Maintenance	4	0	1	0	0	0	0	137	0		137	124
Sub-total: Maintenance	4	0	1	0	0	0	0	137	0	0	137	124
Total Emissions	75	13	110	2	34	8	1	11,936	0	0	11,977	10,834

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-12. Summary of Output - Alternative E
Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	6	5	106	2	27	8	1	11,398	0	0	11,438	10,345
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	34	3	0	0	0	0	0	71	0		71	64
Sub-total: Construction	43	9	106	2	27	8	1	11,469	0	0	11,508	10,409
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	3	0	1	0	0	218	0	0	219	198
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	28	3	0	0	6	0	0	111	0		112	101
Sub-total: Operations	28	3	3	0	7	0	0	331	0	0	332	300
Road Maintenance	4	0	1	0	0	0	0	137	0		137	124
Sub-total: Maintenance	4	0	1	0	0	0	0	137	0	0	137	124
Total Emissions	75	13	110	2	34	8	1	11,936	0	0	11,977	10,834

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-13. Summary of Output - Alternative E
Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	13	12	244	5	63	18	2	26,254	0	0	26,345	23,829
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	79	8	1	0	1	0	0	163	0		163	148
Sub-total: Construction	99	21	244	5	63	18	2	26,416	0	0	26,508	23,977
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	503	0	0	505	457
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	43	4	0	0	9	0	0	173	0		173	157
Sub-total: Operations	45	5	7	0	11	1	0	678	0	0	680	616
Road Maintenance	5	1	1	0	1	0	0	176	0		176	160
Sub-total: Maintenance	5	1	1	0	1	0	0	176	0	0	176	160
Total Emissions	148	27	252	5	75	19	2	27,270	0	0	27,364	24,753

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-14. Summary of Output - Alternative F
Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	12	12	235	5	60	17	2	25,324	0	0	25,412	22,985
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	76	8	1	0	1	0	0	157	0		157	142
Sub-total: Construction	95	21	236	5	61	17	2	25,481	0	0	25,569	23,127
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	485	0	0	487	441
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	31	3	0	0	6	0	0	124	0		125	113
Sub-total: Operations	33	4	6	0	8	1	0	611	0	0	613	555
Road Maintenance	4	0	1	0	0	0	0	152	0		152	138
Sub-total: Maintenance	4	0	1	0	0	0	0	152	0	0	152	138
Total Emissions	132	25	243	5	70	18	2	26,244	0	0	26,334	23,820

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-15. Summary of Output - Alternative F
Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	12	12	235	5	60	17	2	25,324	0	0	25,412	22,985
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	76	8	1	0	1	0	0	157	0		157	142
Sub-total: Construction	95	21	236	5	61	17	2	25,481	0	0	25,569	23,128
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	6	0	2	0	0	485	0	0	487	441
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	43	4	0	0	9	0	0	171	0		172	156
Sub-total: Operations	44	5	7	0	11	1	0	658	0	0	660	598
Road Maintenance	5	1	1	0	1	0	0	175	0		175	159
Sub-total: Maintenance	5	1	1	0	1	0	0	175	0	0	175	159
Total Emissions	144	26	244	5	72	18	2	26,313	0	0	26,404	23,884

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-16. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Oil Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	140	30	348	7	90	26	3	37,597	0	0	37,727	34,125
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	64	7	10	0	15	1	0	966	0	0	969	877
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	8	1	2	0	1	0	0	303	0	0	303	275
Total Emissions	212	38	360	7	107	27	3	38,866	0	0	38,999	35,278

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-17. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,914
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	140	30	348	7	90	26	3	37,597	0	0	37,727	34,125
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	63	6	1	0	13	1	0	253	0		254	231
Sub-total: Operations	65	7	10	0	16	1	0	972	0	0	975	883
Road Maintenance	8	1	3	0	1	0	0	310	0		310	282
Sub-total: Maintenance	8	1	3	0	1	0	0	310	0	0	310	282
Total Emissions	214	38	360	7	107	27	3	38,879	0	0	39,012	35,289

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-18. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	140	30	348	7	90	26	3	37,597	0	0	37,727	34,125
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	259	0		260	236
Sub-total: Operations	67	7	10	0	16	1	0	977	0	0	981	888
Road Maintenance	7	1	2	0	1	0	0	264	0		264	240
Sub-total: Maintenance	7	1	2	0	1	0	0	264	0	0	264	240
Total Emissions	214	38	359	7	107	27	3	38,839	0	0	38,972	35,253

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-19. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Oil Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	140	30	348	7	90	26	3	37,597	0	0	37,727	34,125
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	64	7	10	0	15	1	0	966	0	0	969	877
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	8	1	2	0	1	0	0	303	0	0	303	275
Total Emissions	212	38	360	7	107	27	3	38,866	0	0	38,999	35,278

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-20. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	11	10	201	4	52	15	1	21,628	0	0	21,703	19,630
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	122
Sub-total: Construction	81	18	201	4	52	15	1	21,762	0	0	21,837	19,752
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	415	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	59	6	1	0	12	1	0	239	0		240	217
Sub-total: Operations	61	6	6	0	14	1	0	655	0	0	657	595
Road Maintenance	8	1	2	0	1	0	0	292	0		293	265
Sub-total: Maintenance	8	1	2	0	1	0	0	292	0	0	293	265
Total Emissions	150	25	209	4	67	16	2	22,709	0	0	22,786	20,612

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-21. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	11	10	201	4	52	15	1	21,628	0	0	21,703	19,631
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	122
Sub-total: Construction	81	18	201	4	52	15	1	21,762	0	0	21,837	19,752
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	415	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	57	6	1	0	12	1	0	230	0		231	210
Sub-total: Operations	59	6	6	0	13	1	0	646	0	0	648	587
Road Maintenance	6	1	2	0	1	0	0	235	0		235	213
Sub-total: Maintenance	6	1	2	0	1	0	0	235	0	0	235	213
Total Emissions	146	24	209	4	66	16	2	22,642	0	0	22,720	20,552

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-22. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Oil Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles – Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	140	30	348	7	90	26	3	37,597	0	0	37,727	34,125
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	64	7	10	0	15	1	0	966	0	0	969	877
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	8	1	2	0	1	0	0	303	0	0	303	275
Total Emissions	212	38	360	7	107	27	3	38,866	0	0	38,999	35,278

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-23. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	4	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	19	19	370	8	95	27	3	39,846	0	0	39,984	36,165
Wind Erosion	7	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	120	12	1	0	1	0	0	247	0		247	224
Sub-total: Construction	150	32	371	8	96	27	3	40,092	0	0	40,231	36,389
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	1	10	0	3	1	0	764	0	0	767	693
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	256	0		256	233
Sub-total: Operations	66	7	10	0	16	1	0	1,022	0	0	1,025	928
Road Maintenance	8	1	3	0	1	0	0	313	0		313	284
Sub-total: Maintenance	8	1	3	0	1	0	0	313	0	0	313	284
Total Emissions	224	40	383	8	113	29	3	41,427	0	0	41,569	37,601

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-24. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	4	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	19	19	370	8	95	27	3	39,846	0	0	39,984	36,166
Wind Erosion	7	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	120	12	1	0	1	0	0	247	0		247	224
Sub-total: Construction	150	32	371	8	96	27	3	40,092	0	0	40,231	36,390
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	1	10	0	3	1	0	764	0	0	767	693
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	66	7	1	0	13	1	0	264	0		264	240
Sub-total: Operations	68	7	10	0	17	1	0	1,030	0	0	1,033	935
Road Maintenance	7	1	2	0	1	0	0	269	0		269	244
Sub-total: Maintenance	7	1	2	0	1	0	0	269	0	0	269	244
Total Emissions	225	40	383	8	113	29	3	41,391	0	0	41,533	37,570

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-25. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Oil Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	140	30	348	7	90	26	3	37,597	0	0	37,727	34,125
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	64	7	10	0	15	1	0	966	0	0	969	877
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	8	1	2	0	1	0	0	303	0	0	303	275
Total Emissions	212	38	360	7	107	27	3	38,866	0	0	38,999	35,278

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-26. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,070
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	137	30	339	7	88	25	3	36,661	0	0	36,788	33,275
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	63	6	1	0	13	1	0	252	0		253	230
Sub-total: Operations	65	7	9	0	16	1	0	953	0	0	956	866
Road Maintenance	8	1	2	0	1	0	0	309	0		309	281
Sub-total: Maintenance	8	1	2	0	1	0	0	309	0	0	309	281
Total Emissions	210	37	351	7	104	26	3	37,923	0	0	38,053	34,421

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-27. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,071
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	137	30	339	7	88	25	3	36,661	0	0	36,788	33,276
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	257	0		258	234
Sub-total: Operations	66	7	9	0	16	1	0	958	0	0	961	870
Road Maintenance	7	1	2	0	1	0	0	263	0		263	238
Sub-total: Maintenance	7	1	2	0	1	0	0	263	0	0	263	238
Total Emissions	210	37	351	7	105	26	3	37,882	0	0	38,012	34,385

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-28. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Oil Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	18	347	7	89	25	3	37,366	0	0	37,495	33,915
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles – Construction	113	11	1	0	1	0	0	231	0		232	210
Sub-total: Construction	140	30	348	7	90	26	3	37,597	0	0	37,727	34,125
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	716	0	0	719	650
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	62	6	1	0	12	1	0	248	0		248	225
Sub-total: Operations	64	7	10	0	15	1	0	966	0	0	969	877
Road Maintenance	8	1	2	0	1	0	0	303	0		303	275
Sub-total: Maintenance	8	1	2	0	1	0	0	303	0	0	303	275
Total Emissions	212	38	360	7	107	27	3	38,866	0	0	38,999	35,278

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-29. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	10	10	200	4	52	15	1	21,604	0	0	21,679	19,608
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	121
Sub-total: Construction	81	18	201	4	52	15	1	21,738	0	0	21,813	19,730
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	414	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	59	6	1	0	12	1	0	239	0		240	217
Sub-total: Operations	61	6	6	0	14	1	0	654	0	0	656	594
Road Maintenance	8	1	2	0	1	0	0	292	0		293	265
Sub-total: Maintenance	8	1	2	0	1	0	0	292	0	0	293	265
Total Emissions	150	25	209	4	67	16	2	22,684	0	0	22,762	20,590

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-30. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	10	10	200	4	52	15	1	21,604	0	0	21,679	19,609
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	65	7	1	0	1	0	0	134	0		134	122
Sub-total: Construction	81	18	201	4	52	15	1	21,738	0	0	21,813	19,730
Well Workover Operations - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	0	0	5	0	2	0	0	414	0	0	416	376
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	1	0		1	1
Well Visits for Inspection & Repair - Operations	57	6	1	0	12	1	0	230	0		231	209
Sub-total: Operations	59	6	6	0	13	1	0	645	0	0	648	586
Road Maintenance	6	1	2	0	1	0	0	235	0		235	213
Sub-total: Maintenance	6	1	2	0	1	0	0	235	0	0	235	213
Total Emissions	146	24	209	4	66	16	2	22,618	0	0	22,695	20,530

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-31. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Oil Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,070
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	137	30	339	7	88	25	3	36,661	0	0	36,788	33,275
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	63	6	1	0	13	1	0	252	0		253	230
Sub-total: Operations	65	7	9	0	16	1	0	953	0	0	956	866
Road Maintenance	8	1	2	0	1	0	0	309	0		309	281
Sub-total: Maintenance	8	1	2	0	1	0	0	309	0	0	309	281
Total Emissions	210	37	351	7	104	26	3	37,923	0	0	38,053	34,421

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-32. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Oil Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions	18	17	338	7	87	25	2	36,436	0	0	36,562	33,071
Wind Erosion	6	1	---	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Construction	110	11	1	0	1	0	0	226	0		226	205
Sub-total: Construction	137	30	339	7	88	25	3	36,661	0	0	36,788	33,276
Well Workover Operations - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Well Workover Operations - On-site Exhaust	1	0	9	0	3	1	0	698	0	0	701	634
Well Workover Operations - On-road Exhaust	0	0	0	0	0	0	0	2	0		2	2
Well Visits for Inspection & Repair - Operations	64	6	1	0	13	1	0	257	0		258	234
Sub-total: Operations	66	7	9	0	16	1	0	958	0	0	961	870
Road Maintenance	7	1	2	0	1	0	0	263	0		263	238
Sub-total: Maintenance	7	1	2	0	1	0	0	263	0	0	263	238
Total Emissions	210	37	351	7	105	26	3	37,882	0	0	38,012	34,385

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-33. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	32	1	9	2	0	3,671	0	0	3,684	3,332
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	79	0		79	72
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	14	3	32	1	10	7	1	3,751	0	0	3,763	3,405
Natural Gas Compression - Operations ^a	3	3	86	0	43	43	13	34,182	71	0	35,778	32,519
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	73	0	0	73	66
Dehy Venting and Flashing	---	---	---	---	---	28	11	306	19		698	670
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	1	0	0	0	0	76	0	0	76	69
Well & Pipeline Visits for Inspection & Repair - Operations	12	1	0	0	0	0	0	21	0		21	19
Tanks Condensate and Loadout	---	---	---	---	---	33	3	2	5		117	117
Wellhead Fugitives	---	---	---	---	---	182	18	107	1,669		35,154	35,144
Pneumatic Devices	---	---	---	---	---	134	13	79	1,226		25,818	25,811
Sub-total: Operations	18	4	86	0	43	420	58	34,855	2,990	0	97,745	94,423
Road Maintenance	3	0	1	0	0	0	0	91	0		91	83
Sub-total: Maintenance	3	0	1	0	0	0	0	91	0	0	91	83
Road Reclamation	0	0	0	0	0	0	0	5	0		5	5
Well Reclamation	1	0	0	0	0	0	0	16	0		16	14
Sub-total: Reclamation	1	0	0	0	0	0	0	21	0	0	21	19
Total Emissions	36	8	119	1	54	427	59	38,718	2,990	0	101,621	97,930

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-34. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	32	1	9	2	0	3,671	0	0	3,684	3,332
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	79	0		79	72
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	14	3	32	1	9	5	0	3,751	0	0	3,763	3,405
Natural Gas Compression - Operations ^a	3	3	88	0	44	44	13	35,242	74	0	36,888	33,528
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	75	0	0	75	68
Dehy Venting and Flashing	---	---	---	---	---	16	6	173	11		395	379
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	1	0	0	0	0	76	0	0	76	69
Well & Pipeline Visits for Inspection & Repair - Operations	12	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	19	2	1	3		66	66
Wellhead Fugitives	---	---	---	---	---	188	19	111	1,721		36,244	36,234
Pneumatic Devices	---	---	---	---	---	138	14	81	1,264		26,619	26,611
Sub-total: Operations	19	5	89	0	45	404	54	35,790	3,072	0	100,395	96,983
Road Maintenance	3	0	0	0	0	0	0	94	0		94	85
Sub-total: Maintenance	3	0	0	0	0	0	0	94	0	0	94	85
Road Reclamation	0	0	0	0	0	0	0	5	0		5	5
Well Reclamation	1	0	0	0	0	0	0	16	0		16	15
Sub-total: Reclamation	1	0	0	0	0	0	0	22	0	0	22	20
Total Emissions	36	8	121	1	54	409	54	39,657	3,072	0	104,274	100,493

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-35. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	32	1	9	2	0	3,671	0	0	3,684	3,332
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	79	0		79	72
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	14	3	32	1	9	5	0	3,751	0	0	3,763	3,405
Natural Gas Compression - Operations ^a	3	3	91	0	45	45	14	36,303	76	0	37,998	34,537
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	77	0	0	77	70
Dehy Venting and Flashing	---	---	---	---	---	12	5	134	8		306	293
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	0	0	0	0	0	76	0	0	76	69
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	14	1	1	2		51	51
Wellhead Fugitives	---	---	---	---	---	193	19	114	1,772		37,335	37,324
Pneumatic Devices	---	---	---	---	---	142	14	84	1,302		27,420	27,412
Sub-total: Operations	19	5	91	0	46	408	53	36,820	3,161	0	103,295	99,785
Road Maintenance	3	0	0	0	0	0	0	97	0		97	88
Sub-total: Maintenance	3	0	0	0	0	0	0	97	0	0	97	88
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Reclamation	1	0	0	0	0	0	0	19	0	0	19	17
Total Emissions	37	8	123	1	55	412	54	40,687	3,161	0	107,174	103,295

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-36. Summary of Output - Alternative B
Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	14	0	4	1	0	1,600	0	0	1,605	1,452
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	6	1	14	0	4	2	0	1,635	0	0	1,640	1,484
Natural Gas Compression - Operations ^a	2	2	59	0	29	29	9	23,418	49	0	24,512	22,279
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	50	0	0	50	45
Dehy Venting and Flashing	---	---	---	---	---	7	3	76	5		172	165
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	6
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	8	1	0	0	0	0	0	14	0		14	13
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		29	29
Wellhead Fugitives	---	---	---	---	---	125	12	73	1,143		24,084	24,077
Pneumatic Devices	---	---	---	---	---	92	9	54	840		17,688	17,683
Sub-total: Operations	12	3	59	0	30	261	34	23,725	2,038	0	66,588	64,327
Road Maintenance	2	0	0	0	0	0	0	62	0		62	57
Sub-total: Maintenance	2	0	0	0	0	0	0	62	0	0	62	57
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	0	0	0	0	0	0	0	11	0		11	10
Sub-total: Reclamation	1	0	0	0	0	0	0	14	0	0	14	13
Total Emissions	21	5	73	0	34	263	34	25,437	2,038	0	68,306	65,881

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-37. Summary of Output - Alternative B
Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	14	0	4	1	0	1,600	0	0	1,605	1,452
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	6	1	14	0	4	2	0	1,635	0	0	1,640	1,484
Natural Gas Compression - Operations ^a	3	3	77	0	38	38	11	30,563	64	0	31,991	29,076
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	65	0	0	65	59
Dehy Venting and Flashing	---	---	---	---	---	7	3	79	5		179	172
Station Visits - Operations	3	0	0	0	0	0	0	9	0		9	8
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	11	1	0	0	0	0	0	19	0		19	17
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		30	30
Wellhead Fugitives	---	---	---	---	---	163	16	96	1,492		31,432	31,423
Pneumatic Devices	---	---	---	---	---	120	12	70	1,096		23,085	23,078
Sub-total: Operations	16	4	77	0	39	336	43	30,934	2,658	0	86,843	83,894
Road Maintenance	2	0	0	0	0	0	0	81	0		81	74
Sub-total: Maintenance	2	0	0	0	0	0	0	81	0	0	81	74
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	0	0	0	0	0	0	0	14	0		14	13
Sub-total: Reclamation	1	0	0	0	0	0	0	16	0	0	16	15
Total Emissions	25	6	91	0	43	338	43	32,666	2,658	0	88,580	85,466

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-38. Summary of Output - Alternative C
Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	35	1	9	3	0	4,018	0	0	4,031	3,647
Well Completion Flaring	0	0	0	0	0	3	0	0	0	0	0	0
Commuting Vehicles - Construction	10	1	0	0	0	0	0	87	0		87	79
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	16	3	35	1	10	5	1	4,105	0	0	4,118	3,726
Natural Gas Compression - Operations ^a	2	2	67	0	34	34	10	26,766	56	0	28,016	25,464
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	57	0	0	57	52
Dehy Venting and Flashing	---	---	---	---	---	13	5	142	9		323	310
Station Visits - Operations	2	0	0	0	0	0	0	8	0		8	7
Well Workover - Operations	0	0	1	0	0	0	0	83	0	0	83	75
Well & Pipeline Visits for Inspection & Repair - Operations	9	1	0	0	0	0	0	16	0		16	15
Tanks Condensate and Loadout	---	---	---	---	---	15	2	1	3		54	54
Wellhead Fugitives	---	---	---	---	---	143	14	84	1,307		27,527	27,519
Pneumatic Devices	---	---	---	---	---	105	10	62	960		20,217	20,211
Sub-total: Operations	14	4	68	0	34	309	41	27,218	2,334	0	76,301	73,707
Road Maintenance	2	0	0	0	0	0	0	71	0		71	65
Sub-total: Maintenance	2	0	0	0	0	0	0	71	0	0	71	65
Road Reclamation	0	0	0	0	0	0	0	4	0		4	4
Well Reclamation	0	0	0	0	0	0	0	12	0		12	11
Sub-total: Reclamation	1	0	0	0	0	0	0	17	0	0	17	15
Total Emissions	32	7	103	1	44	315	42	31,410	2,334	0	80,507	77,512

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-39. Summary of Output - Alternative C
Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	35	1	9	3	0	4,018	0	0	4,031	3,647
Well Completion Flaring	0	0	0	0	0	3	0	0	0	0	0	0
Commuting Vehicles - Construction	10	1	0	0	0	0	0	87	0		87	79
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	16	3	35	1	10	5	1	4,105	0	0	4,118	3,726
Natural Gas Compression - Operations ^a	3	3	93	0	47	47	14	37,259	78	0	38,999	35,447
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	79	0	0	79	72
Dehy Venting and Flashing	---	---	---	---	---	14	5	147	9		335	322
Station Visits - Operations	3	0	0	0	0	0	0	11	0		11	10
Well Workover - Operations	0	0	1	0	0	0	0	83	0	0	83	75
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	23	0		23	21
Tanks Condensate and Loadout	---	---	---	---	---	16	2	1	3		56	56
Wellhead Fugitives	---	---	---	---	---	198	20	117	1,819		38,319	38,308
Pneumatic Devices	---	---	---	---	---	146	15	86	1,336		28,142	28,134
Sub-total: Operations	20	5	94	0	47	420	55	37,805	3,245	0	106,047	102,443
Road Maintenance	3	0	0	0	0	0	0	99	0		99	90
Sub-total: Maintenance	3	0	0	0	0	0	0	99	0	0	99	90
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	16
Sub-total: Reclamation	1	0	0	0	0	0	0	20	0	0	20	18
Total Emissions	39	9	129	1	58	426	56	42,029	3,245	0	110,284	106,277

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-40. Summary of Output - Alternative D
Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	31	1	8	2	0	3,548	0	0	3,560	3,221
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	14	3	31	1	9	5	0	3,625	0	0	3,637	3,290
Natural Gas Compression - Operations ^a	2	2	65	0	33	33	10	26,115	55	0	27,334	24,844
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	55	0	0	55	50
Dehy Venting and Flashing	---	---	---	---	---	11	4	122	7		279	268
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	7
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	9	1	0	0	0	0	0	16	0		16	14
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		47	47
Wellhead Fugitives	---	---	---	---	---	139	14	82	1,275		26,857	26,850
Pneumatic Devices	---	---	---	---	---	102	10	60	936		19,725	19,719
Sub-total: Operations	14	3	66	0	33	298	39	26,532	2,276	0	74,394	71,865
Road Maintenance	2	0	0	0	0	0	0	70	0		70	63
Sub-total: Maintenance	2	0	0	0	0	0	0	70	0	0	70	63
Road Reclamation	0	0	0	0	0	0	0	4	0		4	4
Well Reclamation	0	0	0	0	0	0	0	12	0		12	11
Sub-total: Reclamation	1	0	0	0	0	0	0	16	0	0	16	15
Total Emissions	30	7	97	1	42	303	40	30,243	2,276	0	78,117	75,234

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-41. Summary of Output - Alternative D
Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	31	1	8	2	0	3,548	0	0	3,560	3,221
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	14	3	31	1	9	5	0	3,625	0	0	3,637	3,290
Natural Gas Compression - Operations ^a	3	3	90	0	45	45	14	35,957	75	0	37,636	34,208
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	76	0	0	76	69
Dehy Venting and Flashing	---	---	---	---	---	12	4	127	8		290	278
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	14	1	1	2		49	49
Wellhead Fugitives	---	---	---	---	---	191	19	113	1,756		36,979	36,969
Pneumatic Devices	---	---	---	---	---	141	14	83	1,289		27,158	27,151
Sub-total: Operations	19	5	91	0	46	403	52	36,462	3,130	0	102,294	98,818
Road Maintenance	3	0	0	0	0	0	0	96	0		96	87
Sub-total: Maintenance	3	0	0	0	0	0	0	96	0	0	96	87
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Reclamation	1	0	0	0	0	0	0	19	0	0	19	17
Total Emissions	36	8	122	1	55	407	53	40,202	3,130	0	106,046	102,213

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-42. Summary of Output - Alternative E
Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	14	0	4	1	0	1,597	0	0	1,602	1,449
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	6	1	14	0	4	2	0	1,631	0	0	1,637	1,481
Natural Gas Compression - Operations ^a	2	2	59	0	29	29	9	23,412	49	0	24,506	22,273
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	50	0	0	50	45
Dehy Venting and Flashing	---	---	---	---	---	7	3	76	5		172	165
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	6
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	8	1	0	0	0	0	0	14	0		14	13
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		29	29
Wellhead Fugitives	---	---	---	---	---	125	12	73	1,143		24,078	24,071
Pneumatic Devices	---	---	---	---	---	92	9	54	840		17,683	17,678
Sub-total: Operations	12	3	59	0	30	261	34	23,719	2,037	0	66,572	64,311
Road Maintenance	2	0	0	0	0	0	0	62	0		62	57
Sub-total: Maintenance	2	0	0	0	0	0	0	62	0	0	62	57
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	0	0	0	0	0	0	0	11	0		11	10
Sub-total: Reclamation	1	0	0	0	0	0	0	14	0	0	14	13
Total Emissions	21	5	73	0	34	263	34	25,428	2,038	0	68,286	65,862

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-43. Summary of Output - Alternative E
Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	14	0	4	1	0	1,597	0	0	1,602	1,449
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	4	0	0	0	0	0	0	35	0		35	32
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	6	1	14	0	4	2	0	1,631	0	0	1,637	1,481
Natural Gas Compression - Operations ^a	3	3	77	0	38	38	11	30,552	64	0	31,979	29,066
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	65	0	0	65	59
Dehy Venting and Flashing	---	---	---	---	---	7	3	79	5		179	172
Station Visits - Operations	3	0	0	0	0	0	0	9	0		9	8
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	33	30
Well & Pipeline Visits for Inspection & Repair - Operations	11	1	0	0	0	0	0	19	0		19	17
Tanks Condensate and Loadout	---	---	---	---	---	8	1	1	1		30	30
Wellhead Fugitives	---	---	---	---	---	163	16	96	1,492		31,420	31,412
Pneumatic Devices	---	---	---	---	---	119	12	70	1,096		23,076	23,069
Sub-total: Operations	16	4	77	0	39	336	43	30,922	2,657	0	86,810	83,862
Road Maintenance	2	0	0	0	0	0	0	81	0		81	74
Sub-total: Maintenance	2	0	0	0	0	0	0	81	0	0	81	74
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	0	0	0	0	0	0	0	14	0		14	13
Sub-total: Reclamation	1	0	0	0	0	0	0	16	0	0	16	15
Total Emissions	25	6	91	0	43	338	43	32,651	2,657	0	88,544	85,432

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-44. Summary of Output - Alternative F
Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	31	1	8	2	0	3,542	0	0	3,554	3,214
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	14	3	31	1	9	4	0	3,618	0	0	3,630	3,284
Natural Gas Compression - Operations ^a	2	2	65	0	33	33	10	26,109	55	0	27,328	24,839
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	55	0	0	55	50
Dehy Venting and Flashing	---	---	---	---	---	11	4	122	7		279	268
Station Visits - Operations	2	0	0	0	0	0	0	7	0		7	7
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	9	1	0	0	0	0	0	16	0		16	14
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		47	47
Wellhead Fugitives	---	---	---	---	---	139	14	82	1,275		26,851	26,844
Pneumatic Devices	---	---	---	---	---	102	10	60	936		19,720	19,715
Sub-total: Operations	14	3	66	0	33	298	39	26,526	2,275	0	74,378	71,849
Road Maintenance	2	0	0	0	0	0	0	70	0		70	63
Sub-total: Maintenance	2	0	0	0	0	0	0	70	0	0	70	63
Road Reclamation	0	0	0	0	0	0	0	4	0		4	4
Well Reclamation	0	0	0	0	0	0	0	12	0		12	11
Sub-total: Reclamation	1	0	0	0	0	0	0	16	0	0	16	15
Total Emissions	30	7	97	1	42	303	40	30,230	2,275	0	78,094	75,211

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-45. Summary of Output - Alternative F
Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	31	1	8	2	0	3,542	0	0	3,554	3,214
Well Completion Flaring	0	0	0	0	0	2	0	0	0	0	0	0
Commuting Vehicles - Construction	9	1	0	0	0	0	0	77	0		77	70
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	14	3	31	1	9	4	0	3,618	0	0	3,630	3,284
Natural Gas Compression - Operations ^a	3	3	90	0	45	45	14	35,945	75	0	37,624	34,197
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	76	0	0	76	69
Dehy Venting and Flashing	---	---	---	---	---	12	4	127	8		290	278
Station Visits - Operations	3	0	0	0	0	0	0	10	0		10	9
Well Workover - Operations	0	0	0	0	0	0	0	73	0	0	73	66
Well & Pipeline Visits for Inspection & Repair - Operations	13	1	0	0	0	0	0	22	0		22	20
Tanks Condensate and Loadout	---	---	---	---	---	14	1	1	2		49	49
Wellhead Fugitives	---	---	---	---	---	191	19	113	1,755		36,967	36,957
Pneumatic Devices	---	---	---	---	---	141	14	83	1,289		27,150	27,142
Sub-total: Operations	19	5	91	0	46	403	52	36,450	3,129	0	102,261	98,787
Road Maintenance	3	0	0	0	0	0	0	96	0		96	87
Sub-total: Maintenance	3	0	0	0	0	0	0	96	0	0	96	87
Road Reclamation	0	0	0	0	0	0	0	2	0		2	2
Well Reclamation	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Reclamation	1	0	0	0	0	0	0	19	0	0	19	17
Total Emissions	36	8	122	1	55	407	53	40,183	3,129	0	106,006	102,175

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-46. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	3	2	45	1	12	3	0	5,223	0	0	5,241	4,741
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	113	0		113	103
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	20	4	45	1	13	7	1	5,336	0	0	5,354	4,844
Natural Gas Compression - Operations ^a	4	4	130	0	65	65	20	51,976	109	0	54,403	49,448
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	110	0	0	110	100
Dehy Venting and Flashing	---	---	---	---	---	28	11	306	19		698	670
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	13
Well Workover - Operations	0	0	1	0	0	0	0	107	0	0	108	98
Well & Pipeline Visits for Inspection & Repair - Operations	18	2	0	0	0	0	0	32	0		32	29
Tanks Condensate and Loadout	---	---	---	---	---	33	3	2	5		117	117
Wellhead Fugitives	---	---	---	---	---	277	28	163	2,538		53,454	53,439
Pneumatic Devices	---	---	---	---	---	203	20	120	1,864		39,258	39,247
Sub-total: Operations	27	7	131	0	66	607	81	52,832	4,534	0	148,196	143,160
Road Maintenance	4	0	1	0	0	0	0	139	0		139	126
Sub-total: Maintenance	4	0	1	0	0	0	0	139	0	0	139	126
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	24	0		24	22
Sub-total: Reclamation	1	0	0	0	0	0	0	32	0	0	32	29
Total Emissions	53	12	178	1	80	614	82	58,339	4,534	1	153,721	148,159

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-47. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	3	2	45	1	12	3	0	5,223	0	0	5,241	4,741
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	113	0		113	103
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	20	4	45	1	13	7	1	5,336	0	0	5,354	4,844
Natural Gas Compression - Operations ^a	5	5	133	0	67	67	20	53,192	111	0	55,676	50,604
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	113	0	0	113	102
Dehy Venting and Flashing	---	---	---	---	---	24	9	261	16		596	572
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	107	0	0	108	98
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	0	0	0	33	0		33	29
Tanks Condensate and Loadout	---	---	---	---	---	28	3	2	5		100	100
Wellhead Fugitives	---	---	---	---	---	283	28	167	2,597		54,704	54,689
Pneumatic Devices	---	---	---	---	---	208	21	122	1,907		40,176	40,165
Sub-total: Operations	28	7	134	0	68	610	81	54,012	4,636	0	151,521	146,373
Road Maintenance	4	0	0	0	0	0	0	142	0		142	129
Sub-total: Maintenance	4	0	0	0	0	0	0	142	0	0	142	129
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	25	0		25	22
Sub-total: Reclamation	1	0	0	0	0	0	0	33	0	0	33	30
Total Emissions	54	12	180	1	81	617	82	59,523	4,636	1	157,050	151,375

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-48. Summary of Output - Alternative A
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	3	2	45	1	12	3	0	5,223	0	0	5,241	4,741
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	113	0		113	103
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	20	4	45	1	13	7	1	5,336	0	0	5,354	4,844
Natural Gas Compression - Operations ^a	5	5	136	0	68	68	20	54,408	114	0	56,949	51,761
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	115	0	0	116	105
Dehy Venting and Flashing	---	---	---	---	---	18	7	201	12		458	439
Station Visits - Operations	4	0	0	0	0	0	0	16	0		16	14
Well Workover - Operations	0	0	1	0	0	0	0	107	0	0	108	98
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	22	2	1	4		77	77
Wellhead Fugitives	---	---	---	---	---	290	29	171	2,656		55,955	55,939
Pneumatic Devices	---	---	---	---	---	213	21	125	1,951		41,095	41,083
Sub-total: Operations	29	7	137	0	69	611	80	55,178	4,737	0	154,805	149,546
Road Maintenance	4	0	0	0	0	0	0	145	0		145	132
Sub-total: Maintenance	4	0	0	0	0	0	0	145	0	0	145	132
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	1	0	0	0	0	0	0	29	0	0	29	26
Total Emissions	54	12	183	1	83	618	81	60,688	4,737	1	160,333	154,547

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-49. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	26	1	7	2	0	3,025	0	0	3,036	2,746
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	66	0		66	59
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	12	3	26	1	8	3	0	3,091	0	0	3,101	2,806
Natural Gas Compression - Operations ^a	4	4	126	0	63	63	19	50,150	105	0	52,491	47,710
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	106	0	0	106	96
Dehy Venting and Flashing	---	---	---	---	---	15	6	162	10		369	354
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	13
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	18	2	0	0	0	0	0	31	0		31	28
Tanks Condensate and Loadout	---	---	---	---	---	17	2	1	3		62	62
Wellhead Fugitives	---	---	---	---	---	267	27	157	2,448		51,575	51,561
Pneumatic Devices	---	---	---	---	---	196	20	115	1,798		37,878	37,868
Sub-total: Operations	26	7	126	0	64	559	73	50,799	4,364	0	142,590	137,748
Road Maintenance	4	0	0	0	0	0	0	134	0		134	121
Sub-total: Maintenance	4	0	0	0	0	0	0	134	0	0	134	121
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	23	0		23	21
Sub-total: Reclamation	1	0	0	0	0	0	0	31	0	0	31	28
Total Emissions	43	10	153	1	72	562	73	54,054	4,364	0	145,856	140,703

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-50. Summary of Output - Alternative B
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	26	1	7	2	0	3,025	0	0	3,036	2,746
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	66	0		66	59
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	12	3	26	1	8	3	0	3,091	0	0	3,101	2,806
Natural Gas Compression - Operations ^a	4	4	121	0	61	61	18	48,323	101	0	50,580	45,972
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	102	0	0	103	93
Dehy Venting and Flashing	---	---	---	---	---	11	4	124	8		284	272
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	12
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	17	2	0	0	0	0	0	30	0		30	27
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		48	48
Wellhead Fugitives	---	---	---	---	---	257	26	152	2,359		49,697	49,683
Pneumatic Devices	---	---	---	---	---	189	19	111	1,733		36,499	36,488
Sub-total: Operations	25	6	122	0	61	532	68	48,919	4,203	0	137,315	132,651
Road Maintenance	4	0	0	0	0	0	0	129	0		129	117
Sub-total: Maintenance	4	0	0	0	0	0	0	129	0	0	129	117
Road Reclamation	0	0	0	0	0	0	0	3	0		3	3
Well Reclamation	1	0	0	0	0	0	0	22	0		22	20
Sub-total: Reclamation	1	0	0	0	0	0	0	25	0	0	25	23
Total Emissions	42	9	148	1	69	535	69	52,164	4,203	0	140,570	135,597

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-51. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	3	3	48	1	13	4	0	5,570	0	0	5,588	5,055
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	14	1	0	0	1	0	0	120	0		120	109
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	22	5	48	1	14	7	1	5,690	0	0	5,709	5,165
Natural Gas Compression - Operations ^a	5	5	134	0	67	67	20	53,670	112	0	56,177	51,059
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	114	0	0	114	103
Dehy Venting and Flashing	---	---	---	---	---	26	10	284	17		648	622
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	115	0	0	115	104
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	31	3	2	5		109	109
Wellhead Fugitives	---	---	---	---	---	286	29	168	2,620		55,196	55,181
Pneumatic Devices	---	---	---	---	---	210	21	124	1,924		40,537	40,526
Sub-total: Operations	28	7	136	0	68	620	83	54,525	4,679	0	152,945	147,748
Road Maintenance	4	0	0	0	0	0	0	143	0		143	130
Sub-total: Maintenance	4	0	0	0	0	0	0	143	0	0	143	130
Road Reclamation	0	0	0	0	0	0	0	8	0		8	8
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	1	0	0	0	0	0	0	33	0	0	33	30
Total Emissions	55	12	185	1	83	628	83	60,391	4,680	1	158,830	153,072

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-52. Summary of Output - Alternative C
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	3	3	48	1	13	4	0	5,570	0	0	5,588	5,055
Well Completion Flaring	0	0	0	0	1	4	0	0	0	0	0	0
Commuting Vehicles - Construction	14	1	0	0	1	0	0	120	0		120	109
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	22	5	48	1	14	7	1	5,690	0	0	5,709	5,165
Natural Gas Compression - Operations ^a	5	5	139	0	69	69	21	55,364	116	0	57,950	52,671
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	117	0	0	118	107
Dehy Venting and Flashing	---	---	---	---	---	20	8	219	13		498	478
Station Visits - Operations	5	0	0	0	0	0	0	16	0		16	14
Well Workover - Operations	0	0	1	0	0	0	0	115	0	0	115	104
Well & Pipeline Visits for Inspection & Repair - Operations	20	2	0	0	1	0	0	34	0		34	31
Tanks Condensate and Loadout	---	---	---	---	---	23	2	2	4		84	84
Wellhead Fugitives	---	---	---	---	---	295	29	174	2,703		56,939	56,922
Pneumatic Devices	---	---	---	---	---	216	22	127	1,985		41,817	41,805
Sub-total: Operations	29	7	140	0	70	625	82	56,167	4,821	1	157,570	152,216
Road Maintenance	4	0	0	0	0	0	0	148	0		148	134
Sub-total: Maintenance	4	0	0	0	0	0	0	148	0	0	148	134
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	1	0	0	0	0	0	0	29	0	0	29	26
Total Emissions	56	12	189	1	85	632	83	62,034	4,821	1	163,456	157,541

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-53. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	26	1	7	2	0	3,022	0	0	3,032	2,743
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	65	0		65	59
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	12	3	26	1	8	3	0	3,088	0	0	3,098	2,802
Natural Gas Compression - Operations ^a	4	4	126	0	63	63	19	50,144	105	0	52,485	47,704
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	106	0	0	106	96
Dehy Venting and Flashing	---	---	---	---	---	15	6	162	10		369	354
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	13
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	18	2	0	0	0	0	0	31	0		31	28
Tanks Condensate and Loadout	---	---	---	---	---	17	2	1	3		62	62
Wellhead Fugitives	---	---	---	---	---	267	27	157	2,448		51,569	51,555
Pneumatic Devices	---	---	---	---	---	196	20	115	1,798		37,874	37,863
Sub-total: Operations	26	7	126	0	64	558	73	50,793	4,364	0	142,574	137,732
Road Maintenance	4	0	0	0	0	0	0	134	0		134	121
Sub-total: Maintenance	4	0	0	0	0	0	0	134	0	0	134	121
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	23	0		23	21
Sub-total: Reclamation	1	0	0	0	0	0	0	31	0	0	31	28
Total Emissions	43	10	153	1	72	562	73	54,045	4,364	0	145,836	140,684

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-54. Summary of Output - Alternative D
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	20	4	44	1	13	6	1	5,204	0	0	5,221	4,723
Natural Gas Compression - Operations ^a	5	5	135	0	68	68	20	54,039	113	0	56,563	51,410
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	115	0	0	115	104
Dehy Venting and Flashing	---	---	---	---	---	18	7	191	12		435	418
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	20	2	1	3		73	73
Wellhead Fugitives	---	---	---	---	---	288	29	169	2,638		55,576	55,560
Pneumatic Devices	---	---	---	---	---	211	21	124	1,938		40,816	40,805
Sub-total: Operations	28	7	136	0	69	605	79	54,793	4,704	0	153,731	148,508
Road Maintenance	4	0	0	0	0	0	0	144	0		144	131
Sub-total: Maintenance	4	0	0	0	0	0	0	144	0	0	144	131
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	1	0	0	0	0	0	0	28	0	0	28	26
Total Emissions	53	12	181	1	82	612	80	60,169	4,704	1	159,124	153,388

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-55. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	20	4	44	1	13	6	1	5,204	0	0	5,221	4,723
Natural Gas Compression - Operations ^a	5	5	133	0	66	66	20	53,008	111	0	55,483	50,429
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	112	0	0	113	102
Dehy Venting and Flashing	---	---	---	---	---	23	9	248	15		566	543
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	0	0	0	32	0		32	29
Tanks Condensate and Loadout	---	---	---	---	---	27	3	2	4		95	95
Wellhead Fugitives	---	---	---	---	---	282	28	166	2,588		54,515	54,499
Pneumatic Devices	---	---	---	---	---	207	21	122	1,901		40,037	40,026
Sub-total: Operations	28	7	134	0	67	606	80	53,811	4,619	0	150,961	145,832
Road Maintenance	4	0	0	0	0	0	0	141	0		141	128
Sub-total: Maintenance	4	0	0	0	0	0	0	141	0	0	141	128
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	25	0		25	22
Sub-total: Reclamation	1	0	0	0	0	0	0	33	0	0	33	30
Total Emissions	53	12	179	1	81	612	81	59,188	4,619	1	156,356	150,713

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-56. Summary of Output - Alternative E
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	1	1	26	1	7	2	0	3,022	0	0	3,032	2,743
Well Completion Flaring	0	0	0	0	0	1	0	0	0	0	0	0
Commuting Vehicles - Construction	8	1	0	0	0	0	0	65	0		65	59
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	12	3	26	1	8	3	0	3,088	0	0	3,098	2,802
Natural Gas Compression - Operations ^a	4	4	121	0	61	61	18	48,311	101	0	50,567	45,961
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	102	0	0	103	93
Dehy Venting and Flashing	---	---	---	---	---	11	4	124	8		284	272
Station Visits - Operations	4	0	0	0	0	0	0	14	0		14	12
Well Workover - Operations	0	0	0	0	0	0	0	62	0	0	62	56
Well & Pipeline Visits for Inspection & Repair - Operations	17	2	0	0	0	0	0	30	0		30	27
Tanks Condensate and Loadout	---	---	---	---	---	13	1	1	2		48	48
Wellhead Fugitives	---	---	---	---	---	257	26	151	2,359		49,685	49,671
Pneumatic Devices	---	---	---	---	---	189	19	111	1,732		36,490	36,480
Sub-total: Operations	25	6	122	0	61	532	68	48,907	4,202	0	137,282	132,620
Road Maintenance	4	0	0	0	0	0	0	129	0		129	117
Sub-total: Maintenance	4	0	0	0	0	0	0	129	0	0	129	117
Road Reclamation	0	0	0	0	0	0	0	3	0		3	3
Well Reclamation	1	0	0	0	0	0	0	22	0		22	20
Sub-total: Reclamation	1	0	0	0	0	0	0	25	0	0	25	23
Total Emissions	42	9	148	1	69	535	69	52,149	4,202	0	140,534	135,562

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-57. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	20	4	44	1	13	6	1	5,204	0	0	5,221	4,723
Natural Gas Compression - Operations ^a	5	5	133	0	66	66	20	53,008	111	0	55,483	50,429
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	112	0	0	113	102
Dehy Venting and Flashing	---	---	---	---	---	23	9	248	15		566	543
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	0	0	0	32	0		32	29
Tanks Condensate and Loadout	---	---	---	---	---	27	3	2	4		95	95
Wellhead Fugitives	---	---	---	---	---	282	28	166	2,588		54,515	54,499
Pneumatic Devices	---	---	---	---	---	207	21	122	1,901		40,037	40,026
Sub-total: Operations	28	7	134	0	67	606	80	53,811	4,619	0	150,961	145,832
Road Maintenance	4	0	0	0	0	0	0	141	0		141	128
Sub-total: Maintenance	4	0	0	0	0	0	0	141	0	0	141	128
Road Reclamation	0	0	0	0	0	0	0	8	0		8	7
Well Reclamation	1	0	0	0	0	0	0	25	0		25	22
Sub-total: Reclamation	1	0	0	0	0	0	0	33	0	0	33	30
Total Emissions	53	12	179	1	81	612	81	59,188	4,619	1	156,356	150,713

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-58. Summary of Output - Alternative F
Cumulative Total Annual Emissions from Natural Gas Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	2	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	2	2	44	1	12	3	0	5,093	0	0	5,111	4,623
Well Completion Flaring	0	0	0	0	1	3	0	0	0	0	0	0
Commuting Vehicles - Construction	13	1	0	0	1	0	0	110	0		110	100
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---	---
Sub-total: Construction	20	4	44	1	13	6	1	5,204	0	0	5,221	4,723
Natural Gas Compression - Operations ^a	5	5	135	0	68	68	20	54,039	113	0	56,563	51,410
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0	0	0	0	0	0	0	115	0	0	115	104
Dehy Venting and Flashing	---	---	---	---	---	18	7	191	12		435	418
Station Visits - Operations	4	0	0	0	0	0	0	15	0		15	14
Well Workover - Operations	0	0	1	0	0	0	0	105	0	0	105	95
Well & Pipeline Visits for Inspection & Repair - Operations	19	2	0	0	1	0	0	33	0		33	30
Tanks Condensate and Loadout	---	---	---	---	---	20	2	1	3		73	73
Wellhead Fugitives	---	---	---	---	---	288	29	169	2,638		55,576	55,560
Pneumatic Devices	---	---	---	---	---	211	21	124	1,938		40,816	40,805
Sub-total: Operations	28	7	136	0	69	605	79	54,793	4,704	0	153,731	148,508
Road Maintenance	4	0	0	0	0	0	0	144	0		144	131
Sub-total: Maintenance	4	0	0	0	0	0	0	144	0	0	144	131
Road Reclamation	0	0	0	0	0	0	0	4	0		4	3
Well Reclamation	1	0	0	0	0	0	0	25	0		25	23
Sub-total: Reclamation	1	0	0	0	0	0	0	28	0	0	28	26
Total Emissions	53	12	181	1	82	612	80	60,169	4,704	1	159,124	153,388

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1; dehydrator unit HAP and formaldehyde HAP (gas compression) added separately

Note: Sub-totals and totals may not add up due to rounding

**Table U-59 Summary of Output - Alternative A
Total Annual Emissions from CBNG Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	0	0	0	0	0	0	0	0	0	0
Wind Erosion	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Combustive Emissions ^a	0	0	0	0	0	0	0	0	0	0	0	0
Commuting Vehicles - Construction	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Construction	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas Compression - Operations ^a	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	0	0	0	0	0	0	0	0	0	0
Wellhead Fugitives	0	0	0	0	0	0	0	0	0	0	0	0
Pneumatics	0	0	0	0	0	0	0	0	0	0	0	0
Station Visits - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well Workover - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Operations	0	0	0	0	0	0	0	0	0	0	0	0
Road Maintenance	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Maintenance	0	0	0	0	0	0	0	0	0	0	0	0
Road Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Well Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Total Emissions	0	0	0	0	0	0	0	0	0	0	0	0

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: No CBNG well development occurred during 2008 in the Planning Area

**Table U-60 Summary of Output - Alternative A
Total Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	457	0	0	458	416
Commuting Vehicles - Construction	2	0	0	0	0	0	0	24	0		24	22
Sub-total: Construction	4	1	3	0	1	0	0	481	0	0	482	438
Natural Gas Compression - Operations ^a	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	3	87		1,828	1,659
Pneumatics	---	---	---	---	---	3	0	43	679		14,299	12,976
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	35	0	0	35	32
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	2
Sub-total: Operations	1	0	1	0	1	4	0	1,074	766	0	17,157	15,569
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	0	0	0	0	0	0	0	2	0	0	2	2
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		2	1
Sub-total: Reclamation	0	0	0	0	0	0	0	2	0	0	2	1
Total Emissions	5	1	5	0	2	4	0	1,559	766	0	17,643	16,010

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-61 Summary of Output - Alternative A
Total Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	457	0	0	458	416
Commuting Vehicles - Construction	2	0	0	0	0	0	0	24	0		24	22
Sub-total: Construction	4	1	3	0	1	0	0	481	0	0	482	438
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	6	174		3,656	3,318
Pneumatics	---	---	---	---	---	7	1	87	1,358		28,599	25,952
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	35	0	0	35	32
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	7	1	1,119	1,532	0	33,283	30,202
Road Maintenance	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Maintenance	0	0	0	0	0	0	0	5	0	0	5	4
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Reclamation	0	0	0	0	0	0	0	3	0	0	3	3
Total Emissions	4	1	5	0	2	8	1	1,608	1,532	0	33,773	30,647

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-62 Summary of Output - Alternative B
Total Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	1	0	0	0	0	127	0	0	127	115
Commuting Vehicles - Construction	0	0	0	0	0	0	0	7	0		7	6
Sub-total: Construction	1	0	1	0	0	0	0	133	0	0	134	121
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	1	24		512	465
Pneumatics	---	---	---	---	---	1	0	12	190		4,004	3,633
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	10	0	0	10	9
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	1	0	1,014	214	0	5,518	5,008
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	0	0	0	0	0	0	0	1	0	0	1	1
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Total Emissions	1	0	2	0	1	1	0	1,148	214	0	5,653	5,130

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-63 Summary of Output - Alternative B
Total Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	1	0	0	0	0	127	0	0	127	115
Commuting Vehicles - Construction	0	0	0	0	0	0	0	7	0		7	6
Sub-total: Construction	1	0	1	0	0	0	0	133	0	0	134	121
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	49		1,024	929
Pneumatics	---	---	---	---	---	2	0	24	380		8,008	7,266
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	10	0	0	10	9
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	2	0	1,026	429	0	10,034	9,105
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	0	0	0	0	0	0	0	1	0	0	1	1
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	0	0	0	0	0	0	0	1	0	0	1	1
Total Emissions	1	0	2	0	1	2	0	1,162	429	0	10,170	9,228

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-64 Summary of Output - Alternative C
Total Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	4	0	1	0	0	545	0	0	547	496
Commuting Vehicles - Construction	2	0	0	0	0	0	0	28	0		28	26
Sub-total: Construction	4	1	4	0	1	0	0	573	0	0	575	522
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	4	103		2,170	1,969
Pneumatics	---	---	---	---	---	4	0	52	806		16,969	15,398
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	42	0	0	42	38
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	2
Sub-total: Operations	1	0	1	0	1	4	0	1,090	909	0	20,175	18,307
Road Maintenance	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Maintenance	0	0	0	0	0	0	0	3	0	0	3	3
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	0	0	0	0	0	0	0	2	0	0	2	2
Total Emissions	6	1	5	0	2	5	0	1,668	909	0	20,755	18,834

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-65 Summary of Output - Alternative C
Total Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	4	0	1	0	0	545	0	0	547	496
Commuting Vehicles - Construction	2	0	0	0	0	0	0	28	0		28	26
Sub-total: Construction	4	1	4	0	1	0	0	573	0	0	575	522
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	8	206		4,339	3,937
Pneumatics	---	---	---	---	---	8	1	103	1,611		33,937	30,796
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	42	0	0	42	38
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	9	1	1,143	1,817	0	39,311	35,672
Road Maintenance	0	0	0	0	0	0	0	6	0		6	5
Sub-total: Maintenance	0	0	0	0	0	0	0	6	0	0	6	5
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Reclamation	0	0	0	0	0	0	0	4	0	0	4	3
Total Emissions	5	1	5	0	2	9	1	1,726	1,817	0	39,895	36,203

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-66 Summary of Output - Alternative D
Total Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	3	1	3	0	1	0	0	458	0	0	459	417
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	3	82		1,731	1,571
Pneumatics	---	---	---	---	---	3	0	41	643		13,537	12,284
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	1
Sub-total: Operations	1	0	1	0	1	3	0	1,070	725	0	16,295	14,787
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	0	0	0	0	0	0	0	2	0	0	2	2
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	0	0	0	0	0	0	0	1	0	0	1	1
Total Emissions	5	1	4	0	2	4	0	1,531	725	0	16,758	15,207

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-67 Summary of Output - Alternative D
Total Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	3	1	3	0	1	0	0	458	0	0	459	417
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	6	165		3,461	3,141
Pneumatics	---	---	---	---	---	6	1	82	1,285		27,074	24,568
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	7	1	1,112	1,450	0	31,561	28,640
Road Maintenance	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Maintenance	0	0	0	0	0	0	0	5	0	0	5	4
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Reclamation	0	0	0	0	0	0	0	3	0	0	3	3
Total Emissions	4	1	4	0	2	7	1	1,577	1,450	0	32,028	29,063

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-68 Summary of Output - Alternative E
Total Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	1	0	0	0	0	116	0	0	116	105
Commuting Vehicles - Construction	0	0	0	0	0	0	0	6	0		6	5
Sub-total: Construction	1	0	1	0	0	0	0	122	0	0	122	111
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	1	22		463	420
Pneumatics	---	---	---	---	---	1	0	11	172		3,623	3,287
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	9	0	0	9	8
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	1	0	1,012	194	0	5,087	4,617
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	0	0	0	0	0	0	0	1	0	0	1	1
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Total Emissions	1	0	2	0	1	1	0	1,134	194	0	5,211	4,728

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-69 Summary of Output - Alternative E
Total Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	0	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	1	0	0	0	0	116	0	0	116	105
Commuting Vehicles - Construction	0	0	0	0	0	0	0	6	0		6	5
Sub-total: Construction	1	0	1	0	0	0	0	122	0	0	122	111
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	44		926	841
Pneumatics	---	---	---	---	---	2	0	22	344		7,245	6,574
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	9	0	0	9	8
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	2	0	1,023	388	0	9,173	8,324
Road Maintenance	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Maintenance	0	0	0	0	0	0	0	1	0	0	1	1
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	0	0	0	0	0	0	0	1	0	0	1	1
Total Emissions	1	0	2	0	1	2	0	1,147	388	0	9,297	8,436

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-70 Summary of Output - Alternative F
Total Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	3	1	3	0	1	0	0	458	0	0	459	417
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	3	82		1,731	1,571
Pneumatics	---	---	---	---	---	3	0	41	643		13,537	12,284
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	2	0		2	1
Sub-total: Operations	1	0	1	0	1	3	0	1,070	725	0	16,295	14,787
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	0	0	0	0	0	0	0	2	0	0	2	2
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	0	0	0	0	0	0	0	1	0	0	1	1
Total Emissions	5	1	4	0	2	4	0	1,531	725	0	16,758	15,207

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-71 Summary of Output - Alternative F
Total Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	435	0	0	436	396
Commuting Vehicles - Construction	2	0	0	0	0	0	0	23	0		23	21
Sub-total: Construction	3	1	3	0	1	0	0	458	0	0	459	417
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	6	165		3,461	3,141
Pneumatics	---	---	---	---	---	6	1	82	1,285		27,074	24,568
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	33	0	0	34	30
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	7	1	1,112	1,450	0	31,561	28,640
Road Maintenance	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Maintenance	0	0	0	0	0	0	0	5	0	0	5	4
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Reclamation	0	0	0	0	0	0	0	3	0	0	3	3
Total Emissions	4	1	4	0	2	7	1	1,577	1,450	0	32,028	29,063

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-72 Summary of Output - Alternative A
Total Cumulative Annual Emissions from CBNG Wells - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	0	0	0	0	0	0	0	0	0	0	0	0
Wind Erosion	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Equipment Combustive Emissions ^a	0	0	0	0	0	0	0	0	0	0	0	0
Commuting Vehicles - Construction	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Construction	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	0	0	0	0	0	0	0	0	0	0
Wellhead Fugitives	0	0	0	0	0	0	0	0	0	0	0	0
Pneumatics	0	0	0	0	0	0	0	0	0	0	0	0
Station Visits - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well Workover - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Operations	0	0	0	0	0	0	0	0	0	0	0	0
Road Maintenance	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Maintenance	0	0	0	0	0	0	0	0	0	0	0	0
Road Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Well Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total: Reclamation	0	0	0	0	0	0	0	0	0	0	0	0
Total Emissions	0	0	0	0	0	0	0	0	0	0	0	0

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: No CBNG well development occurred during 2008 in the Planning Area

**Table U-73 Summary of Output - Alternative A
Total Cumulative Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	5	0	2	0	0	705	0	0	707	642
Commuting Vehicles - Construction	3	0	0	0	0	0	0	37	0		37	33
Sub-total: Construction	5	1	5	0	2	0	0	741	0	0	744	675
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	133		2,803	2,544
Pneumatics	---	---	---	---	---	5	1	67	1,041		21,926	19,896
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	54	0	0	54	49
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	3	0		3	2
Sub-total: Operations	2	0	1	0	1	6	1	1,119	1,174	0	25,778	23,392
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	0	0	0	0	0	0	0	4	0	0	4	3
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	0	0	0	0	0	0	0	2	0	0	2	2
Total Emissions	7	1	7	0	3	6	1	1,866	1,174	0	26,528	24,073

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-74 Summary of Output - Alternative A
Total Cumulative Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	5	0	2	0	0	705	0	0	707	642
Commuting Vehicles - Construction	3	0	0	0	0	0	0	37	0		37	33
Sub-total: Construction	5	1	5	0	2	0	0	741	0	0	744	675
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	10	267		5,607	5,088
Pneumatics	---	---	---	---	---	10	1	133	2,082		43,852	39,793
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	54	0	0	54	49
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	11	1	1,188	2,348	0	50,505	45,830
Road Maintenance	0	0	0	0	0	0	0	8	0		8	7
Sub-total: Maintenance	0	0	0	0	0	0	0	8	0	0	8	7
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	5	0		5	4
Sub-total: Reclamation	0	0	0	0	0	0	0	5	0	0	5	4
Total Emissions	6	1	7	0	3	12	1	1,941	2,348	0	51,261	46,516

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-75 Summary of Output - Alternative B
Total Cumulative Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	336	0	0	337	306
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		18	16
Sub-total: Construction	3	0	3	0	1	0	0	353	0	0	354	322
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	64		1,341	1,217
Pneumatics	---	---	---	---	---	2	0	32	498		10,486	9,516
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	26	0	0	26	23
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	1	0		1	1
Sub-total: Operations	1	0	1	0	1	3	0	1,052	562	0	12,847	11,657
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	0	0	0	0	0	0	0	2	0	0	2	2
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	0	0	0	0	0	0	0	1	0	0	1	1
Total Emissions	3	1	4	0	2	3	0	1,408	562	0	13,204	11,982

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-76 Summary of Output - Alternative B
Total Cumulative Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	3	0	1	0	0	336	0	0	337	306
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		18	16
Sub-total: Construction	3	0	3	0	1	0	0	353	0	0	354	322
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	127		2,681	2,433
Pneumatics	---	---	---	---	---	5	0	64	996		20,972	19,031
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	26	0	0	26	23
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	5	1	1,085	1,123	0	24,672	22,389
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	0	0	0	0	0	0	0	4	0	0	4	3
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	0	0	0	0	0	0	0	2	0	0	2	2
Total Emissions	3	1	4	0	2	6	1	1,444	1,123	0	25,033	22,716

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-77 Summary of Output - Alternative C
Total Cumulative Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	6	0	2	0	0	793	0	0	795	722
Commuting Vehicles - Construction	3	0	0	0	0	0	0	41	0		41	38
Sub-total: Construction	6	1	6	0	2	1	0	834	0	0	837	759
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	6	151		3,169	2,876
Pneumatics	---	---	---	---	---	6	1	75	1,177		24,786	22,492
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	61	0	0	61	55
Well & Pipeline Visits for Inspection & Repair - Operations	2	0	0	0	0	0	0	3	0		3	3
Sub-total: Operations	2	0	1	0	1	6	1	1,135	1,327	0	29,011	26,326
Road Maintenance	0	0	0	0	0	0	0	4	0		4	4
Sub-total: Maintenance	0	0	0	0	0	0	0	4	0	0	4	4
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	3	0		3	2
Sub-total: Reclamation	0	0	0	0	0	0	0	3	0	0	3	2
Total Emissions	8	1	7	0	3	7	1	1,976	1,327	0	29,855	27,091

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-78 Summary of Output - Alternative C
Total Cumulative Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	6	0	2	0	0	793	0	0	795	722
Commuting Vehicles - Construction	3	0	0	0	0	0	0	41	0		41	38
Sub-total: Construction	6	1	6	0	2	1	0	834	0	0	837	759
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	11	301		6,338	5,751
Pneumatics	---	---	---	---	---	12	1	151	2,353		49,571	44,983
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	61	0	0	61	55
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	13	1	1,213	2,655	0	56,963	51,690
Road Maintenance	0	0	0	0	0	0	0	9	0		9	8
Sub-total: Maintenance	0	0	0	0	0	0	0	9	0	0	9	8
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	5	0		5	5
Sub-total: Reclamation	0	0	0	0	0	0	0	5	0	0	5	5
Total Emissions	7	1	7	0	3	13	1	2,061	2,655	0	57,813	52,462

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-79 Summary of Output - Alternative D
Total Cumulative Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	5	1	5	0	2	0	0	718	0	0	720	654
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	130		2,730	2,477
Pneumatics	---	---	---	---	---	5	1	65	1,014		21,354	19,377
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	3	0		3	2
Sub-total: Operations	2	0	1	0	1	5	1	1,115	1,144	0	25,132	22,805
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	0	0	0	0	0	0	0	4	0	0	4	3
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	0	0	0	0	0	0	0	2	0	0	2	2
Total Emissions	7	1	6	0	3	6	1	1,839	1,144	0	25,858	23,465

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-80 Summary of Output - Alternative D
Total Cumulative Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	5	1	5	0	2	0	0	718	0	0	720	654
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	10	260		5,460	4,955
Pneumatics	---	---	---	---	---	10	1	130	2,028		42,708	38,755
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	11	1	1,182	2,287	0	49,213	44,658
Road Maintenance	0	0	0	0	0	0	0	7	0		7	7
Sub-total: Maintenance	0	0	0	0	0	0	0	7	0	0	7	7
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	4	0		4	4
Sub-total: Reclamation	0	0	0	0	0	0	0	5	0	0	5	4
Total Emissions	6	1	6	0	3	11	1	1,912	2,287	0	49,945	45,323

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-81 Summary of Output - Alternative E
Total Cumulative Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	2	0	1	0	0	325	0	0	326	296
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Construction	3	0	2	0	1	0	0	342	0	0	343	311
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	2	61		1,292	1,172
Pneumatics	---	---	---	---	---	2	0	31	480		10,105	9,170
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	25	0	0	25	23
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	1	0		1	1
Sub-total: Operations	1	0	1	0	1	3	0	1,050	541	0	12,416	11,266
Road Maintenance	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Maintenance	0	0	0	0	0	0	0	2	0	0	2	2
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	1	0		1	1
Sub-total: Reclamation	0	0	0	0	0	0	0	1	0	0	1	1
Total Emissions	3	1	3	0	2	3	0	1,394	541	0	12,761	11,580

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-82 Summary of Output - Alternative E
Total Cumulative Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	2	0	1	0	0	325	0	0	326	296
Commuting Vehicles - Construction	1	0	0	0	0	0	0	17	0		17	15
Sub-total: Construction	3	0	2	0	1	0	0	342	0	0	343	311
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	123		2,584	2,345
Pneumatics	---	---	---	---	---	5	0	61	959		20,210	18,339
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	25	0	0	25	23
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	5	1	1,081	1,082	0	23,811	21,607
Road Maintenance	0	0	0	0	0	0	0	3	0		3	3
Sub-total: Maintenance	0	0	0	0	0	0	0	3	0	0	3	3
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	0	0	0	0	0	0	0	2	0	0	2	2
Total Emissions	3	0	3	0	2	5	1	1,429	1,082	0	24,160	21,924

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-83 Summary of Output - Alternative F
Total Cumulative Annual Emissions from CBNG Wells - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	5	1	5	0	2	0	0	718	0	0	720	654
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	0	0	5	130		2,730	2,477
Pneumatics	---	---	---	---	---	5	1	65	1,014		21,354	19,377
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	1	0	0	0	0	0	0	3	0		3	2
Sub-total: Operations	2	0	1	0	1	5	1	1,115	1,144	0	25,132	22,805
Road Maintenance	0	0	0	0	0	0	0	4	0		4	3
Sub-total: Maintenance	0	0	0	0	0	0	0	4	0	0	4	3
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	2	0		2	2
Sub-total: Reclamation	0	0	0	0	0	0	0	2	0	0	2	2
Total Emissions	7	1	6	0	3	6	1	1,839	1,144	0	25,858	23,465

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-84 Summary of Output - Alternative F
Total Cumulative Annual Emissions from CBNG Wells - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Well Pad & Station Construction - Fugitive Dust	1	0	---	---	---	---	---	---	---	---	---	---
Wind Erosion	1	0	---	---	---	---	---	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0	0	5	0	2	0	0	683	0	0	685	621
Commuting Vehicles - Construction	3	0	0	0	0	0	0	36	0		36	32
Sub-total: Construction	5	1	5	0	2	0	0	718	0	0	720	654
Natural Gas Compression - Operations	0	0	0	0	0	0	0	0	0	0	0	0
Dehydrators	0	0	0	0	0	0	0	0	0	0	0	0
Central Processing Heaters	0	0	1	0	1	0	0	990	0	0	992	901
Wellhead Fugitives	---	---	---	---	---	1	0	10	260		5,460	4,955
Pneumatics	---	---	---	---	---	10	1	130	2,028		42,708	38,755
Station Visits - Operations	0	0	0	0	0	0	0	0	0		0	0
Well Workover - Operations	0	0	0	0	0	0	0	52	0	0	53	48
Well & Pipeline Visits for Inspection & Repair - Operations	0	0	0	0	0	0	0	0	0		0	0
Sub-total: Operations	0	0	1	0	1	11	1	1,182	2,287	0	49,213	44,658
Road Maintenance	0	0	0	0	0	0	0	7	0		7	7
Sub-total: Maintenance	0	0	0	0	0	0	0	7	0	0	7	7
Road Reclamation	0	0	0	0	0	0	0	0	0		0	0
Well Reclamation	0	0	0	0	0	0	0	4	0		4	4
Sub-total: Reclamation	0	0	0	0	0	0	0	5	0	0	5	4
Total Emissions	6	1	6	0	3	11	1	1,912	2,287	0	49,945	45,323

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-85. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2008**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	1	1	12	0	5	1	0	1,356	0	1,356	1,231
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	679	73	15	0	8	2	0	2,096	0	2,096	1,902

^aHAPs = Hazardous Air Pollutants, assumed = VOCs*0.1, and formaldehyde HAP added for gas compression

Note: Sub-totals and totals may not add up due to rounding

**Table U-86. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	1	0	1,426	0	1,426	1,294
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	679	73	7	0	5	2	0	2,165	0	2,166	1,965

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-87. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	1	0	0	1,426	0	1,426	1,294
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	678	73	4	0	4	2	0	2,165	0	2,166	1,966

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-88. Summary of Output - Alternative B
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	78	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	564	56	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	0	0	1,369	0	1,369	1,242
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	652	70	7	0	5	2	0	2,108	0	2,109	1,914

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-89. Summary of Output - Alternative B
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	97	15	---	---	---	---	---	---	---	---	---
Unpaved Roads	705	71	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	2	0	1	0	0	1,711	0	1,711	1,553
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	812	87	4	0	4	2	0	2,451	0	2,451	2,224

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-90. Summary of Output - Alternative C
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	98	15	---	---	---	---	---	---	---	---	---
Unpaved Roads	705	71	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	1	1	5	0	2	1	0	1,711	0	1,711	1,553
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	813	87	8	0	5	2	0	2,450	0	2,451	2,224

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-91. Summary of Output - Alternative C
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	97	15	---	---	---	---	---	---	---	---	---
Unpaved Roads	705	71	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	2	0	1	0	0	1,711	0	1,711	1,553
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	812	87	4	0	4	2	0	2,451	0	2,451	2,224

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-92. Summary of Output - Alternative D
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	73	11	---	---	---	---	---	---	---	---	---
Unpaved Roads	529	53	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	1	0	0	1,283	0	1,283	1,164
Wind Erosion	5	1	---	---	---	---	---	---	---	---	---
Total Emissions	612	66	7	0	5	2	0	2,022	0	2,023	1,836

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-93. Summary of Output - Alternative D
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	80	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	576	58	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	1	0	0	1,397	0	1,397	1,268
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---
Total Emissions	659	71	4	0	4	2	0	2,137	0	2,137	1,940

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-94. Summary of Output - Alternative E
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	80	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	576	58	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	0	0	1,397	0	1,397	1,268
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---
Total Emissions	660	71	7	0	5	2	0	2,136	0	2,137	1,939

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-95. Summary of Output - Alternative E
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	73	11	---	---	---	---	---	---	---	---	---
Unpaved Roads	529	53	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	4	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	0	0	0	1,283	0	1,283	1,165
Wind Erosion	4	1	---	---	---	---	---	---	---	---	---
Total Emissions	611	65	4	0	4	1	0	2,023	0	2,024	1,836

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-96. Summary of Output - Alternative F
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	4	0	2	1	0	1,426	0	1,426	1,294
Wind Erosion	3	0	---	---	---	---	---	---	---	---	---
Total Emissions	674	72	7	0	5	2	0	2,165	0	2,166	1,965

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-97. Summary of Output - Alternative F
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Product Handling, Transfer, and Storage	81	12	---	---	---	---	---	---	---	---	---
Unpaved Roads	588	59	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	3	0	3	1	0	739	0	740	672
Heavy Equipment - Dust	2	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Combustive	0	0	1	0	1	0	0	1,426	0	1,426	1,294
Wind Erosion	2	0	---	---	---	---	---	---	---	---	---
Total Emissions	673	72	4	0	4	2	0	2,165	0	2,166	1,966

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-98. Summary of Output - Alternative A
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	439	122	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,124	308	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-99. Summary of Output - Alternative A
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,192	322	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-100. Summary of Output - Alternative A
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,108	310	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-101. Summary of Output - Alternative B
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,192	322	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-102. Summary of Output - Alternative B
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,108	310	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-103. Summary of Output - Alternative C
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,192	322	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-104. Summary of Output - Alternative C
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,108	310	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-105. Summary of Output - Alternative D
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,192	322	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-106. Summary of Output - Alternative D
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,108	310	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-107. Summary of Output - Alternative E
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	344	92	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	13	2										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,022	277	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-108. Summary of Output - Alternative E
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	302	85	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	13	2										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	1,980	270	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-109. Summary of Output - Alternative F
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	507	137	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,192	322	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-110. Summary of Output - Alternative F
Annual Emissions Estimation for Locatable Minerals Equipment Usage - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric Tonnes
Product Handling, Transfer, and Storage	1,197	132	47									
Batch Drop	2	0										
Mine Development	423	124	---	---	---	---	---	---	---	---	---	---
Unpaved Roads	462	46	---	---	---	---	---	---	---	---	---	---
Commuting - Exhaust	0	0	5	0	7	3	0	1,155	0		1,156	1,049
Heavy Equipment - Dust	20	3										
Heavy Equipment - Combustive	5	5	36	2	14	5	0	11,368	0		11,370	10,317
Total Emissions	2,108	310	88	2	21	7	1	12,523	0	0	12,525	11,366

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-111. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2008**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	0	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	2	0	1	0	0	170	0	170	154
Sub-total: Heavy Equipment	1	0	2	0	1	0	0	170	0	170	154
Commuting Vehicles - Fugitive Dust	27	2	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	749	0	749	680
Sub-total: Commuting Vehicles	27	3	3	0	7	3	0	749	0	749	680
Total Emissions	27	3	4	0	8	3	0	919	0	919	834

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-112. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	179	18	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	8	0	4	1	0	2,115	0	2,116	1,920
Sub-total: Heavy Equipment	179	19	8	0	4	1	0	2,115	0	2,116	1,920
Commuting Vehicles - Fugitive Dust	50	5	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	50	5	3	0	7	3	0	1,644	0	1,644	1,492
Total Emissions	230	24	11	0	10	4	0	3,759	0	3,760	3,412

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-113. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	106	11	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	866	0	866	786
Sub-total: Heavy Equipment	106	11	1	0	1	0	0	866	0	866	786
Commuting Vehicles - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	76	8	3	0	7	3	0	1,644	0	1,644	1,492
Total Emissions	182	19	4	0	7	3	0	2,510	0	2,511	2,278

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-114. Summary of Output - Alternative B
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	149	15	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	6	0	3	1	0	1,567	0	1,567	1,422
Sub-total: Heavy Equipment	150	15	6	0	3	1	0	1,567	0	1,567	1,422
Commuting Vehicles - Fugitive Dust	36	4	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	36	4	2	0	5	2	0	1,133	0	1,134	1,029
Total Emissions	186	19	8	0	8	3	0	2,700	0	2,700	2,450

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-115. Summary of Output - Alternative B
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	767	0	767	696
Sub-total: Heavy Equipment	77	8	1	0	1	0	0	767	0	767	696
Commuting Vehicles - Fugitive Dust	63	6	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	63	6	2	0	5	2	0	1,133	0	1,134	10,29
Total Emissions	139	14	3	0	5	2	0	1,900	0	1,901	1,725

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-116. Summary of Output - Alternative C
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	202	20	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	10	0	5	1	0	2,658	0	2,659	2,413
Sub-total: Heavy Equipment	203	21	10	0	5	1	0	2,658	0	2,659	2,413
Commuting Vehicles - Fugitive Dust	60	6	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	4	0	7	3	0	2,207	0	2,208	2,004
Sub-total: Commuting Vehicles	60	6	4	0	7	3	0	2,207	0	2,208	2,004
Total Emissions	264	27	14	1	12	4	0	4,866	0	4,867	4,416

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-117. Summary of Output - Alternative C
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	129	13	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	990	0	990	898
Sub-total: Heavy Equipment	130	13	1	0	1	0	0	990	0	990	898
Commuting Vehicles - Fugitive Dust	82	9	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	4	0	7	3	0	2,207	0	2,208	2,004
Sub-total: Commuting Vehicles	82	9	4	0	7	3	0	2,207	0	2,208	2,004
Total Emissions	212	22	5	0	8	4	0	3,197	0	3,198	2,902

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-118. Summary of Output - Alternative D
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	179	18	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	8	0	4	1	0	2,115	0	2,116	1,920
Sub-total: Heavy Equipment	179	19	8	0	4	1	0	2,115	0	2,116	1,920
Commuting Vehicles - Fugitive Dust	50	5	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	50	5	3	0	7	3	0	1,644	0	1,644	1,492
Total Emissions	230	24	11	0	10	4	0	3,759	0	3,760	3,412

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-119. Summary of Output - Alternative D
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	106	11	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	866	0	866	786
Sub-total: Heavy Equipment	106	11	1	0	1	0	0	866	0	866	786
Commuting Vehicles - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	7	3	0	1,644	0	1,644	1,492
Sub-total: Commuting Vehicles	76	8	3	0	7	3	0	1,644	0	1,644	1,492
Total Emissions	182	19	4	0	7	3	0	2,510	0	2,511	2,278

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-120. Summary of Output - Alternative E
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	149	15	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	6	0	3	1	0	1,567	0	1,567	1,422
Sub-total: Heavy Equipment	150	15	6	0	3	1	0	1,567	0	1,567	1,422
Commuting Vehicles - Fugitive Dust	36	4	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	36	4	2	0	5	2	0	1,133	0	1,134	1,029
Total Emissions	186	19	8	0	8	3	0	2,700	0	2,700	2,450

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-121. Summary of Output - Alternative E
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	76	8	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	767	0	767	696
Sub-total: Heavy Equipment	77	8	1	0	1	0	0	767	0	767	696
Commuting Vehicles - Fugitive Dust	63	6	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	2	0	5	2	0	1,133	0	1,134	1,029
Sub-total: Commuting Vehicles	63	6	2	0	5	2	0	1,133	0	1,134	1,029
Total Emissions	139	14	3	0	5	2	0	1,900	0	1,901	1,725

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

Table U-122. Summary of Output - Alternative F
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2018

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	124	12	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	1	1	8	0	4	1	0	2,035	0	2,035	1,847
Sub-total: Heavy Equipment	125	13	8	0	4	1	0	2,035	0	2,035	1,847
Commuting Vehicles - Fugitive Dust	45	4	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	6	3	0	1,520	0	1,521	1,380
Sub-total: Commuting Vehicles	45	5	3	0	6	3	0	1,520	0	1,521	1,380
Total Emissions	170	18	11	0	10	4	0	3,555	0	3,556	3,227

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-123. Summary of Output - Alternative F
Total Annual Emissions from Renewable Energy, Rights-of-Way, and Corridor Development - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	51	5	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	1	0	0	848	0	848	769
Sub-total: Heavy Equipment	52	5	1	0	1	0	0	848	0	848	769
Commuting Vehicles - Fugitive Dust	70	7	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	3	0	6	3	0	1,520	0	1,521	1,380
Sub-total: Commuting Vehicles	71	7	3	0	6	3	0	1,520	0	1,521	1,380
Total Emissions	122	13	4	0	7	3	0	2,368	0	2,369	2,150

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-124. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2008**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	0	0	0	78	0	78	71
Sub-total: Construction	6	1	1	0	0	0	0	78	0	78	71
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	28	1	1	0	13	13	1	404	5,708	120,273	109,140
Total Emissions	34	2	2	0	14	13	1	482	5,708	120,351	109,211

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-125. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	84	0	84	76
Sub-total: Construction	6	1	0	0	0	0	0	84	0	84	76
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	28	1	1	0	13	13	1	404	5,708	120,273	109,140
Total Emissions	34	2	2	0	14	13	1	488	5,708	120,356	109,216

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-126. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	81	0	81	74
Sub-total: Construction	6	1	0	0	0	0	0	81	0	81	74
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	28	1	1	0	13	13	1	404	5,708	120,273	109,140
Total Emissions	34	2	1	0	13	13	1	485	5,708	120,354	109,214

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-127. Summary of Output - Alternative B
Total Annual Emissions from Livestock Grazing Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	42	0	42	38
Sub-total: Construction	3	0	0	0	0	0	0	42	0	42	38
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	14	1	1	0	7	6	1	201	2,875	60,575	54,968
Total Emissions	17	1	1	0	7	6	1	243	2,875	60,616	55,006

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-128. Summary of Output - Alternative B
Total Annual Emissions from Livestock Grazing Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	41	0	41	37
Sub-total: Construction	3	0	0	0	0	0	0	41	0	41	37
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	14	1	1	0	7	6	1	201	2,875	60,575	54,968
Total Emissions	17	1	1	0	7	6	1	242	2,875	60,615	55,005

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-129. Summary of Output - Alternative C
Total Annual Emissions from Livestock Grazing Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	11	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	1	0	0	0	0	167	0	167	152
Sub-total: Construction	11	1	1	0	0	0	0	167	0	167	152
Commuting Vehicles - Fugitive Dust	29	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	26	25	3	456	0	461	418
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	30	2	1	0	26	25	3	456	5,708	120,327	109,189
Total Emissions	41	3	2	0	26	25	3	623	5,708	120,494	109,341

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-130. Summary of Output - Alternative C
Total Annual Emissions from Livestock Grazing Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	11	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	162	0	162	147
Sub-total: Construction	11	1	0	0	0	0	0	162	0	162	147
Commuting Vehicles - Fugitive Dust	29	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	26	25	3	456	0	461	418
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	30	2	1	0	26	25	3	456	5,708	120,327	109,189
Total Emissions	41	3	2	0	26	25	3	618	5,708	120,489	109,337

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-131. Summary of Output - Alternative D
Total Annual Emissions from Livestock Grazing Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	84	0	84	76
Sub-total: Construction	6	1	0	0	0	0	0	84	0	84	76
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	28	1	1	0	13	13	1	404	5,708	120,273	109,140
Total Emissions	34	2	2	0	14	13	1	488	5,708	120,356	109,216

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-132. Summary of Output - Alternative D
Total Annual Emissions from Livestock Grazing Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	6	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	81	0	81	74
Sub-total: Construction	6	1	0	0	0	0	0	81	0	81	74
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	13	1	404	0	407	369
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	28	1	1	0	13	13	1	404	5,708	120,273	109,140
Total Emissions	34	2	1	0	13	13	1	485	5,708	120,354	109,214

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-133. Summary of Output - Alternative E
Total Annual Emissions from Livestock Grazing Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	42	0	42	38
Sub-total: Construction	3	0	0	0	0	0	0	42	0	42	38
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	14	1	1	0	7	6	1	201	2,875	60,575	54,968
Total Emissions	17	1	1	0	7	6	1	243	2,875	60,616	55,006

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-134. Summary of Output - Alternative E
Total Annual Emissions from Livestock Grazing Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	41	0	41	37
Sub-total: Construction	3	0	0	0	0	0	0	41	0	41	37
Commuting Vehicles - Fugitive Dust	14	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	6	1	201	0	203	184
Enteric Fermentation and Manure	---	---	---	---	---	---	---		2,875	60,372	54,784
Sub-total: Operations and Maintenance	14	1	1	0	7	6	1	201	2,875	60,575	54,968
Total Emissions	17	1	1	0	7	6	1	242	2,875	60,615	55,005

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-135. Summary of Output - Alternative F
Total Annual Emissions from Livestock Grazing Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	5	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	79	0	79	72
Sub-total: Construction	5	1	0	0	0	0	0	79	0	79	72
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	12	1	401	0	404	367
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	28	1	1	0	13	12	1	401	5,708	120,270	109,138
Total Emissions	33	2	2	0	13	12	1	481	5,708	120,349	109,210

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-136. Summary of Output - Alternative F
Total Annual Emissions from Livestock Grazing Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	5	1	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	0	0	0	77	0	77	70
Sub-total: Construction	5	1	0	0	0	0	0	77	0	77	70
Commuting Vehicles - Fugitive Dust	28	1	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	13	12	1	401	0	404	367
Enteric Fermentation and Manure	---	---	---	---	---	---	---		5,708	119,866	108,771
Sub-total: Operations and Maintenance	28	1	1	0	13	12	1	401	5,708	120,270	109,138
Total Emissions	33	2	1	0	13	12	1	478	5,708	120,347	109,208

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-137. Summary of Output - Alternative A
Total Annual Emissions from Forest Products - Year 2008**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	319	32	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	322	32	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-138. Summary of Output - Alternative A
Total Annual Emissions from Forest Products - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	319	32	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	322	32	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-139. Summary of Output - Alternative A
Total Annual Emissions from Forest Products - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	319	32	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	322	32	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-140. Summary of Output - Alternative B
Total Annual Emissions from Forest Products - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	213	21	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	216	22	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-141. Summary of Output - Alternative B
Total Annual Emissions from Forest Products - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	213	21	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	216	22	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-142. Summary of Output - Alternative C
Total Annual Emissions from Forest Products - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	429	43	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	429	43	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	432	43	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-143. Summary of Output - Alternative C
Total Annual Emissions from Forest Products - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	429	43	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	429	43	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	432	43	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-144. Summary of Output - Alternative D
Total Annual Emissions from Forest Products - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	319	32	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	322	32	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-145. Summary of Output - Alternative D
Total Annual Emissions from Forest Products - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	319	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	319	32	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	322	32	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-146. Summary of Output - Alternative E
Total Annual Emissions from Forest Products - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	213	21	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	216	22	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-147. Summary of Output - Alternative E
Total Annual Emissions from Forest Products - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	213	21	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	213	21	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	216	22	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-148. Summary of Output - Alternative F
Total Annual Emissions from Forest Products - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	320	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	320	32	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	322	32	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-149. Summary of Output - Alternative F
Total Annual Emissions from Forest Products - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	320	32	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust	0	0	0	0	1	0	0	17	0	17	15
Sub-total: Heavy Equipment	320	32	0	0	1	0	0	17	0	17	15
Commuting Vehicles - Fugitive Dust	3	0	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	0	0	0	19	0	19	18
Sub-total: Commuting Vehicles	3	0	0	0	0	0	0	19	0	19	18
Total Emissions	322	32	0	0	1	0	0	36	0	36	33

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-150. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2008**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	21.06	2.16	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	12.61	1.27	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Total Emissions	33.67	3.43	0.59	0.02	0.68	0.18	0.02	105.99	0.00	106.01	96.19

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-151. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	21.06	2.16	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	12.61	1.27	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Total Emissions	33.67	3.43	0.59	0.02	0.68	0.18	0.02	105.99	0.00	106.01	96.19

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-152. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	21.06	2.16	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Sub-total: Commuting Vehicles	12.61	1.27	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Total Emissions	33.67	3.43	0.59	0.02	0.68	0.18	0.02	105.99	0.00	106.05	96.23

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-153. Summary of Output - Alternative B
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	10.53	1.08	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.17	7.41
Sub-total: Commuting Vehicles	6.31	0.63	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.17	7.41
Total Emissions	16.84	1.71	0.29	0.01	0.34	0.09	0.01	52.99	0.00	53.00	48.10

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-154. Summary of Output - Alternative B
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	10.53	1.08	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.19	7.43
Sub-total: Commuting Vehicles	6.31	0.63	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.19	7.43
Total Emissions	16.84	1.71	0.29	0.01	0.34	0.09	0.01	52.99	0.00	53.02	48.12

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-155. Summary of Output - Alternative C
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	42.00	4.20	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.12	0.12	0.70	0.03	0.68	0.10	0.01	179.29	0.00	179.33	162.73
Sub-total: Heavy Equipment	42.12	4.32	0.70	0.03	0.68	0.10	0.01	179.29	0.00	179.33	162.73
Commuting Vehicles - Fugitive Dust	25.19	2.51	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.03	0.47	0.00	0.68	0.26	0.03	32.68	0.00	32.68	29.66
Sub-total: Commuting Vehicles	25.22	2.54	0.47	0.00	0.68	0.26	0.03	32.68	0.00	32.68	29.66
Total Emissions	67.34	6.86	1.17	0.03	1.36	0.36	0.04	211.98	0.00	212.01	192.39

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-156. Summary of Output - Alternative C
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	42.00	4.20	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.12	0.12	0.70	0.03	0.68	0.10	0.01	179.29	0.00	179.33	162.73
Sub-total: Heavy Equipment	42.12	4.32	0.70	0.03	0.68	0.10	0.01	179.29	0.00	179.33	162.73
Commuting Vehicles - Fugitive Dust	25.19	2.51	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.03	0.47	0.00	0.68	0.26	0.03	32.68	0.00	32.77	29.73
Sub-total: Commuting Vehicles	25.22	2.54	0.47	0.00	0.68	0.26	0.03	32.68	0.00	32.77	29.73
Total Emissions	67.34	6.86	1.17	0.03	1.36	0.36	0.04	211.98	0.01	212.10	192.46

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-157. Summary of Output - Alternative D
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	21.06	2.16	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	12.61	1.27	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Total Emissions	33.67	3.43	0.59	0.02	0.68	0.18	0.02	105.99	0.00	106.01	96.19

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-158. Summary of Output - Alternative D
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	21.06	2.16	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Sub-total: Commuting Vehicles	12.61	1.27	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Total Emissions	33.67	3.43	0.59	0.02	0.68	0.18	0.02	105.99	0.00	106.05	96.23

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-159. Summary of Output - Alternative E
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	10.53	1.08	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.17	7.41
Sub-total: Commuting Vehicles	6.31	0.63	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.17	7.41
Total Emissions	16.84	1.71	0.29	0.01	0.34	0.09	0.01	52.99	0.00	53.00	48.10

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-160. Summary of Output - Alternative E
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	10.50	1.05	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Sub-total: Heavy Equipment	10.53	1.08	0.18	0.01	0.17	0.03	0.00	44.82	0.00	44.83	40.68
Commuting Vehicles - Fugitive Dust	6.30	0.63	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.19	7.43
Sub-total: Commuting Vehicles	6.31	0.63	0.12	0.00	0.17	0.06	0.01	8.17	0.00	8.19	7.43
Total Emissions	16.84	1.71	0.29	0.01	0.34	0.09	0.01	52.99	0.00	53.02	48.12

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-161. Summary of Output - Alternative F
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	21.06	2.16	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Sub-total: Commuting Vehicles	12.61	1.27	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.34	14.83
Total Emissions	33.67	3.43	0.59	0.02	0.68	0.18	0.02	105.99	0.00	106.01	96.19

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-162. Summary of Output - Alternative F
Total Annual Emissions from Vegetation Management of Invasive Species - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq}	CO _{2eq} metric tonnes
Heavy Equipment - Fugitive Dust	21.00	2.10	---	---	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Sub-total: Heavy Equipment	21.06	2.16	0.35	0.02	0.34	0.05	0.01	89.65	0.00	89.66	81.36
Commuting Vehicles - Fugitive Dust	12.59	1.25	---	---	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Sub-total: Commuting Vehicles	12.61	1.27	0.24	0.00	0.34	0.13	0.01	16.34	0.00	16.38	14.87
Total Emissions	33.67	3.43	0.59	0.02	0.68	0.18	0.02	105.99	0.00	106.05	96.23

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-163. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2008**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	1	1	3	0	9	2	0	406	0		406	369
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	1	0	7	7	1	164	0		165	150
Total Emissions	266	167	54	14	1,814	100	10	570	95	14	6,850	6,216

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-164. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	266	166	51	14	1,806	99	10	286	95	14	6,565	5,957

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-165. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	2	0	8	2	0	408	0		409	371
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	163	0		164	149
Total Emissions	266	167	52	14	1,813	100	10	571	95	14	6,851	6,217

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-166. Summary of Output - Alternative B
Total Annual Emissions from Fire Management Projects - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	114	81	25	7	899	46	5	0	48	7	3,139	2,849
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	152	85	26	7	907	53	5	286	48	7	3,426	3,109

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-167. Summary of Output - Alternative B
Total Annual Emissions from Fire Management Projects - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	114	81	25	7	899	46	5	0	48	7	3,139	2,849
Heavy Equipment Exhaust	1	1	4	0	21	4	0	1,049	0		1,050	952
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	18	17	2	417	0		420	381
Total Emissions	154	87	30	7	938	68	7	1,466	48	7	4,609	4,182

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-168. Summary of Output - Alternative C
Total Annual Emissions from Fire Management Projects - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	455	324	100	28	3,597	183	18	0	190	28	12,556	11,394
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	493	328	101	28	3,605	190	19	286	191	28	12,843	11,654

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-169. Summary of Output - Alternative C
Total Annual Emissions from Fire Management Projects - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	455	324	100	28	3,597	183	18	0	190	28	12,556	11,394
Heavy Equipment Exhaust	1	1	3	0	16	3	0	638	0		638	579
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	13	13	1	239	0		242	219
Total Emissions	494	329	104	28	3,626	200	20	877	191	28	13,436	12,193

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-170. Summary of Output - Alternative D
Total Annual Emissions from Fire Management Projects - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	266	166	51	14	1,806	99	10	286	95	14	6,565	5,957

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-171. Summary of Output - Alternative D
Total Annual Emissions from Fire Management Projects - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	5	1	0	279	0		279	253
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	5	4	0	112	0		113	103
Total Emissions	266	166	51	14	1,808	97	10	391	95	14	6,670	6,053

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-172. Summary of Output - Alternative E
Total Annual Emissions from Fire Management Projects - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	104	73	23	6	809	41	4	0	43	6	2,825	2,564
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	142	77	23	6	817	48	5	286	43	6	3,112	2,824

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-173. Summary of Output - Alternative E
Total Annual Emissions from Fire Management Projects - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	104	73	23	6	809	41	4	0	43	6	2,825	2,564
Heavy Equipment Exhaust	1	1	4	0	21	4	0	1,049	0		1,050	952
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	1	1	1	0	18	17	2	417	0		420	381
Total Emissions	144	79	27	6	849	63	6	1,466	43	6	4,295	3,897

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-174. Summary of Output - Alternative F
Total Annual Emissions from Fire Management Projects - Year 2018**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	1	0	0	132	0		132	120
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	7	7	1	154	0		154	140
Total Emissions	266	166	51	14	1,806	99	10	286	95	14	6,565	5,957

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-175. Summary of Output - Alternative F
Total Annual Emissions from Fire Management Projects - Year 2027**

Activity	Annual Emissions (Tons)											
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	N ₂ O	CO _{2eq}	CO _{2eq} metric tonnes
Fugitive Dust and Smoke	227	162	50	14	1,798	92	9	0	95	14	6,278	5,697
Heavy Equipment Exhaust	0	0	1	0	5	1	0	279	0		279	253
Commuting Vehicles - Fugitive Dust	38	4	---	---	---	---	---	---	---		---	---
Commuting Vehicles - Vehicle Exhaust	0	0	0	0	5	4	0	112	0		113	103
Total Emissions	266	166	51	14	1,808	97	10	391	95	14	6,670	6,053

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-176. Summary of Output - All Alternatives
Annual Criteria Air Pollutant Emissions from Off-highway Vehicles for Park, Hot Springs, Big Horn and Washakie Counties**

	2008				2018				2027			
	ATVs	Off-road Motorcycles	Snow- mobiles	2008 total	ATVs	Off-road Motorcycles	Snow- mobiles	2018 total	ATVs	Off-road Motorcycles	Snow- mobiles	2027 total
	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
PM ₁₀	7.3	5.2	18.1	30.6	3.4	4.3	15.2	22.8	1.6	4.09	12.37	18.1
PM _{2.5}	6.6	4.7	16.2	27.5	3.0	3.8	13.7	20.6	1.4	3.7	11.1	16.2
NO _x	8.4	1.5	11.1	21.0	9.1	2.1	33.8	44.9	8.9	2.29	46.63	57.8
SO ₂	0.7	0.2	2.7	3.5	1.0	0.2	3.3	4.5	1.0	0.25	3.61	4.9
CO	680.2	169.5	1573.3	2423.0	829.6	179.8	1289.0	2298.4	829.0	187.11	1164.35	2180.5
VOC	219.4	137.6	693.8	1050.7	119.6	114.2	493.0	726.9	73.2	110.81	392.12	576.1

Note: Sub-totals and totals may not add up due to rounding

Tpy tons per year

**Table U-177. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2008**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.43	0.41	5.59	0.13	2.09	0.50	0.05	610.54	0.01	610.70	554.17
Total Emissions	80.19	8.97	5.59	0.13	2.09	0.50	0.05	610.54	0.01	610.70	554.17

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-178. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.29	0.28	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	80.05	8.83	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-179. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.18	0.17	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	79.95	8.72	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-180. Summary of Output - Alternative B
Total Annual Emissions from Road Maintenance Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.22	0.21	1.60	0.08	0.71	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	60.83	6.71	1.60	0.08	0.71	0.38	0.04	468.99	0.00	469.06	425.64

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-181. Summary of Output - Alternative B
Total Annual Emissions from Road Maintenance Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.14	0.13	0.48	0.07	0.24	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	60.75	6.63	0.48	0.07	0.24	0.38	0.04	468.99	0.00	469.06	425.64

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-182. Summary of Output - Alternative C
Total Annual Emissions from Road Maintenance Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	125.95	13.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.45	0.44	3.32	0.17	1.47	0.79	0.08	974.53	0.01	974.67	884.45
Total Emissions	126.40	13.94	3.32	0.17	1.47	0.79	0.08	974.53	0.01	974.67	884.45

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-183. Summary of Output - Alternative C
Total Annual Emissions from Road Maintenance Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	125.95	13.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.28	0.27	0.99	0.15	0.49	0.79	0.08	974.53	0.01	974.67	884.45
Total Emissions	126.23	13.78	0.99	0.15	0.49	0.79	0.08	974.53	0.01	974.67	884.45

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-184. Summary of Output - Alternative D
Total Annual Emissions from Road Maintenance Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.29	0.28	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	80.05	8.83	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-185. Summary of Output - Alternative D
Total Annual Emissions from Road Maintenance Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.18	0.17	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	79.95	8.72	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-186. Summary of Output - Alternative E
Total Annual Emissions from Road Maintenance Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.22	0.21	1.60	0.08	0.71	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	60.83	6.71	1.60	0.08	0.71	0.38	0.04	468.99	0.00	469.06	425.64

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-187. Summary of Output - Alternative E
Total Annual Emissions from Road Maintenance Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	60.61	6.50	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.14	0.13	0.48	0.07	0.24	0.38	0.04	468.99	0.00	469.06	425.64
Total Emissions	60.75	6.63	0.48	0.07	0.24	0.38	0.04	468.99	0.00	469.06	425.64

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-188. Summary of Output - Alternative F
Total Annual Emissions from Road Maintenance Projects - Year 2018**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.29	0.28	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	80.05	8.83	2.10	0.11	0.93	0.50	0.05	617.20	0.00	617.29	560.15

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

**Table U-189. Summary of Output - Alternative F
Total Annual Emissions from Road Maintenance Projects - Year 2027**

Activity	Annual Emissions (Tons)										
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^a	CO ₂	CH ₄	CO _{2eq} tons	CO _{2eq} metric tonnes
Road Maintenance - Fugitive Dust	79.77	8.55	---	---	---	---	---				
Road Maintenance - Combustive Emissions ^a	0.18	0.17	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15
Total Emissions	79.95	8.72	0.63	0.10	0.31	0.50	0.05	617.20	0.00	617.29	560.15

^aHAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Sub-totals and totals may not add up due to rounding

6.0 REFERENCES

- BLM (Bureau of Land Management). 2007. Resource Management Plan and Final Environmental Impact Statement for the Casper Field Office.
- EPA (Environmental Protection Agency). 2003. MOBILE6 Vehicle Emission Modeling Software. U.S. Environmental Protection Agency. Available online: <http://www.epa.gov/otaq/m6.htm>.
- EPA. 2008. NONROAD2008a Model. U.S. Environmental Protection Agency. Available online: <http://www.epa.gov/otaq/nonrdmdl.htm>.
- FLAG (Federal Land Manager's Air Quality Related Values Working Group). 2010. Phase I Report - Revised (2010). Natural Resource Report NPS/NRPC/NRR-2010/232. Available online: http://www.nature.nps.gov/air/pubs/pdf/flag/FLAG_2010.pdf.
- IEWS (Visibility Information Exchange Web Site). 2009. Visibility Information Exchange Web Site (IEWS). Available online: <http://views.cira.colostate.edu/web/>.
- WRAP (Western Regional Air Partnership). 2009. 2002 Base Year Emissions. Available online: <http://www.wrapair.org/forums/ef/UMSI/index.html>.
- Wyoming DEQ (Department of Environmental Quality). 2004. Wyoming Air Quality Standards and Regulations. Wyoming Department of Environmental Quality–Air Quality Division. Available online: <http://deq.state.wy.us/aqd/standards.asp>.
- Wyoming DEQ. 2011. Memorandum on Permitting Generators in Coalbed Methane (CBM) Service. Wyoming Department of Environmental Quality, Air Quality Division.

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