
CASPER DRAFT
RESOURCE MANAGEMENT PLAN AND
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX J

Technical Support Document for Air Quality

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Appendix J Technical Support Document for Air Quality

This technical support document describes the process used to conduct air quality impact analysis for the Casper Resource Management Plan (RMP) revision, Draft Environmental Impact Statement (EIS). This document will serve as the basis for subsequent air quality impact analyses of other alternatives and the preferred alternative. Appendix J is divided into the following six sections:

- 1.0 Regulatory Framework
- 2.0 Agency Roles and Authorities
- 3.0 Existing Air Quality
- 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) Casper Field Office.

1.0 REGULATORY FRAMEWORK

For quantitative analysis, the air quality criteria discussed in the paragraphs below apply. Although the criteria listed do not apply to the qualitative analysis presented in the Casper Air Quality Analysis, they are identified here for reference purposes. The basic framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act (CAA) and its amendments and the 1999 Regional Haze Regulations. The CAA addresses criteria air pollutants, state and national ambient air quality standards for criteria air pollutants, and the Prevention of Significant Deterioration program. The Regional Haze Regulations address visibility impairment.

Ambient Air Quality Constituents

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

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 operation of internal combustion engines. Such engines 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 NO_x and volatile reactive organic compound (VOC) emissions. As stated above, internal combustion engines are the main source of NO_x. VOCs, such as terpenes, are very reactive. Sources of VOCs include, but are not limited to, paint, varnish, and types of vegetation. The faint acrid smell common after thunderstorms is caused by ozone formation caused by lightning. O₃ 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/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.

Hazardous Air Pollutants

Although HAPs, including N-hexane, ethylbenzene, toluene, xylene, formaldehyde, and benzene, do not have ambient air quality standards, the U.S. Environmental Protection Agency (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 Casper RMP is a National Environmental Policy Act (NEPA) document and not a regulatory document, but the Record of Decision is binding and a “public record” (see 40 Code of Regulations [CFR] 1505.2). In addition, there are regulatory issues that should be taken into account in preparing this EIS and ensuing project-specific Weiss. 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.

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 sulfur dioxide (SO₂). Deposition of nitric acid, nitrate, and sulfate can adversely impact 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 impact 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.

Wyoming and National Ambient Air Quality Standards

Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based standards for the maximum concentration of air pollutants at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health. State standards must be as strict as, or stricter than, federal standards.

The EPA has developed standards for each pollutant for a specific averaging time (see Table J-1). Short averaging times (1, 3, and 24 hours) addresses short-term exposure, while the annual standards address long-term exposure. Longer-term standards are set to lower allowable concentrations than are short-term standards to recognize the cumulative impacts of long-term exposure.

Prevention of Significant Deterioration

The goal of the Prevention of Significant Deterioration (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. 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 Indian 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 WAAQS and NAAQS.

Table J-1. National and Wyoming Ambient Air Quality Standards

Pollutant	Average Time	NAAQS (µg/m ³)	WAAQS (µg/m ³)
Carbon Monoxide (CO)	1 hour	40,000	40,000
	8 hours	10,000	10,000
Nitrogen Dioxide (NO ₂)	Annual	100	100
Ozone (O ₃)	1 hour	235	235
	8 hours	157	157
Particulate Matter (PM ₁₀)	24 hours	150	150
	Annual	50	50
Particulate Matter (PM _{2.5})	24 hours	65	65
	Annual	15	15
Sulfur Dioxide (SO ₂)	3 hours	1,300 ¹	1,300
	24 hours	365	260
	Annual	80	60
Hydrogen Sulfide (H ₂ S)	½ hour ²	-	70
	½ hour ³	-	40

Sources: Wyoming DEQ 2004; EPA 2005

¹Secondary standard only, as there is no 3-hour federal primary standard for SO₂.

²Average not to be exceeded more than two times per year.

³Average not to be exceeded more than two times in any 5 consecutive days.

µg/m³ micrograms per cubic meter

NAAQS National Ambient Air Quality Standards

WAAQS Wyoming Ambient Air Quality Standards

Table J-2 provides the incremental increases allowed for specific pollutants in Class I and Class II areas.

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.

Table J-2. Prevention of Significant Deterioration Increments

Pollutant	Average Period	PSD Increment Class I	PSD Increment Class II
Sulfur Dioxide SO ₂	3-hours	25	512
	24-hours	5	91
	Annual	21	20
Particulate Matter PM ₁₀	24-hours	8	30
	Annual	4	17
Nitrogen Dioxide NO ₂	Annual	2.5	2.5
Carbon Monoxide CO	1-hour	None	None
	8-hours	None	None
Lead	3-months	None	None

Source: Wyoming DEQ 2004

PSD Prevention of Significant Deterioration

Regional Haze Regulations

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 Wyoming Department of Environmental Quality–Air Quality Division (DEQ AQD) submitted its Regional Haze State Implementation Plan (SIP) in accordance with 40 CFR, Part 51.309, in December 2003. The EPA has not taken action yet on this SIP.

Visual range, one of several ways to express visibility, is the farthest distance at which a person can distinguish a dark landscape feature from a light background, such as the sky. Without human-caused visibility impairment, natural visual range is estimated to average about 110 to 115 miles in the western United States and 60 to 80 miles in the eastern United States (Malm 1999).

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.

Applicability to the Casper 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 [field] and pipeline [sales] 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 U.S. Forest Service (USFS), the National Park Service (NPS), and the U.S. Fish and Wildlife Service (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.

The NAAQS and the WAAQS are health-based standards for the maximum acceptable concentrations of air pollutants at locations to which the public has access. The analysis of the proposed alternatives must demonstrate continued compliance with all applicable local, state, tribal, and federal air quality standards. Existing air quality throughout the project area is in attainment of all ambient air quality standards, as demonstrated by the relatively low concentration levels presented in Table J-3.

Air quality regulations require that stationary proposed new or modified existing air pollutant emission sources (including oil and gas compression facilities) undergo a permitting review before their construction can begin. Therefore, the Wyoming DEQ AQD has been given primary authority over and responsibility for reviewing permit applications and for requiring emission permits, fees, and control device before construction and (or) operation. In addition, the U.S. Congress (through CAA Section 116) authorized local, state, and tribal air quality regulatory agencies to establish air pollution control requirements more (but not less) stringent than federal requirements. Also, under both the Federal Land Policy and Management Act and the CAA, the BLM cannot authorize any activity that would not conform to all applicable local, state, tribal, and federal air quality laws, regulations, standards, and implementation plans.

Given the project 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 legal 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.

Table J-3. Background Concentrations and Applicable Ambient Air Quality Standards

Pollutant/Monitoring Station (Monitor ID)	Average Time/ Measurement	Maximum Concentration by Year ($\mu\text{g}/\text{m}^3$)			NAAQS ($\mu\text{g}/\text{m}^3$)
		2002	2003	2004	
Nitrogen Dioxide (ppm)					
Antelope Site 3, Converse County (56009081942602-1)	Annual	N/A	0.004	0.004	0.053
PM_{2.5} ($\mu\text{g}/\text{m}^3$)					
Antelope Site 3, Converse County (56009081988101-1)	Annual 24 Hours	3.4 15	4.3 29	3.3 11	15 65
PM₁₀ ($\mu\text{g}/\text{m}^3$)					
Casper, Natrona County (56025000181102)	Annual	17	24	17	50
Laramie River Power Plant, Platte County (56031080581102)	Annual	24	21	21	50
Antelope Site 5, Converse County (56009085081102)	Annual	25	24	26	50
Antelope Site 6, Converse County (56009085181102)	Annual	27	26	30	50
North Antelope Na-5, Campbell County (56005087081102-2)	Annual	28	24	26	50
North Antelope/Rochelle Coal, Gillette, Campbell County (56005091081102)	Annual	24	27	24	50
Casper, Natrona County (56025000181102)	24 Hours	44	194	60	150
Laramie River Power Plant, Platte County (56031080581102)	24 Hours	78	92	127	150
Antelope Site 5, Converse County (56009085081102)	24 Hours	124	112	65	150
Antelope Site 6, Converse County (56009085181102)	24 Hours	104	121	93	150
North Antelope Na-5, Campbell County (56005087081102-2)	24 Hours	125	100	115	150
North Antelope/Rochelle Coal, Gillette, Campbell County (56005091081102)	24 Hours	135	116	111	150

Source: EPA 2005

$\mu\text{g}/\text{m}^3$ micrograms per cubic meter

ID Identification

NAAQS National Ambient Air Quality Standards

N/A not applicable

PM₁₀ particulate matter less than 10 microns in diameter

PM_{2.5} particulate matter less than 2.5 microns in diameter

ppm parts per million

Sources subject to the PSD permit review procedure also are required to demonstrate potential impacts on air quality-related values (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 U.S. 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.

2.0 AGENCY ROLES AND AUTHORITIES

U.S. Environmental Protection Agency

The EPA administers the federal CAA (42 U.S. Code [U.S.C.] 7401 et seq.) to maintain the NAAQS that protect human health and to preserve the rural air quality in the region by ensuring the PSD Class I and Class II increments for SO₂, NO₂, and PM₁₀ are not exceeded. The EPA has delegated this CAA authority to the State of Wyoming.

Wyoming Department of Environmental Quality

Wyoming regulates pollutants emitted into the air through the Wyoming Environmental Quality Act (W.S. 35-11-101 et seq.). Wyoming also is authorized by an approved SIP to administer all requirements of the PSD permit program under the CAA. In addition, the approved Wyoming SIP contains a number of programs that provide for the implementation, maintenance, and enforcement of the NAAQS, including a New Source Review program for minor source permitting that requires, among other things, an application of BACT for all new or modified sources, regardless of size or source category. Included, as well, are authorities for the control of particulate emissions, such as including fugitive particulate emissions from haul roads, access roads, or general facility boundaries. Wyoming also has been delegated the responsibility for operating an approved ambient air quality monitoring network for the purpose of demonstrating compliance with the NAAQS and the WAAQS.

Bureau of Land Management

NEPA requires that federal agencies consider mitigation of direct, indirect, and cumulative impacts during their preparation of an EIS (BLM Land Use Planning Manual 1601). Under the CAA, federal agencies must comply with SIPs regarding the control and abatement of air pollution. Before approval of RMPs or amendments to RMPs, the state director is to submit any known inconsistencies with SIPs to the governor of that state. If the governor of the state recommends changes in the proposed RMP or amendment to meet SIP requirements, the state director shall give the public an opportunity to comment on those recommendations (BLM Land Use Planning Manual, Section 1610.3-2.).

U.S. Forest Service

The USFS administers national forests, which include several wilderness areas that could be affected by direct impacts associated with the project, such as the Bridger and Fitzpatrick wilderness areas which have mandatory federal Class I designations. In addition, the Class II Cloud Peaks wilderness area should be included in the planning area analysis. As federal land managers, the USFS could act as a consultant to recommend that the BLM impact analysis results, or any future EPA- or state-administered PSD refined impact analysis results (if justified), trigger adverse impairment status. If the USFS determines impairment of wilderness areas, the BLM, the state, and (or) the EPA might need to mitigate this predicted adverse air quality impact.

National Park Service

One area administered by the NPS with a mandatory federal Class I area designation, Wind Cave National Park, could be affected by direct impacts associated with the Casper Field Office BLM emissions. As federal land managers, the NPS could act as a consultant to recommend that the BLM impact analysis results, or any future EPA- or state-administered PSD refined impact analysis results (if justified), trigger adverse impairment status. If the NPS determines impairment of NPS-administered Class I areas, the BLM, the state, and (or) EPA might need to mitigate this predicted adverse air quality impact.

3.0 EXISTING AIR QUALITY

As described in Chapter 3.2, Affected Environment (Air Resources), specific air quality monitoring is not conducted throughout most of the project area, but air quality conditions are considered to be generally good, as characterized by limited air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations. Table J-3 summarizes the ambient air quality background concentrations in the planning area. This information was provided by the Wyoming DEQ. Although monitoring is conducted primarily in urban or industrial areas, the data selected are considered to be the best available representation of background air pollutant concentrations throughout the project area. The assumed background pollutant concentrations are below applicable ambient air quality standard for all pollutants and averaging times (although ozone levels approach the standards). Federal standards, Wyoming standards, and PSD increment values are presented in Tables J-1 and J-2.

4.0 AIR QUALITY IMPACT ANALYSIS

As described in Chapter 4, Environmental Consequences (Air Quality), 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 were based on the best available engineering data and assumptions, emission inventory procedures, and professional and scientific judgment. However, where specific data or procedures were not available, activity assumptions were incorporated, as documented in the emission spreadsheets.

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. Table J-1 presents these requirements and legal limits.

Because the potential air pollutant emission sources comprise many small sources spread out over a very large area, discrete visible plumes are not likely to impact the distant sensitive areas, but the potential for cumulative visibility impacts (increased regional haze) is a concern. Regional haze degradation is caused by fine particles' and gases' scattering and absorbing light. Potential changes to regional haze are calculated in terms of a perceptible "just noticeable change" (1.0 deciview) in visibility when compared to background conditions in mandatory federal PSD Class I areas.

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 air quality impact analyses or mitigation measures. Thus, before development occurred, additional site-specific air quality analyses would be performed to ensure protection of air quality. Federal land managers would require a demonstration that potential effects from proposed projects would not adversely impact AQRV (including visibility) in sensitive Class I and Class II areas.

5.0 EMISSION CALCULATIONS

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.

Summary emission inventories for each of the BLM activities for all of the alternatives are found in Chapter 4.2, Air Quality Impact Assessment. Activity data used to estimate emissions for proposed emission sources were obtained from Casper Field Office staff and NEPA analyses performed for BLM actions within Wyoming that are similar to those associated with the actions proposed in this RMP/EIS (BLM 2002; BLM 2005b). Emission factors used to estimate proposed emission were obtained from (1) the EPA NONROAD Emissions Model (EPA 2004), (2) Wyoming DEQ AQD BACT levels for natural gas-fired internal combustion engines (Hanify 2006 and Wyoming DEQ 2000), (3) MOBILE6 emissions models for on-road vehicles (EPA 2003), and, (4) special studies on fugitive dust emissions (EPA 2001).

The analysis includes emissions estimates for the following activities: (1) oil development, (2) CBNG and conventional natural gas development, (3) coal mine development, (4) salable and locatable minerals development, (5) renewable energy development, (6) livestock management activities, (7) vegetation management, (8) fire management (including prescribed fire), (9) forest and woodlands activities, (10) rights-of-way, (11) OHV use, and (12) resource roads. Activities related to cultural resources, paleontology, recreation, noxious and invasive weed control, and wildlife and fish would produce inconsequential amounts of air emissions.

Assumptions Used in Developing Emissions for the Casper 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 producing coalbed natural gas (CBNG) and conventional oil and gas wells projected in the RFD and existing currently 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 Casper Field Office).
- However, it is possible that conditions close to this could occur in some isolated areas. For oil, gas, and CBNG wells development of new federal producing wells was assumed to occur at a uniform rate through 2020.
- 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 and CBNG would be equipped with nonselective catalytic reduction (NSCR) catalyst.
- Activity data associated with management actions other than those related to conventional and CBNG 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 (2011) for modeling purposes.
- EPA off-road emission standards were used to estimate emissions for non-road sources in project years 2006, 2011, and 2020. This approach simulates the replacement of existing sources by new lower-emitting equipment with future EPA off-road 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. For a complete list

of Standard Practices, BMPs, and Guidelines for Surface-Disturbing Activities, refer to Appendix K.

- BMPs for surface-disturbing activities are applied under all alternatives. Appendix K lists standard practices 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. These spreadsheets are available on CD.

Oil and Gas Wells Emissions Estimation

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

The estimated numbers of oil and gas wells are provided by the Casper Field Office and shown in Table J-4 (this table accounts for net wells in operation and subtracts wells that have been abandoned).

Coal Mine Emission Estimation

Criteria pollutant emissions from coal mine operations were based on coal mine emissions data for Antelope Mine operations (MacDonald 2005) projected for the years 2011 and 2020.

Salable and Locatable Minerals Emission Estimation

Criteria pollutant emissions from salable and locatable minerals operations were calculated based on data provided by the Casper Field Office 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.

Table J-4. Numbers of Oil and Gas Wells for the Casper Field Office

Well Type	Existing Wells 2001	Operational Wells 2011	Operational Wells 2020
Alternative A			
Coalbed Natural Gas	--	215	457
Natural Gas	506	733	957
Oil	2,867	3,184	3,498
Alternative B			
Coalbed Natural Gas	--	30	64
Natural Gas	506	529	546
Oil	2,867	2,901	2,927
Alternative C			
Coalbed Natural Gas	--	198	421
Natural Gas	506	713	916
Oil	2,867	3,158	3,441
Alternative D			
Coalbed Natural Gas	--	216	458
Natural Gas	506	729	949
Oil	2,867	3,179	3,487
Alternative E			
Coalbed Natural Gas	--	216	459
Natural Gas	506	731	953
Oil	2,867	3,182	3,493

Source: BLM 2005a

Renewable Energy Emissions Estimation

Criteria pollutant emissions from renewable energy activities were calculated based on data provided by the Casper Field Office 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.

Livestock Grazing Emissions Estimation

Criteria pollutant emissions from livestock grazing operations were calculated based on data provided by the Casper Field Office 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.

Vegetation Emissions Estimation

Criteria pollutant emissions from vegetation operations were calculated based on data provided by the Casper Field Office 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.

Fire-Management Emissions Estimation

Criteria pollutant emissions from fire-management activities were calculated based on data provided by the Casper Field Office 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.

Forest and Woodlands Emissions Estimation

Criteria pollutant emissions from forest and woodlands activities were calculated based on data provided by the Casper Field Office 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.

Rights-of-Way Corridors Emissions Estimation

Criteria pollutant emissions from rights-of-way corridors operations were calculated based on data provided by the Casper Field Office 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.

Off-Highway Vehicles Emission Estimation

Criteria pollutant emissions from off-highway vehicles were calculated based on data provided by the Casper Field Office and used best available information, BACT, AP-42, and the emission studies from other BLM documents. Off-highway vehicles include all terrain vehicles, motorcycles, and snowmobiles.

Road Maintenance Emission Estimation

Criteria pollutant emissions from road maintenance activities (excluding well road maintenance) were calculated based on data provided by the Casper Field Office 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 road maintenance would occur twice in the summer and once in the winter.

Summary of Emissions for All BLM Activities

Tables J-5 through J-124 summarizes the projected total annual emissions by resource. In most cases, year 2011 and 2020 are presented. These years vary for select resources.

**Table J-5. Summary of Output - Alternative A
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	18.93	2.84	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.54	0.54	10.75	0.34	2.13	0.63	0.06
Commuting Vehicles - Construction	3.11	0.48	0.08	0.02	0.23	0.05	0.00
Subtotal: Construction	22.58	3.86	10.83	0.35	2.35	0.68	0.07
Natural Gas Compression - Operations ^a	8.69	8.69	48.29	0.10	96.58	48.29	33.80
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.01	0.01	0.16	0.00	0.13	0.01	0.00
Station Visits - Operations	8.31	1.24	0.04	0.00	0.42	0.03	0.00
Well Workover - Operations	2.36	0.37	0.53	0.00	0.13	0.03	0.00
Well & Pipeline visits for Inspection & Repair - Operations	5.40	0.81	0.02	0.00	0.27	0.02	0.00
Subtotal: Operations	24.77	11.13	49.04	0.11	97.54	48.37	33.81
Road Maintenance	1.36	0.15	0.38	0.00	0.09	0.03	0.00
Subtotal: Maintenance	1.36	0.15	0.38	0.00	0.09	0.03	0.00
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.00	0.00	0.00	0.00
Total Emissions	48.77	15.18	60.25	0.47	99.98	49.08	33.88

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-6. Summary of Output - Alternative A
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	18.93	2.84	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.54	0.54	10.75	0.34	2.13	0.63	0.06
Commuting Vehicles - Construction	3.11	0.48	0.08	0.02	0.23	0.05	0.00
Subtotal: Construction	22.58	3.86	10.83	0.35	2.35	0.68	0.07
Natural Gas Compression - Operations ^a	8.67	8.67	48.17	0.10	96.33	48.17	33.72
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.01	0.01	0.16	0.00	0.13	0.01	0.00
Station Visits - Operations	8.28	1.24	0.04	0.00	0.42	0.03	0.003
Well Workover - Operations	4.99	0.75	0.05	0.00	0.03	0.02	0.002
Well & Pipeline visits for Inspection & Repair - Operations	11.48	1.72	0.05	0.01	0.58	0.04	0.004
Subtotal: Operations	33.43	12.39	48.46	0.11	97.51	48.26	33.73
Road Maintenance	2.85	0.28	0.06	0.004	0.03	0.03	0.003
Subtotal: Maintenance	2.85	0.28	0.06	0.004	0.03	0.03	0.003
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	58.92	16.57	59.35	0.47	99.90	48.97	33.80

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-7. Summary of Output - Alternative B
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	2.57	0.39	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.08	0.08	1.56	0.05	0.31	0.09	0.01
Commuting Vehicles - Construction	0.45	0.07	0.01	0.00	0.03	0.01	0.00
Subtotal: Construction	3.10	0.53	1.57	0.05	0.35	0.10	0.01
Natural Gas Compression - Operations ^a	1.20	1.20	6.65	0.01	13.30	6.65	4.65
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.00	0.00	0.02	0.00	0.02	0.00	0.00
Station Visits - Operations	1.14	0.17	0.01	0.00	0.06	0.00	0.00
Well Workover - Operations	0.33	0.05	0.07	0.00	0.02	0.00	0.00
Well & Pipeline visits for Inspection & Repair - Operations	0.76	0.11	0.00	0.00	0.04	0.00	0.00
Subtotal: Operations	3.43	1.53	6.75	0.02	13.43	6.66	4.66
Road Maintenance	0.19	0.02	0.05	0.00	0.01	0.00	0.00
Subtotal: Maintenance	0.19	0.02	0.05	0.00	0.01	0.00	0.00
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.00	0.00	0.00	0.00
Total Emissions	6.78	2.13	8.38	0.07	13.79	6.76	4.67

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-8. Summary of Output - Alternative B
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	2.57	0.39	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.08	0.08	1.56	0.05	0.31	0.09	0.01
Commuting Vehicles - Construction	0.45	0.07	0.01	0.00	0.03	0.01	0.00
Subtotal: Construction	3.10	0.53	1.57	0.05	0.35	0.10	0.01
Natural Gas Compression - Operations ^a	1.22	1.22	6.79	0.01	13.59	6.79	4.76
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.00	0.00	0.02	0.00	0.02	0.00	0.00
Station Visits - Operations	1.17	0.18	0.01	0.00	0.06	0.00	0.000
Well Workover - Operations	0.70	0.10	0.01	0.00	0.00	0.00	0.000
Well & Pipeline visits for Inspection & Repair - Operations	1.61	0.24	0.01	0.00	0.08	0.01	0.001
Subtotal: Operations	4.70	1.75	6.83	0.02	13.75	6.81	4.76
Road Maintenance	0.40	0.04	0.01	0.001	0.00	0.00	0.000
Subtotal: Maintenance	0.40	0.04	0.01	0.001	0.00	0.00	0.000
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	8.25	2.36	8.42	0.07	14.10	6.91	4.77

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-9. Summary of Output - Alternative C
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction – Fugitive Dust	17.38	2.61	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.50	0.50	9.94	0.31	1.97	0.58	0.06
Commuting Vehicles – Construction	2.87	0.44	0.08	0.01	0.21	0.05	0.00
Subtotal: Construction	20.76	3.55	10.02	0.33	2.18	0.63	0.06
Natural Gas Compression – Operations ^a	7.96	7.96	44.24	0.09	88.49	44.24	30.97
Separator, Dehydrator & Water Tank Heaters – Operations ^a	0.01	0.01	0.14	0.00	0.12	0.01	0.00
Station Visits – Operations	7.61	1.14	0.03	0.00	0.39	0.02	0.00
Well Workover – Operations	2.18	0.34	0.48	0.00	0.12	0.03	0.00
Well & Pipeline visits for Inspection & Repair – Operations	4.98	0.75	0.02	0.00	0.25	0.02	0.00
Subtotal: Operations	22.74	10.20	44.93	0.10	89.36	44.32	30.98
Road Maintenance	1.25	0.14	0.35	0.00	0.08	0.03	0.00
Subtotal: Maintenance	1.25	0.14	0.35	0.00	0.08	0.03	0.00
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.00	0.00	0.00	0.00
Total Emissions	44.80	13.93	55.30	0.43	91.63	44.97	31.04

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-10. Summary of Output - Alternative C
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	17.38	2.61	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.50	0.50	9.94	0.31	1.97	0.58	0.06
Commuting Vehicles - Construction	2.87	0.44	0.08	0.01	0.21	0.05	0.00
Subtotal: Construction	20.76	3.55	10.02	0.33	2.18	0.63	0.06
Natural Gas Compression - Operations ^a	8.01	8.01	44.49	0.09	88.98	44.49	31.14
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.01	0.01	0.14	0.00	0.12	0.01	0.00
Station Visits - Operations	7.65	1.15	0.03	0.00	0.39	0.02	0.002
Well Workover - Operations	4.60	0.69	0.04	0.00	0.03	0.02	0.002
Well & Pipeline visits for Inspection & Repair - Operations	10.57	1.58	0.05	0.01	0.54	0.03	0.003
Subtotal: Operations	30.84	11.44	44.76	0.10	90.06	44.58	31.15
Road Maintenance	2.63	0.26	0.05	0.004	0.03	0.02	0.002
Subtotal: Maintenance	2.63	0.26	0.05	0.004	0.03	0.02	0.002
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	54.28	15.29	54.83	0.43	92.27	45.23	31.22

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-11. Summary of Output - Alternative D
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction – Fugitive Dust	18.98	2.85	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.54	0.54	10.77	0.34	2.13	0.63	0.06
Commuting Vehicles – Construction	3.11	0.48	0.08	0.02	0.23	0.05	0.00
Subtotal: Construction	22.63	3.87	10.86	0.36	2.36	0.68	0.07
Natural Gas Compression – Operations ^a	8.69	8.69	48.29	0.10	96.58	48.29	33.80
Separator, Dehydrator & Water Tank Heaters – Operations ^a	0.01	0.01	0.16	0.00	0.13	0.01	0.00
Station Visits – Operations	8.31	1.24	0.04	0.00	0.42	0.03	0.00
Well Workover – Operations	2.37	0.37	0.53	0.00	0.13	0.03	0.00
Well & Pipeline visits for Inspection & Repair – Operations	5.41	0.81	0.02	0.00	0.28	0.02	0.00
Subtotal: Operations	24.79	11.13	49.04	0.11	97.54	48.37	33.81
Road Maintenance	1.36	0.15	0.38	0.00	0.09	0.03	0.00
Subtotal: Maintenance	1.36	0.15	0.38	0.00	0.09	0.03	0.00
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.00	0.00	0.00	0.00
Total Emissions	48.84	15.19	60.28	0.47	99.99	49.08	33.88

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-12. Summary of Output - Alternative D
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	18.98	2.85	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.54	0.54	10.77	0.34	2.13	0.63	0.06
Commuting Vehicles - Construction	3.11	0.48	0.08	0.02	0.23	0.05	0.00
Subtotal: Construction	22.63	3.87	10.86	0.36	2.36	0.68	0.07
Natural Gas Compression - Operations ^a	8.67	8.67	48.17	0.10	96.33	48.17	33.72
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.01	0.01	0.16	0.00	0.13	0.01	0.00
Station Visits - Operations	8.28	1.24	0.04	0.00	0.42	0.03	0.003
Well Workover - Operations	5.00	0.75	0.05	0.00	0.03	0.02	0.002
Well & Pipeline visits for Inspection & Repair - Operations	11.50	1.72	0.05	0.01	0.59	0.04	0.004
Subtotal: Operations	33.47	12.40	48.46	0.11	97.51	48.26	33.73
Road Maintenance	2.86	0.28	0.06	0.004	0.03	0.03	0.003
Subtotal: Maintenance	2.86	0.28	0.06	0.004	0.03	0.03	0.003
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	59.01	16.59	59.37	0.47	99.90	48.97	33.80

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-13. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction – Fugitive Dust	19.02	2.85	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.54	0.54	10.80	0.34	2.13	0.63	0.06
Commuting Vehicles – Construction	3.12	0.48	0.08	0.02	0.23	0.05	0.00
Subtotal: Construction	22.68	3.88	10.88	0.36	2.36	0.68	0.07
Natural Gas Compression – Operations ^a	8.69	8.69	48.29	0.10	96.58	48.29	33.80
Separator, Dehydrator & Water Tank Heaters – Operations ^a	0.01	0.01	0.16	0.00	0.13	0.01	0.00
Station Visits – Operations	8.31	1.24	0.04	0.00	0.42	0.03	0.00
Well Workover – Operations	2.38	0.37	0.53	0.00	0.13	0.03	0.00
Well & Pipeline visits for Inspection & Repair – Operations	5.42	0.81	0.02	0.00	0.28	0.02	0.00
Subtotal: Operations	24.81	11.13	49.04	0.11	97.54	48.37	33.81
Road Maintenance	1.36	0.15	0.38	0.00	0.09	0.03	0.00
Subtotal: Maintenance	1.36	0.15	0.38	0.00	0.09	0.03	0.00
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.00	0.00	0.00	0.00
Total Emissions	48.91	15.20	60.30	0.47	99.99	49.09	33.88

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-14. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Coalbed Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	19.02	2.85	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.54	0.54	10.80	0.34	2.13	0.63	0.06
Commuting Vehicles - Construction	3.12	0.48	0.08	0.02	0.23	0.05	0.00
Subtotal: Construction	22.68	3.88	10.88	0.36	2.36	0.68	0.07
Natural Gas Compression - Operations ^a	8.67	8.67	48.19	0.10	96.38	48.19	33.73
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.01	0.01	0.16	0.00	0.13	0.01	0.00
Station Visits - Operations	8.29	1.24	0.04	0.00	0.42	0.03	0.003
Well Workover - Operations	5.01	0.75	0.05	0.00	0.03	0.02	0.002
Well & Pipeline visits for Inspection & Repair - Operations	11.53	1.73	0.05	0.01	0.59	0.04	0.004
Subtotal: Operations	33.51	12.41	48.48	0.11	97.56	48.29	33.74
Road Maintenance	2.86	0.28	0.06	0.004	0.03	0.03	0.003
Subtotal: Maintenance	2.86	0.28	0.06	0.004	0.03	0.03	0.003
Road Reclamation	0.04	0.04	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.06	0.04	0.00	0.0000	0.00	0.0000	0.0000
Total Emissions	59.12	16.61	59.42	0.47	99.96	49.00	33.82

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-15. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2001**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	3.36	0.50	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	12.78	12.78	427.94	57.40	106.75	13.08	1.31
Well Completion Flaring	8.05	1.25	0.23	0.05	0.60	0.14	0.01
Subtotal: Construction	24.19	14.53	428.17	57.45	107.35	13.22	1.32
Natural Gas Compression - Operations ^a	0.09	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.75	0.75	10.60	0.70	2.28	0.87	0.09
Station Visits - Operations	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Well Workover - Operations	17.58	2.63	0.08	0.01	0.89	0.06	0.01
Subtotal: Operations	18.42	3.40	10.68	0.71	3.18	0.93	0.09
Road Maintenance	20.99	2.83	9.89	1.21	2.25	0.51	0.05
Subtotal: Maintenance	20.99	2.83	9.89	1.21	2.25	0.51	0.05
Total Emissions	63.59	20.75	448.74	59.37	112.78	14.65	1.47

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs* 0.1

**Table J-16. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction – Fugitive Dust	3.08	0.46	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	11.73	11.73	392.94	52.71	98.02	12.01	1.20
Well Completion Flaring	7.39	1.14	0.21	0.04	0.55	0.13	0.01
Subtotal: Construction	22.21	13.34	393.16	52.75	98.57	12.14	1.21
Natural Gas Compression – Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters – Operations ^a	0.69	0.69	9.74	0.64	2.10	0.80	0.08
Station Visits – Operations	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Well Workover – Operations	19.27	2.89	0.09	0.01	0.98	0.06	0.01
Subtotal: Operations	20.04	3.59	9.82	0.65	3.08	0.86	0.09
Road Maintenance	23.00	3.10	10.84	1.33	2.47	0.55	0.06
Subtotal: Maintenance	23.00	3.10	10.84	1.33	2.47	0.55	0.06
Total Emissions	65.25	20.03	413.82	54.73	104.12	13.55	1.36

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-17. Summary of Output - Alternative A
Total Annual Emissions from Oil Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	3.08	0.46	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	11.73	11.73	392.94	52.71	98.02	12.01	1.20
Well Completion Flaring	7.39	1.14	0.21	0.04	0.55	0.13	0.01
Subtotal: Construction	22.21	13.34	393.16	52.75	98.57	12.14	1.21
Natural Gas Compression - Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.69	0.69	9.74	0.64	2.10	0.80	0.08
Station Visits - Operations	0.00	0.00	0.00	0.00	0.01	0.00	0.000
Well Workover - Operations	21.17	3.17	0.09	0.01	1.08	0.07	0.007
Subtotal: Operations	21.94	3.88	9.83	0.65	3.18	0.87	0.09
Road Maintenance	25.27	3.40	11.91	1.457	2.71	0.61	0.061
Subtotal: Maintenance	25.27	3.40	11.91	1.457	2.71	0.61	0.061
Total Emissions	69.42	20.62	414.89	54.86	104.46	13.61	1.36

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-18. Summary of Output - Alternative B
Total Annual Emissions from Oil Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.97	0.97	32.65	4.38	8.14	1.00	0.10
Well Completion Flaring	0.61	0.10	0.02	0.00	0.05	0.01	0.00
Subtotal: Construction	1.85	1.11	32.67	4.38	8.19	1.01	0.10
Natural Gas Compression - Operations ^a	0.01	0.00	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.06	0.06	0.81	0.05	0.17	0.07	0.01
Station Visits - Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Workover - Operations	17.55	2.63	0.08	0.01	0.89	0.06	0.01
Subtotal: Operations	17.62	2.69	0.89	0.06	1.07	0.12	0.01
Road Maintenance	20.96	2.82	9.87	1.21	2.25	0.50	0.05
Subtotal: Maintenance	20.96	2.82	9.87	1.21	2.25	0.50	0.05
Total Emissions	40.42	6.62	43.43	5.65	11.50	1.64	0.16

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-19. Summary of Output - Alternative B
Total Annual Emissions from Oil Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.97	0.97	32.65	4.38	8.14	1.00	0.10
Well Completion Flaring	0.61	0.10	0.02	0.00	0.05	0.01	0.00
Subtotal: Construction	1.85	1.11	32.67	4.38	8.19	1.01	0.10
Natural Gas Compression - Operations ^a	0.01	0.00	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.06	0.06	0.81	0.05	0.17	0.07	0.01
Station Visits - Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Well Workover - Operations	17.71	2.65	0.08	0.01	0.90	0.06	0.006
Subtotal: Operations	17.78	2.71	0.89	0.06	1.08	0.12	0.01
Road Maintenance	21.15	2.85	9.96	1.219	2.27	0.51	0.051
Subtotal: Maintenance	21.15	2.85	9.96	1.219	2.27	0.51	0.051
Total Emissions	40.77	6.67	43.51	5.66	11.53	1.64	0.16

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-20. Summary of Output - Alternative C
Total Annual Emissions from Oil Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	2.79	0.42	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	10.63	10.63	355.90	47.74	88.78	10.88	1.09
Well Completion Flaring	6.69	1.04	0.19	0.04	0.50	0.12	0.01
Subtotal: Construction	20.12	12.08	356.10	47.78	89.28	10.99	1.10
Natural Gas Compression - Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.63	0.63	8.82	0.58	1.90	0.72	0.07
Station Visits - Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Workover - Operations	19.11	2.86	0.08	0.01	0.97	0.06	0.01
Subtotal: Operations	19.81	3.50	8.90	0.59	2.88	0.79	0.08
Road Maintenance	22.81	3.07	10.75	1.32	2.45	0.55	0.05
Subtotal: Maintenance	22.81	3.07	10.75	1.32	2.45	0.55	0.05
Total Emissions	62.74	18.65	375.75	49.69	94.60	12.33	1.23

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-21. Summary of Output - Alternative C
Total Annual Emissions from Oil Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	2.79	0.42	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	10.63	10.63	355.90	47.74	88.78	10.88	1.09
Well Completion Flaring	6.69	1.04	0.19	0.04	0.50	0.12	0.01
Subtotal: Construction	20.12	12.08	356.10	47.78	89.28	10.99	1.10
Natural Gas Compression - Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.63	0.63	8.82	0.58	1.90	0.72	0.07
Station Visits - Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Well Workover - Operations	20.82	3.12	0.09	0.01	1.06	0.07	0.007
Subtotal: Operations	21.52	3.76	8.91	0.59	2.96	0.79	0.08
Road Maintenance	24.86	3.35	11.71	1.433	2.66	0.60	0.060
Subtotal: Maintenance	24.86	3.35	11.71	1.433	2.66	0.60	0.060
Total Emissions	66.50	19.19	376.72	49.80	94.91	12.38	1.24

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-22. Summary of Output - Alternative D
Total Annual Emissions from Oil Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	3.03	0.45	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	11.52	11.52	385.65	51.73	96.21	11.78	1.18
Well Completion Flaring	7.25	1.12	0.21	0.04	0.54	0.13	0.01
Subtotal: Construction	21.80	13.09	385.86	51.77	96.74	11.91	1.19
Natural Gas Compression - Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.68	0.68	9.55	0.63	2.06	0.78	0.08
Station Visits - Operations	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Well Workover - Operations	19.23	2.88	0.08	0.01	0.98	0.06	0.01
Subtotal: Operations	19.99	3.57	9.64	0.64	3.04	0.85	0.08
Road Maintenance	22.96	3.09	10.82	1.32	2.46	0.55	0.06
Subtotal: Maintenance	22.96	3.09	10.82	1.32	2.46	0.55	0.06
Total Emissions	64.76	19.76	406.32	53.74	102.25	13.31	1.33

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-23. Summary of Output - Alternative D
Total Annual Emissions from Oil Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	3.03	0.45	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	11.52	11.52	385.65	51.73	96.21	11.78	1.18
Well Completion Flaring	7.25	1.12	0.21	0.04	0.54	0.13	0.01
Subtotal: Construction	21.80	13.09	385.86	51.77	96.74	11.91	1.19
Natural Gas Compression - Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.68	0.68	9.55	0.63	2.06	0.78	0.08
Station Visits - Operations	0.00	0.00	0.00	0.00	0.01	0.00	0.000
Well Workover - Operations	21.10	3.16	0.09	0.01	1.07	0.07	0.007
Subtotal: Operations	21.86	3.85	9.65	0.64	3.14	0.85	0.09
Road Maintenance	25.19	3.39	11.87	1.453	2.70	0.61	0.061
Subtotal: Maintenance	25.19	3.39	11.87	1.453	2.70	0.61	0.061
Total Emissions	68.85	20.34	407.38	53.87	102.58	13.37	1.34

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-24. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Oil Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	3.06	0.46	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	11.63	11.63	389.62	52.26	97.20	11.91	1.19
Well Completion Flaring	7.33	1.13	0.21	0.04	0.54	0.13	0.01
Subtotal: Construction	22.02	13.23	389.83	52.30	97.74	12.03	1.20
Natural Gas Compression - Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.69	0.69	9.65	0.64	2.08	0.79	0.08
Station Visits - Operations	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Well Workover - Operations	19.25	2.88	0.09	0.01	0.98	0.06	0.01
Subtotal: Operations	20.02	3.58	9.74	0.65	3.06	0.86	0.09
Road Maintenance	22.99	3.10	10.83	1.33	2.46	0.55	0.06
Subtotal: Maintenance	22.99	3.10	10.83	1.33	2.46	0.55	0.06
Total Emissions	65.03	19.90	410.40	54.28	103.27	13.44	1.34

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-25. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Oil Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	3.06	0.46	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	11.63	11.63	389.62	52.26	97.20	11.91	1.19
Well Completion Flaring	7.33	1.13	0.21	0.04	0.54	0.13	0.01
Subtotal: Construction	22.02	13.23	389.83	52.30	97.74	12.03	1.20
Natural Gas Compression - Operations ^a	0.08	0.01	---	---	---	---	---
Separator, Dehydrator & Water Tank Heaters - Operations ^a	0.69	0.69	9.65	0.64	2.08	0.79	0.08
Station Visits - Operations	0.00	0.00	0.00	0.00	0.01	0.00	0.000
Well Workover - Operations	21.14	3.17	0.09	0.01	1.08	0.07	0.007
Subtotal: Operations	21.90	3.86	9.75	0.65	3.16	0.86	0.09
Road Maintenance	25.23	3.40	11.89	1.455	2.70	0.61	0.061
Subtotal: Maintenance	25.23	3.40	11.89	1.455	2.70	0.61	0.061
Total Emissions	69.16	20.49	411.47	54.41	103.60	13.50	1.35

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants, assumed = VOCs*0.1

**Table J-26. Summary of Output -Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2001**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	10.72	1.61	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	10.49	10.49	217.88	4.69	70.48	17.77	1.78
Well Completion Flaring	0.10	0.10	0.94	0.01	5.14	25.33	2.53
Commuting Vehicles - Construction	25.01	4.23	2.74	0.54	7.06	1.65	0.16
Subtotal: Construction	46.32	16.42	221.56	5.23	82.67	44.75	4.47
Natural Gas Compression - Operations ^a	7.82	7.82	118.37	0.24	236.75	118.37	18.94
Separator, Dehydrator & Water Tank Heaters - Operations ^a	6.57	6.57	86.40	0.52	72.58	2,219.92	221.99
Station Visits - Operations	7.52	1.13	0.03	0.00	0.38	0.02	0.00
Well Workover - Operations	0.26	0.10	2.33	0.01	0.47	0.09	0.01
Well & Pipeline visits for Inspection & Repair - Operations	13.38	2.01	0.06	0.01	0.68	0.04	0.00
Tanks Condensate and Loadout	---	---	---	---	---	215.77	21.58
Subtotal: Operations	35.55	17.61	207.20	0.78	310.86	2,554.22	262.52
Road Maintenance	3.41	0.42	1.92	0.04	0.64	0.16	0.02
Subtotal: Maintenance	3.41	0.42	1.92	0.04	0.64	0.16	0.02
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions	85.30	34.46	430.68	6.05	394.17	2,599.13	267.02

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-27. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	9.89	1.48	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	5.08	5.08	144.06	4.33	21.76	6.46	0.65
Well Completion Flaring	0.10	0.10	0.90	0.01	4.92	23.39	2.34
Commuting Vehicles - Construction	23.10	3.90	2.53	0.50	6.52	1.52	0.15
Subtotal: Construction	38.17	10.57	147.50	4.83	33.20	31.37	3.14
Natural Gas Compression - Operations ^a	10.74	10.74	162.69	0.33	325.38	162.69	26.03
Separator, Dehydrator & Water Tank Heaters - Operations ^a	9.03	9.03	118.78	0.71	99.77	3,163.94	316.39
Station Visits - Operations	10.34	1.55	0.05	0.01	0.53	0.03	0.00
Well Workover - Operations	0.24	0.09	2.15	0.01	0.43	0.09	0.01
Well & Pipeline visits for Inspection & Repair - Operations	18.40	2.76	0.08	0.01	0.94	0.06	0.01
Tanks Condensate and Loadout	---	---	---	---	---	307.55	30.75
Subtotal: Operations	48.75	24.17	283.75	1.06	427.05	3,634.36	373.20
Road Maintenance	4.62	0.50	1.29	0.01	0.30	0.11	0.01
Subtotal: Maintenance	4.62	0.50	1.29	0.01	0.30	0.11	0.01
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions	91.56	35.24	432.54	5.90	460.55	3,665.84	376.35

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-28. Summary of Output - Alternative A
Total Annual Emissions from Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	9.89	1.48	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	5.08	5.08	144.06	4.33	21.76	6.46	0.65
Well Completion Flaring	0.10	0.10	0.90	0.01	4.92	23.39	2.34
Commuting Vehicles - Construction	23.10	3.90	2.53	0.50	6.52	1.52	0.15
Subtotal: Construction	38.17	10.57	147.50	4.83	33.20	31.37	3.14
Natural Gas Compression - Operations ^a	14.03	14.03	212.54	0.43	425.08	212.54	34.01
Separator, Dehydrator & Water Tank Heaters - Operations ^a	11.78	11.78	155.04	0.93	130.24	3635.67	363.57
Station Visits - Operations	13.50	2.02	0.06	0.01	0.69	0.04	0.004
Well Workover - Operations	0.18	0.03	0.14	0.01	0.05	0.07	0.007
Well & Pipeline visits for Inspection & Repair - Operations	24.03	3.60	0.11	0.01	1.22	0.08	0.008
Tanks Condensate and Loadout	---	---	---	---	---	353.30	35.33
Subtotal: Operations	63.54	31.47	367.89	1.38	557.28	4201.71	432.92
Road Maintenance	5.97	0.59	0.12	0.009	0.07	0.06	0.006
Subtotal: Maintenance	5.97	0.59	0.12	0.009	0.07	0.06	0.006
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.01	0.00	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	107.70	42.63	515.51	6.23	590.55	4,233.14	436.07

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-29. Summary of Output - Alternative B
Total Annual Emissions from Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	0.68	0.10	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.40	0.40	11.21	0.34	1.70	0.50	0.05
Well Completion Flaring	0.00	0.00	0.01	0.00	0.07	1.81	0.18
Commuting Vehicles - Construction	1.81	0.31	0.20	0.04	0.51	0.12	0.01
Subtotal: Construction	2.89	0.81	11.42	0.38	2.28	2.44	0.24
Natural Gas Compression - Operations ^a	7.75	7.75	117.40	0.23	234.80	117.40	18.78
Separator, Dehydrator & Water Tank Heaters - Operations ^a	6.48	6.48	85.23	0.51	71.59	423.65	42.37
Station Visits - Operations	7.46	1.12	0.03	0.00	0.38	0.02	0.00
Well Workover - Operations	0.02	0.01	0.17	0.00	0.03	0.01	0.00
Well & Pipeline visits for Inspection & Repair - Operations	13.27	1.99	0.06	0.01	0.68	0.04	0.00
Tanks Condensate and Loadout	---	---	---	---	---	40.81	4.08
Subtotal: Operations	34.98	17.34	202.89	0.76	307.48	581.94	65.24
Road Maintenance	3.34	0.36	0.93	0.00	0.22	0.08	0.01
Subtotal: Maintenance	3.34	0.36	0.93	0.00	0.22	0.08	0.01
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions	41.22	18.51	215.24	1.14	309.98	584.45	65.49

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-30. Summary of Output - Alternative B
Total Annual Emissions from Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	0.68	0.10	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	0.40	0.40	11.21	0.34	1.70	0.50	0.05
Well Completion Flaring	0.00	0.00	0.01	0.00	0.07	1.81	0.18
Commuting Vehicles - Construction	1.81	0.31	0.20	0.04	0.51	0.12	0.01
Subtotal: Construction	2.89	0.81	11.42	0.38	2.28	2.44	0.24
Natural Gas Compression - Operations ^a	8.01	8.01	121.26	0.24	242.52	121.26	19.40
Separator, Dehydrator & Water Tank Heaters - Operations ^a	6.69	6.69	88.02	0.53	73.94	381.47	38.15
Station Visits - Operations	7.70	1.15	0.03	0.00	0.39	0.03	0.003
Well Workover - Operations	0.01	0.00	0.01	0.00	0.00	0.01	0.001
Well & Pipeline visits for Inspection & Repair - Operations	13.71	2.05	0.06	0.01	0.70	0.04	0.004
Tanks Condensate and Loadout	---	---	---	---	---	36.69	3.67
Subtotal: Operations	36.13	17.91	209.39	0.78	317.55	539.50	61.23
Road Maintenance	3.41	0.33	0.07	0.005	0.04	0.03	0.003
Subtotal: Maintenance	3.41	0.33	0.07	0.005	0.04	0.03	0.003
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.01	0.00	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	42.43	19.05	220.88	1.16	319.88	541.96	61.47

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-31. Summary of Output - Alternative C
Total Annual Emissions from Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction – Fugitive Dust	8.95	1.34	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	4.60	4.60	130.41	3.92	19.70	5.85	0.58
Well Completion Flaring	0.09	0.09	0.78	0.01	4.23	21.17	2.12
Commuting Vehicles – Construction	20.91	3.53	2.29	0.45	5.90	1.38	0.14
Subtotal: Construction	34.54	9.56	133.47	4.37	29.83	28.40	2.84
Natural Gas Compression – Operations ^a	10.45	10.45	158.31	0.32	316.63	158.31	25.33
Separator, Dehydrator & Water Tank Heaters – Operations ^a	8.78	8.78	115.54	0.69	97.06	2,926.65	292.67
Station Visits – Operations	10.06	1.51	0.04	0.00	0.51	0.03	0.00
Well Workover – Operations	0.22	0.08	1.95	0.01	0.39	0.08	0.01
Well & Pipeline visits for Inspection & Repair – Operations	17.90	2.68	0.08	0.01	0.91	0.06	0.01
Tanks Condensate and Loadout	---	---	---	---	---	284.45	28.45
Subtotal: Operations	47.41	23.51	275.93	1.03	415.50	3,369.59	346.46
Road Maintenance	4.50	0.49	1.25	0.01	0.29	0.11	0.01
Subtotal: Maintenance	4.50	0.49	1.25	0.01	0.29	0.11	0.01
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions	86.47	33.56	410.66	5.41	445.62	3,398.09	349.31

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-32. Summary of Output - Alternative C
Total Annual Emissions from Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	8.95	1.34	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	4.60	4.60	130.41	3.92	19.70	5.85	0.58
Well Completion Flaring	0.09	0.09	0.78	0.01	4.23	21.17	2.12
Commuting Vehicles - Construction	20.91	3.53	2.29	0.45	5.90	1.38	0.14
Subtotal: Construction	34.54	9.56	133.47	4.37	29.83	28.40	2.84
Natural Gas Compression - Operations ^a	13.43	13.43	203.43	0.41	406.87	203.43	32.55
Separator, Dehydrator & Water Tank Heaters - Operations ^a	11.28	11.28	148.36	0.89	124.63	3330.25	333.03
Station Visits - Operations	12.93	1.94	0.06	0.01	0.66	0.04	0.004
Well Workover - Operations	0.17	0.03	0.13	0.01	0.05	0.06	0.006
Well & Pipeline visits for Inspection & Repair - Operations	23.00	3.45	0.10	0.01	1.17	0.08	0.008
Tanks Condensate and Loadout	---	---	---	---	---	323.59	32.36
Subtotal: Operations	60.80	30.12	352.08	1.32	533.37	3857.45	397.95
Road Maintenance	5.71	0.56	0.11	0.008	0.07	0.05	0.005
Subtotal: Maintenance	5.71	0.56	0.11	0.008	0.07	0.05	0.005
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.01	0.00	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	101.07	40.24	485.67	5.71	563.27	3,885.90	400.80

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-33. Summary of Output - Alternative D
Total Annual Emissions from Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction – Fugitive Dust	9.70	1.46	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	4.98	4.98	141.35	4.25	21.35	6.34	0.63
Well Completion Flaring	0.10	0.10	0.88	0.01	4.78	22.95	2.30
Commuting Vehicles – Construction	22.67	3.83	2.48	0.49	6.40	1.49	0.15
Subtotal: Construction	37.45	10.37	144.71	4.74	32.52	30.78	3.08
Natural Gas Compression – Operations ^a	10.69	10.69	161.85	0.32	323.71	161.85	25.90
Separator, Dehydrator & Water Tank Heaters – Operations ^a	8.98	8.98	118.16	0.71	99.25	3,116.06	311.61
Station Visits – Operations	10.28	1.54	0.05	0.01	0.52	0.03	0.00
Well Workover – Operations	0.24	0.09	2.11	0.01	0.42	0.08	0.01
Well & Pipeline visits for Inspection & Repair – Operations	18.30	2.74	0.08	0.01	0.93	0.06	0.01
Tanks Condensate and Loadout	---	---	---	---	---	302.89	30.29
Subtotal: Operations	48.49	24.04	282.25	1.06	424.84	3,580.99	367.81
Road Maintenance	4.60	0.50	1.28	0.01	0.30	0.11	0.01
Subtotal: Maintenance	4.60	0.50	1.28	0.01	0.30	0.11	0.01
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions	90.56	34.91	428.25	5.80	457.67	3,611.88	370.90

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-34. Summary of Output - Alternative D
Total Annual Emissions from Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	9.70	1.46	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	4.98	4.98	141.35	4.25	21.35	6.34	0.63
Well Completion Flaring	0.10	0.10	0.88	0.01	4.78	22.95	2.30
Commuting Vehicles - Construction	22.67	3.83	2.48	0.49	6.40	1.49	0.15
Subtotal: Construction	37.45	10.37	144.71	4.74	32.52	30.78	3.08
Natural Gas Compression - Operations ^a	13.92	13.92	210.76	0.42	421.53	210.76	33.72
Separator, Dehydrator & Water Tank Heaters - Operations ^a	11.68	11.68	153.74	0.92	129.15	3589.56	358.96
Station Visits - Operations	13.39	2.01	0.06	0.01	0.68	0.04	0.004
Well Workover - Operations	0.18	0.03	0.14	0.01	0.05	0.07	0.007
Well & Pipeline visits for Inspection & Repair - Operations	23.83	3.57	0.11	0.01	1.21	0.08	0.008
Tanks Condensate and Loadout	---	---	---	---	---	348.82	34.88
Subtotal: Operations	63.00	31.21	364.81	1.37	552.62	4149.33	427.58
Road Maintenance	5.92	0.58	0.12	0.008	0.07	0.06	0.006
Subtotal: Maintenance	5.92	0.58	0.12	0.008	0.07	0.06	0.006
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.01	0.00	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	106.39	42.16	509.64	6.12	585.21	4,180.16	430.66

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-35. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Natural Gas Wells - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction – Fugitive Dust	9.80	1.47	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	5.03	5.03	142.71	4.29	21.55	6.40	0.64
Well Completion Flaring	0.10	0.10	0.90	0.01	4.89	23.17	2.32
Commuting Vehicles – Construction	22.89	3.87	2.50	0.49	6.46	1.51	0.15
Subtotal: Construction	37.81	10.47	146.11	4.79	32.90	31.08	3.11
Natural Gas Compression – Operations ^a	10.72	10.72	162.27	0.32	324.54	162.27	25.96
Separator, Dehydrator & Water Tank Heaters – Operations ^a	9.00	9.00	118.47	0.71	99.52	3,163.93	316.39
Station Visits – Operations	10.31	1.54	0.05	0.01	0.52	0.03	0.00
Well Workover – Operations	0.24	0.09	2.13	0.01	0.43	0.09	0.01
Well & Pipeline visits for Inspection & Repair – Operations	18.35	2.75	0.08	0.01	0.93	0.06	0.01
Tanks Condensate and Loadout	---	---	---	---	---	307.55	30.75
Subtotal: Operations	48.62	24.10	283.00	1.06	425.95	3,633.93	373.13
Road Maintenance	4.61	0.50	1.29	0.01	0.30	0.11	0.01
Subtotal: Maintenance	4.61	0.50	1.29	0.01	0.30	0.11	0.01
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions	91.06	35.07	430.41	5.85	459.15	3,665.11	376.25

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-36. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Natural Gas Wells - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Well Pad & Station Construction - Fugitive Dust	9.80	1.47	---	---	---	---	---
Heavy Equipment Combustive Emissions ^a	5.03	5.03	142.71	4.29	21.55	6.40	0.64
Well Completion Flaring	0.10	0.10	0.90	0.01	4.89	23.17	2.32
Commuting Vehicles - Construction	22.89	3.87	2.50	0.49	6.46	1.51	0.15
Subtotal: Construction	37.81	10.47	146.11	4.79	32.90	31.08	3.11
Natural Gas Compression - Operations ^a	13.98	13.98	211.65	0.42	423.30	211.65	33.86
Separator, Dehydrator & Water Tank Heaters - Operations ^a	11.73	11.73	154.39	0.93	129.69	3605.54	360.55
Station Visits - Operations	13.45	2.01	0.06	0.01	0.68	0.04	0.004
Well Workover - Operations	0.18	0.03	0.14	0.01	0.05	0.07	0.007
Well & Pipeline visits for Inspection & Repair - Operations	23.93	3.59	0.11	0.01	1.22	0.08	0.008
Tanks Condensate and Loadout	---	---	---	---	---	350.37	35.04
Subtotal: Operations	63.27	31.34	366.35	1.38	554.95	4167.75	429.47
Road Maintenance	5.95	0.58	0.12	0.009	0.07	0.06	0.006
Subtotal: Maintenance	5.95	0.58	0.12	0.009	0.07	0.06	0.006
Road Reclamation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Well Reclamation	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Reclamation	0.01	0.00	0.00	0.0000	0.00	0.000	0.0000
Total Emissions	107.05	42.40	512.58	6.17	587.92	4,198.89	432.59

^a PM_{2.5} assumed = PM₁₀ for this source.

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

**Table J-37. Summary of Output - Alternative A
Total Annual Emissions from Coal Mining Operations - Year 2002**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Coal1	10.55	2.47	61.11	1.05	---	---	---
Coal2	0.33	0.08	1.89	0.03	---	---	---
Dump1	7.46	1.75	---	---	---	---	---
Dump2	0.23	0.05	---	---	---	---	---
Overburden	1.54	0.36	148.08	0.35	---	---	---
OB Proc	293.44	68.73	35.99	3.56	---	---	---
Train Loop	3.45	0.81	126.11	9.00	---	---	---
Wind Erosion	162.83	38.14	0.00	0.00	---	---	---
Total Emissions	479.82	112.39	373.18	13.99	0.00	0.00	0.00

Source: MacDonald #AQ014

^a PM_{2.5} = PM₁₀ * 0.234 for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: Coal mine emissions in year 2002 come from #AQ14, and are emissions for Antelope Coal Mine, increased by a factor of 1.095 in 2011 & 1.254 in 2020.

**Table J-38. Summary of Output - Alternative A
Total Annual Emissions from Coal Mining Operations - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Coal1	11.55	2.68	66.91	1.14	---	---	---
Coal2	0.36	0.08	2.07	0.04	---	---	---
Dump1	8.17	1.90	---	---	---	---	---
Dump2	0.25	0.06	---	---	---	---	---
Overburden	1.68	0.39	162.14	0.38	---	---	---
OB Proc	321.32	74.55	39.41	3.90	---	---	---
Train Loop	3.78	0.88	138.09	9.86	---	---	---
Wind Erosion	178.29	41.36	0.00	0.00	---	---	---
Total Emissions	525.40	121.89	408.63	15.32	0.00	0.00	0.00

Source: MacDonald #AQ014

^a PM_{2.5} = PM₁₀ * 0.232 for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-39. Summary of Output - Alternative A
Total Annual Emissions from Coal Mining Operations - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Coal1	13.23	3.07	76.63	1.31	---	---	---
Coal2	0.41	0.09	2.37	0.04	---	---	---
Dump1	9.35	2.17	---	---	---	---	---
Dump2	0.29	0.07	---	---	---	---	---
Overburden	1.93	0.45	185.69	0.44	---	---	---
OB Proc	367.98	85.37	45.13	4.47	---	---	---
Train Loop	4.33	1.00	158.14	11.29	---	---	---
Wind Erosion	204.18	47.37	0.00	0.00	---	---	---
Total Emissions	601.69	139.59	467.97	17.55	0.00	0.00	0.00

Source: MacDonald #AQ014

^aPM_{2.5} = PM₁₀ * 0.232 for this source.

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

**Table J-40. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2001**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	172.41	18.97	6.83	---	---	---	---
Unpaved Roads	99.99	14.95	---	---	---	---	---
Commuting Vehicles - Exhaust	0.28	0.25	1.34	0.24	5.96	0.85	0.08
Batch Drop Operations	0.63	0.20	---	---	---	---	---
Heavy Equipment - Dust	21.45	3.22	---	---	---	---	---
Heavy Equipment - Combustive	0.50	0.50	10.40	0.22	3.35	0.84	0.08
Total	295.25	38.08	18.57	0.46	9.31	1.69	0.17

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-41. Summary of Output - Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	172.41	18.97	6.83	---	---	---	---
Unpaved Roads	99.99	14.95	---	---	---	---	---
Commuting Vehicles - Exhaust	0.28	0.25	1.34	0.24	5.96	0.85	0.08
Batch Drop Operations	0.63	0.20	---	---	---	---	---
Heavy Equipment - Dust	21.45	3.22	---	---	---	---	---
Heavy Equipment - Combustive	0.16	0.16	5.00	0.02	1.15	0.33	0.03
Total	294.92	37.74	13.17	0.26	7.10	1.18	0.12

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-42. Summary of Output – Alternative A
Annual Emissions Estimation for Salable Minerals Equipment Usage – Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	172.41	18.97	6.83	---	---	---	---
Unpaved Roads	99.99	14.95	---	---	---	---	---
Commuting Vehicles – Exhaust	0.28	0.25	1.34	0.24	5.96	0.85	0.08
Batch Drop Operations	0.63	0.20	---	---	---	---	---
Heavy Equipment – Dust	21.45	3.22	---	---	---	---	---
Heavy Equipment – Combustive	0.01	0.01	0.35	0.02	0.12	0.16	0.02
Total	294.77	37.59	8.52	0.26	6.08	1.01	0.10

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-43. Summary of Output - Alternative B
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	166.11	18.27	6.58	---	---	---	---
Unpaved Roads	96.34	14.41	---	---	---	---	---
Commuting Vehicles - Exhaust	0.27	0.24	1.29	0.23	5.74	0.81	0.08
Batch Drop Operations	0.60	0.19	---	---	---	---	---
Heavy Equipment - Dust	20.67	3.10	---	---	---	---	---
Heavy Equipment - Combustive	0.16	0.16	4.82	0.02	1.10	0.32	0.03
Total	284.14	36.36	12.69	0.25	6.84	1.14	0.11

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-44. Summary of Output - Alternative B
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	166.11	18.27	6.58	---	---	---	---
Unpaved Roads	96.34	14.41	---	---	---	---	---
Commuting Vehicles - Exhaust	0.27	0.24	1.29	0.23	5.74	0.81	0.08
Batch Drop Operations	0.60	0.19	---	---	---	---	---
Heavy Equipment - Dust	20.67	3.10	---	---	---	---	---
Heavy Equipment - Combustive	0.01	0.01	0.33	0.02	0.11	0.16	0.02
Total	284.00	36.22	8.21	0.25	5.85	0.97	0.10

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-45. Summary of Output - Alternative C
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	209.39	23.03	8.30	---	---	---	---
Unpaved Roads	121.44	18.16	---	---	---	---	---
Commuting Vehicles - Exhaust	0.33	0.30	1.63	0.29	7.24	1.03	0.10
Batch Drop Operations	0.76	0.24	---	---	---	---	---
Heavy Equipment - Dust	25.74	3.86	---	---	---	---	---
Heavy Equipment - Combustive	0.20	0.20	6.07	0.03	1.39	0.40	0.04
Total	357.87	45.79	16.00	0.32	8.63	1.43	0.14

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-46. Summary of Output - Alternative C
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	209.39	23.03	8.30	---	---	---	---
Unpaved Roads	121.44	18.16	---	---	---	---	---
Commuting Vehicles - Exhaust	0.33	0.30	1.63	0.29	7.24	1.03	0.10
Batch Drop Operations	0.76	0.24	---	---	---	---	---
Heavy Equipment - Dust	25.74	3.86	---	---	---	---	---
Heavy Equipment - Combustive	0.02	0.02	0.42	0.03	0.14	0.20	0.02
Total	357.69	45.61	10.35	0.32	7.38	1.22	0.12

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-47. Summary of Output - Alternative D
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	292.30	32.15	11.58	---	---	---	---
Unpaved Roads	169.53	25.35	---	---	---	---	---
Commuting Vehicles - Exhaust	0.47	0.42	2.27	0.40	10.10	1.43	0.14
Batch Drop Operations	1.06	0.33	---	---	---	---	---
Heavy Equipment - Dust	36.27	5.44	---	---	---	---	---
Heavy Equipment - Combustive	0.27	0.27	8.48	0.04	1.94	0.56	0.06
Total	499.90	63.98	22.33	0.45	12.04	2.00	0.20

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-48. Summary of Output - Alternative D
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	292.30	32.15	11.58	---	---	---	---
Unpaved Roads	169.53	25.35	---	---	---	---	---
Commuting Vehicles - Exhaust	0.47	0.42	2.27	0.40	10.10	1.43	0.14
Batch Drop Operations	1.06	0.33	---	---	---	---	---
Heavy Equipment - Dust	36.27	5.44	---	---	---	---	---
Heavy Equipment - Combustive	0.02	0.02	0.59	0.04	0.20	0.27	0.03
Total	499.65	63.72	14.44	0.45	10.30	1.71	0.17

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-49. Summary of Output - Alternative E (Preferred Alternative)
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	215.70	23.73	8.55	---	---	---	---
Unpaved Roads	125.10	18.71	---	---	---	---	---
Commuting Vehicles - Exhaust	0.34	0.31	1.68	0.30	7.45	1.06	0.11
Batch Drop Operations	0.78	0.25	---	---	---	---	---
Heavy Equipment - Dust	26.52	3.98	---	---	---	---	---
Heavy Equipment - Combustive	0.20	0.20	6.26	0.03	1.43	0.42	0.04
Total	368.65	47.17	16.48	0.33	8.89	1.47	0.15

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-50. Summary of Output - Alternative E (Preferred Alternative)
Annual Emissions Estimation for Salable Minerals Equipment Usage - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5} ^a	NO _x	SO ₂	CO	VOC	HAPs ^b
Sand Handling, Transfer, and Storage	215.70	23.73	8.55	---	---	---	---
Unpaved Roads	125.10	18.71	---	---	---	---	---
Commuting Vehicles - Exhaust	0.34	0.31	1.68	0.30	7.45	1.06	0.11
Batch Drop Operations	0.78	0.25	---	---	---	---	---
Heavy Equipment - Dust	26.52	3.98	---	---	---	---	---
Heavy Equipment - Combustive	0.02	0.02	0.43	0.03	0.15	0.20	0.02
Total	368.47	46.99	10.66	0.33	7.60	1.26	0.13

^a Emission factor for PM_{2.5} = PM₁₀ for combustive emissions.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-51. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy Development - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	75.98	11.40	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.05	0.05	1.43	0.01	0.32	0.07	0.01
Subtotal: Heavy Equipment	76.03	11.44	1.43	0.01	0.32	0.07	0.01
Commuting Vehicles - Fugitive Dust	12.45	1.86	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.07	0.06	0.29	0.06	0.86	0.17	0.02
Subtotal: Commuting Vehicles	12.51	1.92	0.29	0.06	0.86	0.17	0.02
Total	88.54	13.37	1.72	0.06	1.18	0.24	0.02

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-52. Summary of Output - Alternative A
Total Annual Emissions from Renewable Energy Development - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	---	---	---	---	---	---	---
Subtotal: Heavy Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	---	---	---	---	---	---	---
Subtotal: Commuting Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-53. Summary of Output - Alternative B
Total Annual Emissions from Renewable Energy Development - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	0.00	0.00	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.00	0.00	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Commuting Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-54. Summary of Output - Alternative B
Total Annual Emissions from Renewable Energy Development - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	---	---	---	---	---	---	---
Subtotal: Heavy Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	---	---	---	---	---	---	---
Subtotal: Commuting Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-55. Summary of Output - Alternative C
Total Annual Emissions from Renewable Energy Development - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	75.98	11.40	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.05	0.05	1.43	0.01	0.32	0.07	0.01
Subtotal: Heavy Equipment	76.03	11.44	1.43	0.01	0.32	0.07	0.01
Commuting Vehicles - Fugitive Dust	12.45	1.86	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.07	0.06	0.29	0.06	0.86	0.17	0.02
Subtotal: Commuting Vehicles	12.51	1.92	0.29	0.06	0.86	0.17	0.02
Total	88.54	13.37	1.72	0.06	1.18	0.24	0.02

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-56. Summary of Output - Alternative C
Total Annual Emissions from Renewable Energy Development - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	---	---	---	---	---	---	---
Subtotal: Heavy Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	---	---	---	---	---	---	---
Subtotal: Commuting Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-57. Summary of Output - Alternative D
Total Annual Emissions from Renewable Energy Development - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	75.98	11.40	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.05	0.05	1.43	0.01	0.32	0.07	0.01
Subtotal: Heavy Equipment	76.03	11.44	1.43	0.01	0.32	0.07	0.01
Commuting Vehicles - Fugitive Dust	12.45	1.86	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.07	0.06	0.29	0.06	0.86	0.17	0.02
Subtotal: Commuting Vehicles	12.51	1.92	0.29	0.06	0.86	0.17	0.02
Total	88.54	13.37	1.72	0.06	1.18	0.24	0.02

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-58. Summary of Output - Alternative D
Total Annual Emissions from Renewable Energy Development - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	---	---	---	---	---	---	---
Subtotal: Heavy Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	---	---	---	---	---	---	---
Subtotal: Commuting Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-59. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Renewable Energy Development - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	75.98	11.40	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.05	0.05	1.43	0.01	0.32	0.07	0.01
Subtotal: Heavy Equipment	76.03	11.44	1.43	0.01	0.32	0.07	0.01
Commuting Vehicles - Fugitive Dust	12.45	1.86	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.07	0.06	0.29	0.06	0.86	0.17	0.02
Subtotal: Commuting Vehicles	12.51	1.92	0.29	0.06	0.86	0.17	0.02
Total	88.54	13.37	1.72	0.06	1.18	0.24	0.02

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-60. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Renewable Energy Development - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	---	---	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	---	---	---	---	---	---	---
Subtotal: Heavy Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	---	---	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	---	---	---	---	---	---	---
Subtotal: Commuting Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Note: The one activity is assigned to Year 2011 for analysis purposes.

**Table J-61. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2001**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.06	0.06	1.12	0.02	0.37	0.09	0.01
Subtotal: Heavy Equipment	9.75	1.51	1.12	0.02	0.37	0.09	0.01
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.44	1.77	1.19	0.04	0.56	0.13	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-62. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.56	0.00	0.15	0.03	0.00
Subtotal: Heavy Equipment	9.71	1.47	0.56	0.00	0.15	0.03	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.40	1.74	0.62	0.02	0.34	0.07	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-63. Summary of Output - Alternative A
Total Annual Emissions from Livestock Grazing Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.04	0.00	0.01	0.02	0.00
Subtotal: Heavy Equipment	9.70	1.46	0.04	0.00	0.01	0.02	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.39	1.72	0.10	0.02	0.21	0.06	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-64. Summary of Output - Alternative B
Total Annual Emissions from Livestock Grazing Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.56	0.00	0.15	0.03	0.00
Subtotal: Heavy Equipment	9.71	1.47	0.56	0.00	0.15	0.03	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.40	1.74	0.62	0.02	0.34	0.07	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-65. Summary of Output - Alternative B
Total Annual Emissions from Livestock Grazing Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.04	0.00	0.01	0.02	0.00
Subtotal: Heavy Equipment	9.70	1.46	0.04	0.00	0.01	0.02	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.39	1.72	0.10	0.02	0.21	0.06	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-66. Summary of Output - Alternative C
Total Annual Emissions from Livestock Grazing Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.56	0.00	0.15	0.03	0.00
Subtotal: Heavy Equipment	9.71	1.47	0.56	0.00	0.15	0.03	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.40	1.74	0.62	0.02	0.34	0.07	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-67. Summary of Output - Alternative C
Total Annual Emissions from Livestock Grazing Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.04	0.00	0.01	0.02	0.00
Subtotal: Heavy Equipment	9.70	1.46	0.04	0.00	0.01	0.02	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.39	1.72	0.10	0.02	0.21	0.06	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-68. Summary of Output - Alternative D
Total Annual Emissions from Livestock Grazing Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.56	0.00	0.15	0.03	0.00
Subtotal: Heavy Equipment	9.71	1.47	0.56	0.00	0.15	0.03	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.40	1.74	0.62	0.02	0.34	0.07	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-69. Summary of Output - Alternative D
Total Annual Emissions from Livestock Grazing Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.04	0.00	0.01	0.02	0.00
Subtotal: Heavy Equipment	9.70	1.46	0.04	0.00	0.01	0.02	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.39	1.72	0.10	0.02	0.21	0.06	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-70. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Livestock Grazing Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.56	0.00	0.15	0.03	0.00
Subtotal: Heavy Equipment	9.71	1.47	0.56	0.00	0.15	0.03	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.40	1.74	0.62	0.02	0.34	0.07	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-71. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Livestock Grazing Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	9.70	1.45	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.04	0.00	0.01	0.02	0.00
Subtotal: Heavy Equipment	9.70	1.46	0.04	0.00	0.01	0.02	0.00
Commuting Vehicles - Fugitive Dust	1.67	0.25	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.01	0.01	0.06	0.01	0.19	0.04	0.00
Subtotal: Commuting Vehicles	1.69	0.26	0.06	0.01	0.19	0.04	0.00
Total	11.39	1.72	0.10	0.02	0.21	0.06	0.01

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-72. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Projects - Year 2001**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.01	0.01	0.28	0.01	0.09	0.02	0.00
Subtotal: Heavy Equipment	0.27	0.05	0.28	0.01	0.09	0.02	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.16	0.19	0.29	0.01	0.14	0.03	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-73. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.01	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.15	0.17	0.02	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-74. Summary of Output - Alternative A
Total Annual Emissions from Vegetation Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.14	0.17	0.01	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-75. Summary of Output - Alternative B
Total Annual Emissions from Vegetation Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.01	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.15	0.17	0.02	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-76. Summary of Output - Alternative B
Total Annual Emissions from Vegetation Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.14	0.17	0.01	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-77. Summary of Output - Alternative C
Total Annual Emissions from Vegetation Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.01	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.15	0.17	0.02	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-78. Summary of Output - Alternative C
Total Annual Emissions from Vegetation Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.14	0.17	0.01	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-79. Summary of Output - Alternative D
Total Annual Emissions from Vegetation Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.01	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.15	0.17	0.02	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-80. Summary of Output - Alternative D
Total Annual Emissions from Vegetation Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.14	0.17	0.01	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-81. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Vegetation Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.01	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.15	0.17	0.02	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-82. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Vegetation Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	0.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal: Heavy Equipment	0.26	0.04	0.00	0.00	0.00	0.00	0.00
Commuting Vehicles - Fugitive Dust	0.88	0.13	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.00	0.00	0.01	0.00	0.05	0.01	0.00
Subtotal: Commuting Vehicles	0.88	0.13	0.01	0.00	0.05	0.01	0.00
Total	1.14	0.17	0.01	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-83. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.50	0.00	0.93	0.31	0.03
Subtotal: Heavy Equipment	20.29	0.07	0.50	0.00	0.93	0.31	0.03
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.76	0.78	0.68	0.04	1.58	0.61	0.06

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-84. Summary of Output - Alternative A
Total Annual Emissions from Fire Management Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.03	0.00	0.68	0.13	0.01
Subtotal: Heavy Equipment	20.28	0.06	0.03	0.00	0.68	0.13	0.01
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.74	0.76	0.21	0.04	1.33	0.43	0.04

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-85. Summary of Output - Alternative B
Total Annual Emissions from Fire Management Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.50	0.00	0.93	0.31	0.03
Subtotal: Heavy Equipment	20.29	0.07	0.50	0.00	0.93	0.31	0.03
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.76	0.78	0.68	0.04	1.58	0.61	0.06

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-86. Summary of Output - Alternative B
Total Annual Emissions from Fire Management Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.03	0.00	0.68	0.13	0.01
Subtotal: Heavy Equipment	20.28	0.06	0.03	0.00	0.68	0.13	0.01
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.74	0.76	0.21	0.04	1.33	0.43	0.04

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-87. Summary of Output - Alternative C
Total Annual Emissions from Fire Management Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.50	0.00	0.93	0.31	0.03
Subtotal: Heavy Equipment	20.29	0.07	0.50	0.00	0.93	0.31	0.03
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.76	0.78	0.68	0.04	1.58	0.61	0.06

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-88. Summary of Output - Alternative C
Total Annual Emissions from Fire Management Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.03	0.00	0.68	0.13	0.01
Subtotal: Heavy Equipment	20.28	0.06	0.03	0.00	0.68	0.13	0.01
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.74	0.76	0.21	0.04	1.33	0.43	0.04

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-89. Summary of Output - Alternative D
Total Annual Emissions from Fire Management Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.50	0.00	0.93	0.31	0.03
Subtotal: Heavy Equipment	20.29	0.07	0.50	0.00	0.93	0.31	0.03
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.76	0.78	0.68	0.04	1.58	0.61	0.06

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-90. Summary of Output - Alternative D
Total Annual Emissions from Fire Management Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.03	0.00	0.68	0.13	0.01
Subtotal: Heavy Equipment	20.28	0.06	0.03	0.00	0.68	0.13	0.01
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.74	0.76	0.21	0.04	1.33	0.43	0.04

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-91. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Fire Management Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.50	0.00	0.93	0.31	0.03
Subtotal: Heavy Equipment	20.29	0.07	0.50	0.00	0.93	0.31	0.03
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.76	0.78	0.68	0.04	1.58	0.61	0.06

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-92. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Fire Management Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	20.26	0.04	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.03	0.00	0.68	0.13	0.01
Subtotal: Heavy Equipment	20.28	0.06	0.03	0.00	0.68	0.13	0.01
Commuting Vehicles - Fugitive Dust	4.42	0.66	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.05	0.05	0.17	0.03	0.64	0.30	0.03
Subtotal: Commuting Vehicles	4.46	0.71	0.17	0.03	0.64	0.30	0.03
Total	24.74	0.76	0.21	0.04	1.33	0.43	0.04

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-93. Summary of Output - Alternative A
Total Annual Emissions from Forest and Woodlands Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	19.14	2.87	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.14	0.00	1.01	0.34	0.03
Subtotal: Heavy Equipment	19.16	2.90	0.14	0.00	1.01	0.34	0.03
Commuting Vehicles - Fugitive Dust	3.14	0.47	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.03	0.03	0.11	0.02	0.26	0.08	0.01
Subtotal: Commuting Vehicles	3.17	0.49	0.11	0.02	0.26	0.08	0.01
Total	22.33	3.39	0.25	0.02	1.28	0.42	0.04

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-94. Summary of Output - Alternative A
Total Annual Emissions from Forest and Woodlands Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	19.14	2.87	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.02	0.00	0.79	0.14	0.01
Subtotal: Heavy Equipment	19.16	2.89	0.02	0.00	0.79	0.14	0.01
Commuting Vehicles - Fugitive Dust	3.14	0.47	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.03	0.03	0.11	0.02	0.26	0.08	0.01
Subtotal: Commuting Vehicles	3.17	0.49	0.11	0.02	0.26	0.08	0.01
Total	22.32	3.39	0.14	0.02	1.06	0.21	0.02

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-95. Summary of Output - Alternative B
Total Annual Emissions from Forest and Woodlands Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	12.64	1.90	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.14	0.00	1.01	0.34	0.03
Subtotal: Heavy Equipment	12.66	1.92	0.14	0.00	1.01	0.34	0.03
Commuting Vehicles - Fugitive Dust	1.98	0.30	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.07	0.01	0.17	0.05	0.00
Subtotal: Commuting Vehicles	2.00	0.31	0.07	0.01	0.17	0.05	0.00
Total	14.66	2.23	0.21	0.01	1.18	0.39	0.04

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-96. Summary of Output - Alternative B
Total Annual Emissions from Forest and Woodlands Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	12.64	1.90	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.02	0.00	0.79	0.14	0.01
Subtotal: Heavy Equipment	12.66	1.92	0.02	0.00	0.79	0.14	0.01
Commuting Vehicles - Fugitive Dust	1.98	0.30	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.02	0.02	0.07	0.01	0.17	0.05	0.00
Subtotal: Commuting Vehicles	2.00	0.31	0.07	0.01	0.17	0.05	0.00
Total	14.66	2.23	0.09	0.01	0.96	0.19	0.02

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-97. Summary of Output - Alternative C
Total Annual Emissions from Forest and Woodlands Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	33.96	5.09	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.14	0.00	1.01	0.34	0.03
Subtotal: Heavy Equipment	33.98	5.12	0.14	0.00	1.01	0.34	0.03
Commuting Vehicles - Fugitive Dust	5.28	0.79	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.04	0.18	0.04	0.43	0.12	0.01
Subtotal: Commuting Vehicles	5.32	0.83	0.18	0.04	0.43	0.12	0.01
Total	39.31	5.95	0.32	0.04	1.44	0.46	0.05

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-98. Summary of Output - Alternative C
Total Annual Emissions from Forest and Woodlands Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	33.96	5.09	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.02	0.00	0.79	0.14	0.01
Subtotal: Heavy Equipment	33.98	5.12	0.02	0.00	0.79	0.14	0.01
Commuting Vehicles - Fugitive Dust	5.28	0.79	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.04	0.18	0.04	0.43	0.12	0.01
Subtotal: Commuting Vehicles	5.32	0.83	0.18	0.04	0.43	0.12	0.01
Total	39.30	5.95	0.20	0.04	1.23	0.26	0.03

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-99. Summary of Output - Alternative D
Total Annual Emissions from Forest and Woodlands Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	45.92	6.89	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.14	0.00	1.01	0.34	0.03
Subtotal: Heavy Equipment	45.94	6.91	0.14	0.00	1.01	0.34	0.03
Commuting Vehicles - Fugitive Dust	7.33	1.10	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.06	0.05	0.24	0.05	0.59	0.15	0.02
Subtotal: Commuting Vehicles	7.39	1.15	0.24	0.05	0.59	0.15	0.02
Total	53.33	8.06	0.38	0.05	1.60	0.50	0.05

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-100. Summary of Output - Alternative D
Total Annual Emissions from Forest and Woodlands Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	45.92	6.89	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.02	0.00	0.79	0.14	0.01
Subtotal: Heavy Equipment	45.94	6.91	0.02	0.00	0.79	0.14	0.01
Commuting Vehicles - Fugitive Dust	7.33	1.10	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.06	0.05	0.24	0.05	0.59	0.15	0.02
Subtotal: Commuting Vehicles	7.39	1.15	0.24	0.05	0.59	0.15	0.02
Total	53.32	8.06	0.27	0.05	1.38	0.29	0.03

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-101. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Forest and Woodlands Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	33.96	5.09	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.14	0.00	1.01	0.34	0.03
Subtotal: Heavy Equipment	33.98	5.12	0.14	0.00	1.01	0.34	0.03
Commuting Vehicles - Fugitive Dust	5.28	0.79	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.04	0.18	0.04	0.43	0.12	0.01
Subtotal: Commuting Vehicles	5.32	0.83	0.18	0.04	0.43	0.12	0.01
Total	39.31	5.95	0.32	0.04	1.44	0.46	0.05

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-102. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Forest and Woodlands Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	33.96	5.09	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.02	0.02	0.02	0.00	0.79	0.14	0.01
Subtotal: Heavy Equipment	33.98	5.12	0.02	0.00	0.79	0.14	0.01
Commuting Vehicles - Fugitive Dust	5.28	0.79	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.04	0.04	0.18	0.04	0.43	0.12	0.01
Subtotal: Commuting Vehicles	5.32	0.83	0.18	0.04	0.43	0.12	0.01
Total	39.30	5.95	0.20	0.04	1.23	0.26	0.03

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-103. Summary of Output - Alternative A
Summary of ROWs and Corridors Emissions - Year 2001**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	2.59	0.39	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.41	0.41	8.12	0.18	2.68	0.68	0.07
Subtotal: Heavy Equipment	3.00	0.80	8.12	0.18	2.68	0.68	0.07
Commuting Vehicles - Fugitive Dust	14.97	2.24	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.85	1.70	7.87	1.55	19.59	4.72	0.47
Subtotal: Commuting Vehicles	16.82	3.94	7.87	1.55	19.59	4.72	0.47
Total	19.82	4.74	15.99	1.72	22.27	5.40	0.54

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-104. Summary of Output - Alternative A
Summary of ROWs and Corridors Emissions - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	2.59	0.39	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.15	0.15	4.14	0.02	0.90	0.25	0.02
Subtotal: Heavy Equipment	2.74	0.54	4.14	0.02	0.90	0.25	0.02
Commuting Vehicles - Fugitive Dust	14.97	2.24	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.85	1.70	7.87	1.55	19.59	4.72	0.47
Subtotal: Commuting Vehicles	16.82	3.94	7.87	1.55	19.59	4.72	0.47
Total	19.56	4.48	12.01	1.57	20.49	4.97	0.50

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-105. Summary of Output - Alternative A
Summary of ROWs and Corridors Emissions - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	2.59	0.39	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.01	0.01	0.35	0.02	0.09	0.13	0.01
Subtotal: Heavy Equipment	2.60	0.40	0.35	0.02	0.09	0.13	0.01
Commuting Vehicles - Fugitive Dust	14.97	2.24	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.85	1.70	7.87	1.55	19.59	4.72	0.47
Subtotal: Commuting Vehicles	16.82	3.94	7.87	1.55	19.59	4.72	0.47
Total	19.42	4.34	8.22	1.57	19.68	4.85	0.49

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-106. Summary of Output - Alternative B
Summary of ROWs and Corridors Emissions - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	0.49	0.07	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.03	0.03	0.79	0.00	0.17	0.05	0.00
Subtotal: Heavy Equipment	0.52	0.10	0.79	0.00	0.17	0.05	0.00
Commuting Vehicles - Fugitive Dust	2.84	0.43	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.35	0.32	1.50	0.29	3.72	0.90	0.09
Subtotal: Commuting Vehicles	3.20	0.75	1.50	0.29	3.72	0.90	0.09
Total	3.72	0.85	2.28	0.30	3.89	0.94	0.09

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-107. Summary of Output - Alternative B
Summary of ROWs and Corridors Emissions - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	0.49	0.07	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.00	0.00	0.07	0.00	0.02	0.02	0.00
Subtotal: Heavy Equipment	0.49	0.08	0.07	0.00	0.02	0.02	0.00
Commuting Vehicles - Fugitive Dust	2.84	0.43	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	0.35	0.32	1.50	0.29	3.72	0.90	0.09
Subtotal: Commuting Vehicles	3.20	0.75	1.50	0.29	3.72	0.90	0.09
Total	3.69	0.82	1.56	0.30	3.74	0.92	0.09

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-108. Summary of Output - Alternative C
Summary of ROWs and Corridors Emissions - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	2.38	0.36	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.14	0.14	3.81	0.02	0.83	0.23	0.02
Subtotal: Heavy Equipment	2.52	0.49	3.81	0.02	0.83	0.23	0.02
Commuting Vehicles - Fugitive Dust	13.77	2.06	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.70	1.57	7.24	1.42	18.02	4.35	0.43
Subtotal: Commuting Vehicles	15.48	3.63	7.24	1.42	18.02	4.35	0.43
Total	17.99	4.12	11.05	1.44	18.85	4.58	0.46

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-109. Summary of Output - Alternative C
Summary of ROWs and Corridors Emissions - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	2.38	0.36	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.01	0.01	0.32	0.02	0.08	0.12	0.01
Subtotal: Heavy Equipment	2.39	0.37	0.32	0.02	0.08	0.12	0.01
Commuting Vehicles - Fugitive Dust	13.77	2.06	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.70	1.57	7.24	1.42	18.02	4.35	0.43
Subtotal: Commuting Vehicles	15.48	3.63	7.24	1.42	18.02	4.35	0.43
Total	17.87	3.99	7.56	1.44	18.10	4.46	0.45

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-110. Summary of Output - Alternative D
Summary of ROWs and Corridors Emissions - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	2.61	0.39	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.15	0.15	4.18	0.02	0.91	0.25	0.03
Subtotal: Heavy Equipment	2.76	0.54	4.18	0.02	0.91	0.25	0.03
Commuting Vehicles - Fugitive Dust	15.12	2.26	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.87	1.72	7.95	1.56	19.78	4.77	0.48
Subtotal: Commuting Vehicles	16.99	3.98	7.95	1.56	19.78	4.77	0.48
Total	19.76	4.52	12.13	1.58	20.70	5.02	0.50

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-111. Summary of Output - Alternative D
Summary of ROWs and Corridors Emissions - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	2.61	0.39	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.01	0.01	0.35	0.02	0.09	0.13	0.01
Subtotal: Heavy Equipment	2.62	0.40	0.35	0.02	0.09	0.13	0.01
Commuting Vehicles - Fugitive Dust	15.12	2.26	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.87	1.72	7.95	1.56	19.78	4.77	0.48
Subtotal: Commuting Vehicles	16.99	3.98	7.95	1.56	19.78	4.77	0.48
Total	19.62	4.38	8.30	1.58	19.88	4.90	0.49

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-112. Summary of Output - Alternative E (Preferred Alternative)
Summary of ROWs and Corridors Emissions - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Heavy Equipment - Fugitive Dust	2.59	0.39	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.15	0.15	4.14	0.02	0.90	0.25	0.02
Subtotal: Heavy Equipment	2.74	0.54	4.14	0.02	0.90	0.25	0.02
Commuting Vehicles - Fugitive Dust	14.97	2.24	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.85	1.70	7.87	1.55	19.59	4.72	0.47
Subtotal: Commuting Vehicles	16.82	3.94	7.87	1.55	19.59	4.72	0.47
Total	19.56	4.48	12.01	1.57	20.49	4.97	0.50

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-113. Summary of Output - Alternative E (Preferred Alternative)
Summary of ROWs and Corridors Emissions - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Fugitive Dust	2.59	0.39	---	---	---	---	---
Heavy Equipment - Vehicle Exhaust ^a	0.01	0.01	0.35	0.02	0.09	0.13	0.01
Subtotal: Heavy Equipment	2.60	0.40	0.35	0.02	0.09	0.13	0.01
Commuting Vehicles - Fugitive Dust	14.97	2.24	---	---	---	---	---
Commuting Vehicles - Vehicle Exhaust	1.85	1.70	7.87	1.55	19.59	4.72	0.47
Subtotal: Commuting Vehicles	16.82	3.94	7.87	1.55	19.59	4.72	0.47
Total	19.42	4.34	8.22	1.57	19.68	4.85	0.49

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

Table J-114. Total of All OHV Emissions

Year	Emissions (Tons/Year)				
	Hydro-carbons (HC)	Carbon Monoxide (CO)	Nitrogen Oxides (NO _x)	Particulate Matter (PM)	HAPs ^a
2000	229.98	427.44	2.94	7.00	23.00
2005	348.80	956.41	4.47	11.18	34.88
2010	449.97	1,201.68	6.29	14.76	45.00
2020	543.49	1,482.84	8.35	17.76	54.35

^a Hazardous air pollutants; assumed equal to HC * 0.10.

**Table J-115. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2001**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.01	0.01	0.16	0.00	0.05	0.01	0.00
Total	1.37	0.15	0.16	0.00	0.05	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-116. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.08	0.00	0.02	0.01	0.00
Total	1.36	0.15	0.08	0.00	0.02	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-117. Summary of Output - Alternative A
Total Annual Emissions from Road Maintenance Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Total	1.36	0.15	0.01	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-118. Summary of Output - Alternative B
Total Annual Emissions from Road Maintenance Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.08	0.00	0.02	0.01	0.00
Total	1.36	0.15	0.08	0.00	0.02	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-119. Summary of Output - Alternative B
Total Annual Emissions from Road Maintenance Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Total	1.36	0.15	0.01	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-120. Summary of Output - Alternative C
Total Annual Emissions from Road Maintenance Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	0.94	0.10	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.05	0.00	0.01	0.00	0.00
Total	0.95	0.10	0.05	0.00	0.01	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-121. Summary of Output - Alternative C
Total Annual Emissions from Road Maintenance Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	0.94	0.10	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.94	0.10	0.00	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-122. Summary of Output - Alternative D
Total Annual Emissions from Road Maintenance Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.08	0.00	0.02	0.01	0.00
Total	1.36	0.15	0.08	0.00	0.02	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-123. Summary of Output - Alternative D
Total Annual Emissions from Road Maintenance Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Total	1.36	0.15	0.01	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-124. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Road Maintenance Projects - Year 2011**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.08	0.00	0.02	0.01	0.00
Total	1.36	0.15	0.08	0.00	0.02	0.01	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

**Table J-125. Summary of Output - Alternative E (Preferred Alternative)
Total Annual Emissions from Road Maintenance Projects - Year 2020**

Activity	Annual Emissions (Tons)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs ^b
Road Maintenance - Fugitive Dust	1.36	0.15	---	---	---	---	---
Road Maintenance - Combustive Emissions ^a	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Total	1.36	0.15	0.01	0.00	0.00	0.00	0.00

^a PM_{2.5} assumed = PM₁₀ for this source.

^b HAPs = Hazardous Air Pollutants; assumed = VOCs * 0.1

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