

FINAL

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**FUGITIVE DUST EMISSIONS PLAN
FOR EIELSON AIR FORCE BASE**

August 2001

Prepared For:

**Air Force Center For Environmental Excellence
Alaska Field Office**

and

**Eielson Air Force Base, Alaska
Contract No. F41624-00-D-8024
Task Order 0035**

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ABBREVIATIONS AND ACRONYMS

°F	Degree Fahrenheit
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
Ave.	average
CAA	Clean Air Act
CAFO	Consent Agreement and Final Order
CES/CEV	Civil Engineering Squadron/Civil Engineering Flight
CH&PP	Central Heat and Power Plant
EPA	Environmental Protection Agency
FDEP	Fugitive Dust Emissions Plan
GOV	government-owned vehicle
Hwy	highway
kph	kilometers per hour
Max.	maximum
Min.	minimum
mos.	Months
O&M	operation and maintenance
Parsons	Parsons Engineering Science, Inc.
POV	privately-owned vehicle
Precip.	precipitation
SCAQMD	South Coast Air Quality Management District
SEPs	Supplemental Environmental Projects
sq.	Square
Temp.	Temperature
yr	year

SECTION 1

INTRODUCTION

This Fugitive Dust Emissions Plan (FDEP) has been prepared by Parsons Engineering Science, Inc. (Parsons) under contract number F41624-00-D-8024, Task Order 0035 for the Air Force Center for Environmental Excellence (AFCEE) – Alaska Field Office and Eielson Air Force Base (AFB) to address current operations conducted at the installation that are sources of fugitive dust emissions. The focus of this plan is to provide mitigation and control measures that will reduce or mitigate the amount of particulate matter entrained in the ambient air as a result of anthropogenic (non-natural) fugitive dust sources.

Background information, including the description of current operations, sources of fugitive dust emissions, and dust mitigation and control measures are presented in the following sections. The scope of this plan has been enhanced to include an installation-wide strategy for paving dirt and gravel roads, grounds-keeping practices, construction practices, and street sweeping operations.

This FDEP includes three sections and three appendices, as follows:

- Section 1.0 provides background information including the Base location information, consent agreement and final order information, and climate discussion.
- Section 2.0 contains a description of installation operations and sources of fugitive dust emissions on the Base.
- Section 3.0 summarizes control and mitigation measures to be used by the Base.
- Appendix A contains a FDEP Checklist.
- Appendix B contains a cost analysis for identified options for treatment of unpaved road/parking areas to reduce or mitigate fugitive dust emissions.
- Appendix C contains the Eielson AFB Street Sweeper Operations and Maintenance (O&M) Manual.

1.1 BACKGROUND

Eielson AFB is located in Fairbanks North Star Borough of Central Alaska, approximately 24 miles southeast of Fairbanks and 10 miles southeast of the city of North Pole along Richardson Highway (Figure 1). The Base covers approximately 19,790

acres, of which approximately 3,650 acres are fully or partially developed. Eielson AFB is located in a relatively undeveloped area. The Base is bounded on the east and the south by Fort Wainwright, a U.S. Army Installation, and on the west and north by private and public land.

Residential and occupational populations are concentrated in the developed portion of the Base. The area is active with ongoing installation operations (including aircraft maintenance and operations, runway and associated facilities, munitions storage, and administrative offices), work, school, and recreational activities. The Base has three elementary schools and one junior-senior high school. There are two childcare centers, a youth center, a community center, and one medical and dental clinic.

1.2 CONSENT AGREEMENT AND FINAL ORDER

On April 9, 2001, a Consent Agreement and Final Order (CAFO) was issued to Eielson AFB by the United States Environmental Protection Agency (EPA) under the authority of Section 113(d) of the Clean Air Act (CAA), 42 U.S.C. § 7413(d). As specified in the CAFO, Eielson AFB is required to perform Supplemental Environmental Projects (SEPs), as follows:

- a. Installation FDEP - conduct a study of fugitive emissions on Eielson AFB and prepare a FDEP designed to control fugitive emissions on the installation; and
- b. Upgrade Street Sweepers – replace the current most mechanically inefficient street sweeper with a new one; retrofit the existing four remaining street sweepers with new equipment that will bring the Air Force into compliance with the most stringent existing U.S. standards for street sweepers; and train appropriate personnel to operate the new street sweeping equipment.

On June 6 through 12, 2001, a field study was performed at Eielson AFB that entailed site visual inspections of the Base areas of concern for fugitive emissions and Base personnel interviews. In addition, information was obtained on the current street sweeping practices and equipment.

This FDEP was prepared to comply with the requirements of the CAFO, Section IV, Item 4.1, for the completion of the SEPs.

1.3 ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION AIR QUALITY CONTROL REQUIREMENTS

Alaska Department of Environmental Conservation (ADEC) Air Quality Control Regulations are provided under Title 18 Alaska Administrative Code (AAC) Chapter 50. Fugitive dust control requirements are stated under 18 AAC 50.045(d) and require an industrial activity or construction project to take reasonable precautions to prevent particulate matter from being emitted into the ambient air.

The Eielson AFB Central Heat and Power Plant (CH&PP) operates under ADEC Air Quality Permit No. 9331-AA001. Standard Conditions B.5 of the permit requires the control of fugitive dust release from material piles and roadways, and coal and ash handling and transport systems.

This FDEP was prepared to comply with the fugitive dust control requirements of 18 AAC 50.045(d) and the ADEC Air Quality Permit No. 9331-AA001.

1.4 CLIMATE

The interior of Alaska has a sub arctic climate. Weather monitoring instruments are located adjacent to the Airfield Operations building on the Eielson AFB runway. The climatic conditions are characterized by low annual precipitation and large differences between summer and winter temperatures. The average annual precipitation at Eielson AFB is 13.3 inches, and approximately 58 percent of the annual precipitation occurs during the warmer months of June through September. The average annual snowfall is 73 inches. The average growing season lasts about 89 days. Table 1 shows the average monthly temperatures, precipitations, humidity, and wind data recorded by the weather station at Eielson AFB.

TABLE 1
MEAN CLIMATIC CONDITIONS
FDEP
EIELSON AFB, ALASKA

Month	Temperature ¹			Precipitation		Relative Humidity	Wind ⁴	
	Mean Daily Min. (°F)	Mean Daily Temp. (°F)	Mean Daily Max. (°F)	Mean Precip. ¹ (inches)	Mean Snowfall ² (inches)	Mean ³ (%)	Mean Speed (kph)	Prevailing Direction
January	-19	-11	-2	0.75	11.4	70	1	North
February	-15	-4	6	0.57	8.2	65	1	North
March	-3	10	23	0.51	7.2	58	2	North
April	19	30	40	0.43	5.0	53	3	North
May	37	48	58	0.74	1.0	52	4	North Northeast
June	48	59	69	1.67	Trace	57	3	North Northeast
July	51	61	71	2.37	0	64	3	North Northeast
August	46	56	66	2.27	Trace	69	3	North Northeast
September	35	45	54	1.38	2.4	66	3	North
October	17	24	32	0.98	11.6	70	2	North Northeast
November	-5	2	10	0.78	13.8	69	1	North
December	-16	-9	-1	0.76	12.8	71	1	North
Annual	16	26	35	13.31	73.5	64	2	North

Source: Eielson AFB Air Weather Service.

°F = degrees Fahrenheit

% = percent

kph = kilometers per hour

1. Temperature and rainfall data averaged over 50 years of record.

2. Snowfall data averaged over 48 years.

3. Numbers are averaged from humidity sensors in two different locations on Eielson AFB.

4. Wind data averaged over 10 years.

SECTION 2

DESCRIPTION OF INSTALLATION OPERATIONS AND SOURCES OF FUGITIVE DUST EMISSIONS

This section describes the current operations of the installation that are potential sources of fugitive dust emissions at Eielson AFB. The major sources of fugitive dust emissions are as follows:

- demolition, earthmoving, and general construction,
- landfill operations,
- ash disposal operations,
- gravel quarry operations,
- open storage piles,
- vehicular traffic on unpaved roads and unpaved parking areas, and
- improper operation of street sweepers.

Information detailing these sources and current operations is provided below.

In addition, construction activities for a new ash disposal site throughout the Quarry Hill munitions area are scheduled to begin in August 2001. A brief description of the proposed construction and operation is provided below.

2.1 DEMOLITION, EARTHMOVING, AND CONSTRUCTION

The Base has on-going and planned construction activities. Presented in this installation plan is a FDEP checklist for demolition, earthmoving, and general construction projects (Appendix A).

During demolition, earthmoving, and construction projects, sources of fugitive dust emissions may include:

- Earth moving activities during the demolition and clearing of existing structures and site preparation activities;

- Vehicle traffic on unpaved construction access roads in and out of the site;
- Track-out of soil onto paved roads with subsequent re-entrainment from passing vehicles;
- Excavation of soils and transfer to temporary storage piles;
- Stockpiling of excavated soil prior to disposal;
- Transfer of soils to haul trucks for disposal offsite;
- Hauling of soil off-site for disposal; and
- Hauling of new soil (i.e., gravel) and foundation materials to site from borrow areas throughout the Base.

2.2 LANDFILL OPERATIONS

There currently are seven active landfills at Eielson AFB (Figure 2). Six of these landfills are used for disposal of clean fill and inert construction and demolition materials, and the other landfill is used for disposal of asbestos and inert waste material.

2.2.1 Asbestos Landfill

The asbestos landfill operates under ADEC Permit No. 9431-BA005. The landfill is located at a remote area from the Base community and has an earthen berm on all sides of the site and a gate on the southwest side to control public access. The entrance gate to the landfill normally is locked and the Insulation Shop regulates access to the site. Only asbestos, remediated soils, coal ash, waste concrete and associated reinforcing material are disposed at this facility. Visual inspection is performed monthly by the Insulation Shop to regulate access and to ensure proper operation and maintenance of the site.

2.2.2 Clean Fill and Construction and Demolition Materials Landfill

There are six landfills utilized for disposal of clean fill and inert construction and demolition materials, including soil, gravel, rock and concrete on Eielson AFB. They are the Flight Line Pond, Flight Line Marsh, and Runway Ponds 4, 5, 6 and 7. Only three of these landfills (Flight Line Pond and Runway Ponds 4 and 5) require operation under ADEC solid waste and wetlands permits. These three landfills are also in the process of deposition of final cover. Revegetation will occur following placement of the final cover.

During landfill operations, sources of fugitive dust emissions include:

- Vehicle traffic on unpaved access roads in and out of the sites;
- Truck hauling of waste or inert fill material to the sites;
- Stockpiling of waste or inert fill material prior to disposal;
- Earth moving activities to prepare areas for fill;

- Dumping and spreading of fill materials;
- Covering of fill with soils or other materials; and
- Track-out of soil onto paved roads with subsequent re-entrainment from passing vehicles.

2.3 ASH DISPOSAL PROCEDURES

2.3.1 Current Ash Disposal Procedures

The by-product of the burnt coal from the CH&PP is ash. The ash is transported from the plant to various permitted locations throughout the Base to build roadways, ranges, berms, and cover material for use on landfills (i.e., asbestos).

The ash is routed to a silo in the plant where it is loaded onto trucks for transport throughout the Base. The ash is removed year round from the plant.

Two covered trucks are currently used to transport the ash. One of the trucks has an opening (approximately 6 feet by 4 feet in size) on the top cover. On a given day one truck is operated and will typically make 4 to 5 trips transporting the ash. The maximum trips per day are 8 to 9, 10-hour workdays with a maximum disposal capacity of one trip per hour. Hauling is performed 4 to 5 days per week. The transport trucks travel approximately 15 miles per hour.

2.3.2 Proposed Ash Disposal Area and Procedures

The proposed ash disposal area will be located within the Quarry Hill munitions area. Construction is scheduled to begin in August 2001 and phased construction/disposal activities are estimated to take 23 years. The design for the Quarry Hill ash disposal site includes three areas designated for disposal, totaling approximately 655,100 cubic yards of ash, 48,900 cubic yards of required cut material, and 41,000 cubic yards of required soil cover. Under the proposed design, the ash disposal fill areas used for roads will be capped with gravel. In addition, within the new disposal site, there will be two new parking areas constructed out of ash and gravel.

During the process of ash disposal (current and proposed), sources of fugitive dust emissions may include:

- Loading of ash from the silo shoot into trucks, performed in a building at CH&PP with the roll-up door opened;
- Hauling of ash to the designated areas; and
- Dumping and spreading of ash at the final location(s).

2.4 GRAVEL QUARRY OPERATIONS

There are two active gravel borrow pits on Eielson AFB, Bear Lake and Mullins Pit (Figure 2). The lake at Mullins Pits is 53.2 acres in size and is expanded annually from gravel

extraction. In 1996, Bear Lake and Mullins Pits were designated as Wildlife Management Areas and management policies were developed for each area. Off-road vehicle use is prohibited when snow cover is absent to prevent damage to the ground cover and to minimize fugitive dust. In addition, the Bear Lake area has a fence and a gate to prohibit off-road vehicle use.

During gravel quarry operations, sources of fugitive dust emissions may include:

- Earth moving activities during dredging;
- Vehicle traffic on unpaved access roads;
- Stockpiling of gravel;
- Sifting of gravel;
- Transfer of gravel to haul trucks; and
- Hauling of gravel to on-Base final destinations.

2.5 OPEN STORAGE PILES

There are three (3) general types of open storage piles at Eielson AFB (Figure 2): asphalt, coal, and gravel.

2.5.1 Asphalt Storage Piles

The asphalt storage area contains one chunked asphalt storage pile and one crushed asphalt storage pile. The chunked pile has a total surface area of approximately 166,400 square-feet and an average height of 20 feet. The crushed pile has a total surface area of approximately 37,100 square-feet and an average height of 15 feet. The asphalt is stored until utilized by the installation for re-surfacing of the roadways.

2.5.2 Coal Storage Piles

The CH&PP has several coal storage piles totaling approximately 59,600 tons used for supply reserve. The age of the coal in the storage piles ranges between 3 to 25 years old. Visible dust from the coal storage piles have not been observed by plant personnel and minimal dust emissions occur during stockpile operations. When stockpiling the coal, the storage pile is compacted every 18 inches.

2.5.3 Miscellaneous Gravel Storage Piles

In addition to the major gravel storage piles located within Bear Lake and Mullins Pit, there are various gravel storage piles located throughout the Base consisting of different soils including sands, gravels, and cobbles. Specifically, around the cooling ponds behind the CH&PP, there are over six different areas of gravel storage piles of various types. There are two gravel storage piles also located near the Waste Water Treatment Facility.

At the open storage piles and associated activities, sources of fugitive dust emissions may include:

- Vehicle traffic on unpaved access roads;
- Stockpiling of material;
- Compaction of material;
- Sifting of material;
- Crushing of material;
- Transfer of material to haul trucks; and
- Hauling of material to on-Base final destinations.

2.6 VEHICULAR TRAFFIC ON UNPAVED ROADS AND PARKING AREAS

There are over twelve miles of heavily-traveled unpaved roads at Eielson AFB that may contribute to fugitive dust emissions. These roads are used throughout the year. A listing of the unpaved roads, approximate length and width, and utilization is provided in Table 2. The list is in order of the highest to lowest vehicle miles traveled with number 1 being the highest. Figure 2 provides the location of the roads, which is referenced according to the number listed on Table 2.

There are ten (10) unpaved parking areas that are designated as potential contributors to fugitive dust emissions. Table 3 lists the unpaved parking area and provides size and usage. The list is in the order of the estimated highest usage. Figure 2 provides the location of the unpaved parking areas, which is referenced according to the number listed on Table 2.

2.7 STREET SWEEPER OPERATIONS

Eielson AFB owns five TYMCO Regenerative Air Systems, Model 600 Sweepers; four are operational and one is inoperable but will be replaced in FY02. The four operational sweepers have been upgraded with new dust control equipment.

The TYMCO Model 600 sweeper has a water system that control dust around the sweeper during operation. Daily street sweeping is conducted from approximately May through August on all paved roads. A Bob Cat broom also is used for sidewalks on an as-needed basis. Depending on the conditions of the sidewalk, a water truck wets down the area prior to sweeping.

During street sweeping operations, sources of fugitive dust emissions include:

- Improper operation of street sweepers (i.e., not utilizing the water system); and
- Inadequate equipment maintenance resulting in inefficient sweeping operation.

**TABLE 2
UNPAVED ROADS**

**FDEP
EIELSON AFB, ALASKA**

No. ¹	Road Name/Description	Estimated Length (feet)	Estimated Ave. Width (feet)	Approximate Surface Area (sq. feet)	Estimated Average Traffic Levels (trips/day or week)	(trips/year) ²
1	Manchu Road	2,175	25	54,375	250 trips/day - residential use	91,250
2	Munitions Road (from Quarry Road to Entrance Gate at Quarry Hill)	6,340	36	228,240	150-200 trips/day - POVs ^{a/} /GOVs ^{b/}	73,000
3	Transmitter Road (from the Moose Creek Bridge to the Entrance Gate at Engineer Hill)	13,505	30	405,150	150-200 trips/day - POVs/GOVs (including heavy equipment)	73,000
4	To the West of Flightline Avenue to Building 1153	450	20	9,000	12 POVs/day; 18 GOVs/day;	7,800
5	Quarry Hill Area (roads w/in restricted area)	13,315	25	332,875	20 trips/day - GOVs (including heavy equipment)	7,300
6	Access from Kodiak Street to Broadway Avenue behind the Commissary	920	20	18,400	10 trips/day - POVs/GOVs (including trucks)	3,650
7	Waste Water Treatment Facility Area	3,380	15	50,700	45-65 trips/week - GOVs	3,380
8	West Perimeter Road (Old Richardson Hwy)	6,830	35	239,050	10 trips/day x 5 days/week GOVs (passenger trucks)	2,600
9	Hursey Gate to West Perimeter Road (Formerly Old Richardson Hwy)	565	20	11,300	10 trips/day x 5 days/week GOVs (passenger trucks)	2,600
10	Access to Polaris Lake from French Creek Drive	900	25	22,500	35-50 trips/week - residential use, used approx. 8 mos./yr	1,600
11	Access from Flightline Avenue to Flightline Marsh Landfill	2,365	25	59,125	25-50 trips/week - trucks w/heavy loads; used only in summer months	800
12	Access to Fire Training Area (4327)	750	15	11,250	500-600 trips/summer, used only in summer months	600

TABLE 3
UNPAVED PARKING AREAS
FDEP
EIELSON AFB, ALASKA

No. ¹	Parking Lot Description	Length (feet)	Width (feet)	(sq. feet)	Estimated Vehicle Travel (vehicles/day)	(vehicles/year)
P1	CH&PP Front Parking Lot	175	120	21,000	60 POVs & passenger trucks/day	21900
	Plus access areas and smaller fenced in area	75	40	3,000		
P2	Behind Commissary, off Kodiak St.	186	117	21,762	40 POVs/day + 20 semi trucks/day	21900
P3	Quarry Hill (outside of fenced area)	145	143	20,735	40 POVs & passenger trucks/day	14600
P4	Wabash Avenue/Division Street (near Vehicle Maintenance Shop)	133	114	15,162	30 POVs & passenger trucks/day	10950
P5	E. of Flightline Ave. b/w Broadway Ave. & Tanker Rd.	375	48	18,000	14 POVs/day	5110
P6	CH&PP Side Parking Lot	98	65	6,370	6 POVs & passenger trucks/day	2190
P7	Quarry Hill Heavy Vehicle Equipment [w/in fenced area]	80	35	2,800	6 GOVs & heavy equipment/day	2190
P8	West of Flightline Ave. [at Bldg. 1232 Nose Dock]	74	37	2,738	6 POVs/day	2190
P9	West of Flightline Ave. [at Bldg. 1230]	113	38	4,294	3 POVs/day	1095
P10	Arctic Ave./Polaris St. Serving Children's Park	101	54	5,454	1 POV/day during summer	112
	plus access road	36	25	900	(summer consists of 16 weeks)	
	TOTALS	1,591		6,354		

1. Number corresponds to the number identified on Figure 2 illustrating parking area location and is ranked by use levels.

**TABLE 2 (Continued)
UNPAVED ROADS**

FDEP

EIELSON AFB, ALASKA

No. ¹	Road Name/Description	Estimated Length (feet)	Estimated Ave. Width (feet)	Approximate Surface Area (sq. feet)	Estimated Average Traffic Levels (trips/day or week)	(trips/year) ²
13	Access from Flightline Avenue to Runway Ponds Landfill	1,575	20	31,500	15-30 trips/week - trucks w/heavy loads, use fluctuates each year - used in summer	480
14	Access to Cooling Ponds behind CH&PP	5,175	25	129,375	150-250 trips/summer - trucks and/or heavy equipment/loads	250
15	Access to Asbestos Landfill	2,930	20	58,600	200-225 trips/yr - 30 cubic yard trucks	225
16	Access to Asphalt Graveyard	1,915	17	32,555	180-205 trips/yr - 30 cubic yard trucks	205
17	Access to Waste Water Treatment Plant from Transmitter Road	1,050	25	26,250	170 trips/year - trucks w/heavy loads, only used when hauling gravel from stockpiles	170
18	Access No. 1 from West Perimeter Road (Formerly Old Richardson Hwy) to Runway	470	15	7,050	1-2 trips/week - GOVs (passenger trucks)	104
19	Access No. 2 from West Perimeter Road (Formerly Old Richardson Hwy) to Runway	470	15	7,050	1-2 trips/week - GOVs (passenger trucks)	104
	TOTALS			1,734,345		

1. Number corresponds to the number identified on Figure 2 illustrating road location and is ranked by traffic levels.

2. Traffic levels for total trips per year were calculated using the maximum daily/weekly/yearly level listed and assumes summer consists of four months duration (16 weeks).

3. ^{a/} POV = Privately-owned vehicle.

4. ^{b/} GOV = Government-owned vehicle.

SECTION 3

CONTROL AND MITIGATION MEASURES

To reduce the amount of particulate matter entrained in the ambient air as a result of the various activities, one or more reasonably available control measures will be used to minimize dust emissions from each fugitive dust source. As a guide to mitigation, measures identified by the South Coast Air Quality Management District (SCAQMD) in California will be implemented, as applicable. Because of the diversity of fugitive dust sources in this region of the U.S., and the severe air quality problems experienced, the SCAQMD has pioneered a variety of control measures and techniques that will be applicable to the Eielson AFB facility. These measures are identified in this section.

3.1 GENERAL CONTROL MEASURES

Control techniques for fugitive dust sources generally involve watering, chemical stabilization, administrative controls such as reduction in vehicle speeds, reduction of surface wind speed with windbreaks or source enclosures, or paving roads. Watering is the most common and least expensive method, but provides only temporary dust control. The use of chemicals to treat exposed surfaces provides longer dust suppression, but may be costly, and may have adverse effects on plant and animal life, or contaminate the treated material. Windbreaks and source enclosures are often impractical because of the size of fugitive dust sources. Although paving roads is costly, it provides a permanent solution to fugitive dust. A cost analysis for the options identified for treatment of unpaved roads and unpaved parking lots at Eielson AFB is provided in Appendix B.

The general measures that will be implemented at Eielson AFB will include:

1. Water application as needed on all unpaved parking or staging areas and unpaved road surfaces to minimize fugitive dust (20% opacity limit).
2. Limiting traffic speeds on all unpaved road surfaces to minimum practical levels.
3. Where feasible, covering all haul truckloads. The method will depend on the individual trucks used and the cargo material hauled.
4. Where feasible, use bed liners in bottom dumping haul vehicles.
5. Application of water to inactive construction areas when there is evidence of wind driven fugitive dust emissions. The inactive areas where water has been applied will be observed to determine the effectiveness of the "crusting over". This will include any observations of vehicle traffic that may have disturbed the surface. Where the crust has been broken those areas will be retreated with water to re-establish the crust.

6. Watering or covering exposed stockpiles as needed to minimize fugitive dust emissions.
7. Perform stockpiling of various sources of fugitive dust during low-wind conditions.
8. Proper operation and maintenance of street sweepers to manufacturers specifications and recommendations. Appendix C contains the O&M Manual for the Eielson AFB street sweepers.
9. Adequate training in accordance with manufacturers operation and maintenance manual and proper documentation of training for street sweeper operators.
10. Where practical, perform load-in/load-out procedures at open storage piles on the downwind side of stockpile.
11. If it is necessary to load ash into haul trucks with the roll-up door open, utilize an available control measure. Currently there is a separator/curtain that is drawn as required within the ash house when ash is discharged into haul trucks. In addition, the ash handling system will be upgraded to include dust control measures as a part of the full stream bag house installation project scheduled for fiscal year 2003.
12. Utilize the FDEP checklist provided in Appendix A.

3.2 SOURCE-SPECIFIC CONTROL MEASURES

Reasonably available control measures for the seven identified sources of fugitive dust are detailed in Table 4 through Table 10.

1. Water application as needed on all unpaved parking or staging areas and unpaved road surfaces to minimize fugitive dust (20% opacity limit).
2. Limiting traffic speeds on all unpaved road surfaces to minimum practical levels.
3. Where feasible, covering all haul truckloads. The method will depend on the individual trucks used and the cargo material hauled.
4. Where feasible, use bed liners in bottom dumping haul vehicles.
5. Application of water to inactive construction areas when there is evidence of wind driven fugitive dust emissions. The inactive areas where water has been applied will be observed to determine the effectiveness of the "crusting over". This will include any observation of vehicle traffic that may have disturbed the surface. Where the crust has been broken those areas will be re-treated with water to re-establish the crust.

TABLE 4
REASONABLY AVAILABLE CONTROL MEASURES FOR
DEMOLITION, EARTHMOVING, AND CONSTRUCTION PROJECTS
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description
Demolition, land clearing, earthmoving, excavation, and stockpiling	Watering	Application of water by means of truck or hose prior to conduction any land clearing. At inactive earthmoving areas, water should be applied at sufficient frequency and quantity to prevent visible dust emissions (20% opacity limit).
	Pre-grading planning	Grade each phase separately or grade entire project, but apply chemical stabilizers or ground cover to graded areas where construction phase begins more than 60 days after grading phase ends.
	Chemical stabilizers	Only effective in areas that are not subject to daily disturbances.
	Wind fencing	Provide three- to five-foot barriers with 50% or less porosity located adjacent to roadways to reduce the amount of windblown material leaving a site.
	Optimal timing	Perform stockpiling during low-wind conditions.
	High wind measures	Cease all active operation; or apply water within 15 minutes to any soil surface that is being moved or otherwise disturbed.
Unpaved construction access roads	Cleaning	Perform street cleaning if subject to material accumulation.
	Chemical stabilization	Only effective in areas that are not used for high volume or heavy equipment traffic use.
	Watering	In sufficient quantities to keep surface moist (20% opacity limit).
	Reduce speed limit	10 mile per hour maximum during construction.
	Trip reduction	Restrict access or redirect traffic to reduce vehicle trips.
	Gravel	Maintain gravel depth of four inches. Perform in areas where paving, chemical stabilization or frequent watering is not feasible.
	High wind measures	Apply a chemical stabilizer prior to wind events; or apply water once each hour; or stop all vehicular traffic.
Transfer of soil to haul trucks and hauling	Cover haul vehicles	Entire surface area of hauled earth should be covered once vehicle is full.
	Maintaining load free board	If the haul truck is not fully covered, maintain at lease six (6) inches of free board.
	Bedliners in haul vehicles	When feasible, use in bottom-dumping haul vehicles.
	High wind measures	Perform operations at downwind side of area or away from high use areas.

TABLE 5
REASONABLY AVAILABLE CONTROL MEASURES FOR
LANDFILL OPERATIONS
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description
Stockpiling	Watering	At inactive areas, water should be applied at sufficient frequency and quantity to prevent visible dust emissions (20% opacity limit).
	Chemical stabilizers	Only effective in areas that are not subject to daily disturbances.
	Optimal timing	Perform stockpiling during low-wind conditions.
	High wind measures	Cease all active operation; or apply water within 15 minutes to any surface that is being moved or otherwise disturbed.
Unpaved access roads	Cleaning	Requires street cleaning if subject to material accumulation.
	Chemical stabilization	Only effective in areas that are not used for high volume or heavy equipment traffic use.
	Watering	In sufficient quantities to keep surface moist (20% opacity limit).
	Reduce speed limit	15 mile per hour maximum.
	Trip reduction	Access restriction by the Insulation Shop.
	Gravel	Maintain gravel to a depth of four inches where paving, chemical stabilization or frequent watering is not feasible.
	High wind measures	Apply a chemical stabilizer prior to wind events; or apply water once each hour; or stop all vehicular traffic.
Hauling and deposition of waste or inert fill material	Cover haul vehicles	Entire surface area of hauled material should be covered.
	Bedliners in haul vehicles	When feasible, use in bottom-dumping haul vehicles.
	Maintaining load free board	If the haul truck is not fully covered, maintain at least six (6) inches of free board.
	High wind measures	Perform operations at downwind side of area or away from high use areas.

TABLE 6
REASONABLY AVAILABLE CONTROL MEASURES FOR
ASH DISPOSAL OPERATIONS
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description
Loading of ash into haul trucks	Enclosed area	If feasible, perform operation in the building with doors closed. If not feasible, use an available control measure at all exposed access points to reduce fugitive dust migration out of the building.
Vehicular track-out, hauling and deposition of ash	Vehicle surface wash-down	Prior to each truck-out, perform adequate ash wash-down methods for the haul truck.
	Cover haul vehicles	Entire surface area of hauled ash should be covered.
	Maintaining load free board	If the haul truck is not fully covered, maintain at least six (6) inches of free board.
	Bedliners in haul vehicles	When feasible, use in bottom-dumping haul vehicles.
	High wind measures	Perform deposition operations at downwind side of area or away from high use areas.

TABLE 7
REASONABLY AVAILABLE CONTROL MEASURES FOR
GRAVEL QUARRY OPERATIONS
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description
Earthmoving, excavation, stockpiling, and sifting	Watering	Application of water by means of truck or hose prior to conduction any earthmoving. At inactive earthmoving areas, water should be applied at sufficient frequency and quantity to prevent visible dust emissions (20% opacity limit).
	Chemical stabilizers	Only effective in areas that are not subject to daily disturbances.
	Optimal timing	Perform stockpiling during low-wind conditions.
	High wind measures	Cease all active operation; or apply water within 15 minutes to any soil surface that is being moved or otherwise disturbed.
Unpaved access roads	Cleaning	Requires street cleaning if subject to material accumulation.
	Chemical stabilization	Only effective in areas that are not used for high volume or heavy equipment traffic use.
	Watering	In sufficient quantities to keep surface moist (20% opacity limit).
	Reduce speed limit	15 mile per hour maximum.
	Trip reduction	Restrict access.
	Gravel	Maintain gravel to a depth of four inches in areas where paving, chemical stabilization or frequent watering is not feasible.
	High wind measures	Apply a chemical stabilizer prior to wind events; or apply water once each hour; or stop all vehicular traffic.
Transfer of gravel to haul trucks and hauling	Cover haul vehicles	Entire surface area of hauled gravel should be covered.
	Maintaining load free board	If the haul truck is not fully covered, maintain at lease six (6) inches of free board.
	Bedliners in haul vehicles	When feasible, use in bottom-dumping haul vehicles.
	High wind measures	Perform operations at downwind side of area or away from high use areas.

TABLE 8
REASONABLY AVAILABLE CONTROL MEASURES FOR
OPEN STORAGE PILES
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description
Stockpiling, compaction, sifting, and crushing	Watering	At inactive storage areas, water should be applied at sufficient frequency and quantity to prevent visible dust emissions (20% opacity limit).
	Coverings	Tarps, plastic, or other material can be used as a temporary covering. When used, these should be anchored to prevent wind from removing coverings.
	Chemical stabilizers	Only effective in areas that are not subject to daily disturbances.
	Altering load-in/load-out procedures	Confine load-in/load-out procedures to leeward (downwind) side of the material.
	Optimal timing	Perform activities during low-wind conditions.
	High wind measures	Apply chemical stabilizers prior to wind events; or apply water once per hour; or install temporary covers.
Unpaved access roads	Cleaning	Requires street cleaning if subject to material accumulation.
	Chemical stabilization	Only effective in areas that are not used for high volume or heavy equipment traffic use.
	Watering	In sufficient quantities to keep surface moist (20% opacity limit).
	Reduce speed limit	15 mile per hour maximum.
	Reduce vehicular trips	Access restriction or redirecting traffic to reduce vehicle trips.
	Gravel	Gravel maintained to a depth of four inches can be an effective measure. Only effective in areas where paving, chemical stabilization or frequent watering is not feasible.
	High wind measures	Apply a chemical stabilizer prior to wind events; or apply water once each hour; or stop all vehicular traffic.
Transfer of material to haul trucks and hauling	Cover haul vehicles	Entire surface area of hauled material should be covered.
	Bedliners in haul vehicles	When feasible, use in bottom-dumping haul vehicles.
	Maintaining load free board	If the haul truck is not fully covered, maintain at least six (6) inches of free board.
	High wind measures	Perform operations at downwind side of area or away from high use areas.

TABLE 9
REASONABLY AVAILABLE CONTROL MEASURES FOR
VEHICLE TRAFFIC ON UNPAVED ROADS AND PARKING AREAS
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description
Unpaved access roads	Cleaning	Requires street cleaning if subject to material accumulation.
	Chemical stabilization	Only effective in areas that are not used for high volume or heavy equipment traffic use.
	Watering	In sufficient quantities to keep surface moist (20% opacity limit).
	Reduce speed limit	15 mile per hour maximum.
	Gravel	Maintain gravel to a depth of four inches in areas where paving, chemical stabilization or frequent watering is not feasible.
	High wind measures	Apply a chemical stabilizer prior to wind events; or apply water once each hour; or stop all vehicular traffic.

TABLE 10
REASONABLY AVAILABLE CONTROL MEASURES FOR
STREET SWEEPER OPERATIONS
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description
Inadequate operation of equipment	Proper operation	Proper operation of street sweepers to manufacturers specification.
	Training	Provide adequate training in accordance with manufacturers O&M manual and proper documentation of training for street sweeper operators.
	Proper equipment	Use certified street sweepers that meet the most stringent existing U.S. standards for street sweepers.
	Record keeping	Maintain operational and maintenance records demonstrating that sweeper equipment is in compliance with manufacturers operating specifications (Appendix C).

APPENDIX A

FUGITIVE DUST EMISSIONS PLAN CHECKLIST

FUGITIVE DUST EMISSIONS PLAN CHECKLIST

FDEP
EIELSON AFB, ALASKA

Site/Project Description: _____	Contractor Number: _____
Contractor Name: _____	Inspection Date: _____
Project Start Date and Estimated Project Duration: _____	

Fugitive Dust Source	Control Measure	Description	Checked	Inspection Comment	
Demolition, land clearing, earthmoving, excavation, stockpiling, compaction, sifting, and crushing	Watering	Application of water by means of truck or hose prior to conducting any land clearing. At inactive earthmoving areas, water should be applied at sufficient frequency and quantity to prevent visible dust emissions (20% opacity limit).	Y__N__		
	Pre-grading planning	Apply chemical stabilizers or ground cover to graded areas where follow-on construction begins 60 days after grading.	Y__N__		
	Coverings on open storage piles	Tarps, plastic, or other material can be used as a temporary covering. When used, these should be anchored to prevent wind from removing coverings.	Y__N__		
	Chemical stabilizers	Only effective in areas that are not subject to daily disturbances.	Y__N__		
	Wind fencing	Provide three- to five-foot barriers with 50% or less porosity located adjacent to project boundaries to reduce windblown material leaving a site.	Y__N__		
	Altering load-in/load-out procedures at storage piles	Confine load-in/load-out procedures to leeward (downwind) side of the material.	Y__N__		
	Optimal timing	Perform stockpiling during low-wind conditions.	Y__N__		
	High wind measures	Cease all active operation or apply sufficient water to any material being moved or disturbed.	Y__N__		
				Y__N__	
				Y__N__	

FUGITIVE DUST EMISSIONS PLAN CHECKLIST
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description	Checked	Inspection Comment	
Continued: Unpaved access roads	Cleaning	Perform street cleaning of excess material accumulations. If powered equipment is used dust cannot leave work site.	Y__N__	_____ _____ _____	
	Chemical stabilization	Only effective in areas that are not used for high volume or heavy equipment traffic use.	Y__N__	_____ _____ _____	
	Watering	In sufficient quantities to keep surface moist and dust suppressed (20% opacity limit).	Y__N__	_____ _____ _____	
	Reduce speed limit	Reduce vehicle and equipment speed to eliminate fugitive dust from leaving the job site.	Y__N__	_____ _____ _____	
	Trip reduction	Restrict access or redirect traffic to reduce vehicle trips.	Y__N__	_____ _____ _____	
	Gravel	Maintain gravel depth of three inches. Perform in areas where paving, chemical stabilization or frequent watering is not feasible.	Y__N__	_____ _____ _____	
	High wind measures	Apply a chemical stabilizer prior to wind events; or apply water once each hour; or stop all vehicular traffic.	Y__N__	_____ _____ _____	
	Transfer of material to haul trucks, vehicular track-out, hauling, and deposition of material	Vehicle surface wash-down	Prior to each truck-out, perform adequate wash-down methods for the haul truck.	Y__N__	_____ _____ _____
		Working in an enclosed area during loading of ash into haul trucks	Where feasible, perform operation in the building with doors closed. If not feasible, use an impermeable curtain at all exposed access points to reduce fugitive dust migration out of the building.	Y__N__	_____ _____ _____
		Cover haul vehicles	Entire surface area of hauled earth should be covered once vehicle is full.	Y__N__	_____ _____ _____
Maintaining load free board		If the haul truck is not fully covered, maintain at least six (6) inches of free board. Uncovered loads will be kept moistened or stabilized to preclude dust emission.	Y__N__	_____ _____ _____	
	Bedliners in haul vehicles	When feasible, use in bottom-dumping haul vehicles.	Y__N__	_____ _____ _____	

FUGITIVE DUST EMISSIONS PLAN CHECKLIST
FDEP
EIELSON AFB, ALASKA

Fugitive Dust Source	Control Measure	Description	Checked	Inspection Comment
Continued: Transfer of material to haul trucks...	High wind measures	Perform operations at downwind side of area or away from high use areas.	Y__N__	_____
	Proper operation	Proper operation of street sweepers to manufacturers specification.	Y__N__	_____
Operation of street sweepers	Training	Provide adequate training in accordance with manufacturers operation and maintenance manual and proper documentation of training for street sweeper operators.	Y__N__	_____
	Proper equipment	Use certified street sweepers that meet the most stringent existing U.S. standard for street sweepers.	Y__N__	_____
	Record Keeping	Maintain operational and maintenance records demonstrating that sweeper equipment is in compliance with manufacturers operating specifications.	Y__N__	_____

Note: If alternative control measures are identified that meet or exceed the measures above, please list them below. The Contracting Officer (CO) may approve these alternatives after review. Until the CO approves the alternative control measure listed, the measures described above will be enforced.

Fugitive Dust Source	Alternative Control Measure	Description	Checked	Inspection Comment	Approval by Contracting Officer

APPENDIX B

**EIELSON AIR FORCE BASE
COST ANALYSIS
TREATMENT OPTIONS FOR UNPAVED ROADS/PARKING AREAS**

APPENDIX C

**EIELSON AIR FORCE BASE
STREET SWEEPER OPERATIONS AND MAINTENANCE MANUAL**