FINAL

2001 AIR EMISSIONS INVENTORY

CRATERS OF THE MOON NATIONAL MONUMENT AND PRESERVE IDAHO

U.S. NATIONAL PARK SERVICE

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CONTENTS

CONTENTS (Continued)

FIGURES

TABLES

1. INTRODUCTION

1.1 BACKGROUND

In August of 1999, the National Park Service (NPS) embarked on the Natural Resource Challenge, a major effort to substantially improve how the NPS manages the natural resources under its care. As part of Natural Resource Challenge, the NPS Air Resources Division (ARD) was tasked with the responsibility of expanding efforts to monitor and understand air quality and related values in the parks. In addition, the NPS Environmental Leadership policy directs the NPS to manage the parks in a manner "that demonstrates sound environmental stewardship by implementing sustainable practices in all aspects of NPS management...." In order to achieve both of these objectives, it is necessary to gain an understanding of air pollution emissions that result from activities within the park. In this regard, development of an in-park air emissions inventory for Craters of the Moon National Monument and Preserve (NM & Pres) serves three functions. First, it provides an understanding of the sources and magnitude of in-park emissions and a basis for contrasting them with emissions from the surrounding area. Second, it identifies existing and potential strategies to mitigate in-park air emissions. Finally, it evaluates and ensures the compliance status of the park relative to state and federal air pollution regulations.

1.2 TYPICAL AIR EMISSION SOURCES

Typical air emission sources within NPS units include stationary, area, and mobile sources. Stationary sources can include fossil fuel-fired space and water heating equipment, generators, fuel storage tanks, and wastewater treatment plants. Area sources may include woodstoves, fireplaces, campfires, and prescribed burning. Mobile sources may include vehicles operated by visitors, tour operators, and NPS and concessioner employees, and nonroard vehicles and equipment.

The air pollutants that are addressed in this report are summarized in the table below. Of the pollutants noted, ozone is not produced and emitted directly from stationary, area, or mobile sources, but rather it is formed as a result a chemical reaction of NOx and VOC emissions in the presence of sunlight. Carbon dioxide historically has not been considered a pollutant; however, in recent years, there has been much interest in its contribution to global climate warming since it is considered a greenhouse gas.

AIR POLLUTANTS AND THEIR CHARACTERISTICS

Pollutant	Characteristics
Particulates (PM_{10})	• Mixture of solid particles and liquid droplets; fine particles (less than 2.5 micrometers) produced by fuel combustion, power plants, and diesel buses and trucks • Can aggravate asthma, produce acute respiratory symptoms, including aggravated coughing and difficult or painful breathing, and chronic bronchitis • Impairs visibility
Sulfur Dioxide ($S0_2$)	• Can cause temporary breathing difficulties for people with asthma • Reacts with other chemicals to form sulfate particles that are major cause of reduced visibility in many parts of the country • Main contributor to acid rain
Nitrogen Oxides (NOx)	• High temperature fuel combustion exhaust product • Can be an irritant to humans and participates in the formation of ozone • Reacts with other pollutants to form nitrite particles that are a significant contributor to visibility reduction in many parts of the country • Contributor to formation of acid rain
Carbon Monoxide (CO)	• Odorless, colorless gas produced by fuel combustion, particularly mobile sources • May cause chest pains and aggravate cardiovascular diseases, such as angina • May affect mental alertness and vision in healthy individuals
Volatile Organic Compounds (VOCs)	• Fuel combustion exhaust product • Consists of a wide variety of carbon-based molecules • Participates in the formation of ozone
Ozone (0_3)	• Not directly emitted by mobile, stationary, or area sources • Formed from complex reactions between NO_x and VOC emissions in the presence of sunlight • Occurs regionally due to multiplicity of sources • Can irritate the respiratory system • Can reduce lung function • Can aggravate asthma and increase susceptibility to respiratory infections • Can inflame and damage the lining of the lungs • Interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, other pollutants, and harsh weather • Damages the leaves of trees and other plants
Carbon Dioxide ($C0_2$)	• Does not directly impair human health • It is a greenhouse gas that traps the earth's heat and contributes to the potential for global warming

1.3 INVENTORY METHODOLOGY

The methodology to accomplish the air emissions inventory was outlined in a protocol that was prepared at the initiation of the project (EA Engineering 2001). Tasks consisted of a site survey in July 2003, interviews with Craters of the Moon NM & Pres personnel (John Apel, Chief, Resource Management 208-527-3257 Ext 501), review of applicable park records, emission calculations, review of applicable state and local air quality regulations, an assessment of mitigation measures and potential emission reduction initiatives, and report preparation. The data were used in conjunction with a number of manual and computer software computational

tools to calculate emissions. Computational tools included U.S. Environmental Protection Agency (USEPA) emission factors such as the Factor Information Retrieval System (FIRE) database, USEPA *TANKS 4.0* model, U.S. Forest Service *First Order Fire Effects Model (FOFEM) 4.0* model, and USEPA *MOBILE6.2* mobile source emissions model. The year 2001 was selected as the basis for the air emission inventory since data for that year were the most recent available at the park. It should be noted that emissions are expected to vary from year to year due to fluctuations in visitation, prescribed burning and wildfires, and other activities. Additional information on emission estimation methodology, including emission factors, is provided in Appendices A and **B.**

1.4 PARK DESCRIPTION

Established in 1924, Craters of the Moon National Monument celebrated its 75th birthday in 1999. In November 2000, a Presidential proclamation greatly expanded the Monument area, and the NPS portions of the expanded Monument were designated as a National Preserve in August 2002. The area is managed cooperatively by the NPS and the Bureau of Land Management (BLM) (Figure 1).

The Monument and Preserve encompass three major lava fields and 250,000 acres of sagebrush steppe grasslands. The Craters of the Moon lava field spreads across 618 square miles and is the largest young basaltic lava field in the lower 48 states. The Monument and Preserve contain more than 25 volcanic cones including outstanding examples of spatter cones. Sixty distinct lava flows form the Craters of the Moon lava field ranging in age from 15,000 to just 2,000 years old. The rugged landscape remains remote and undeveloped with only one paved road across the northern end. Traditional livestock grazing continues within the grass/shrublands administered by BLM.

The Kings Bowl and Wapi lava fields, both about 2,200 years old, are now part of the National Preserve. All three lava fields lie along the Great Rift, with some of the best examples of open rift cracks in the world. There are excellent examples of pahoehoe, slabby pahoehoe, shelly pahoehoe, spiny pahoehoe, and block lava, as well as rafted blocks, tree molds, lava tubes, and many other volcanic features.

A site map of the developed area at the entrance to the park is depicted in Figure 2 and descriptions are noted in Table 1.

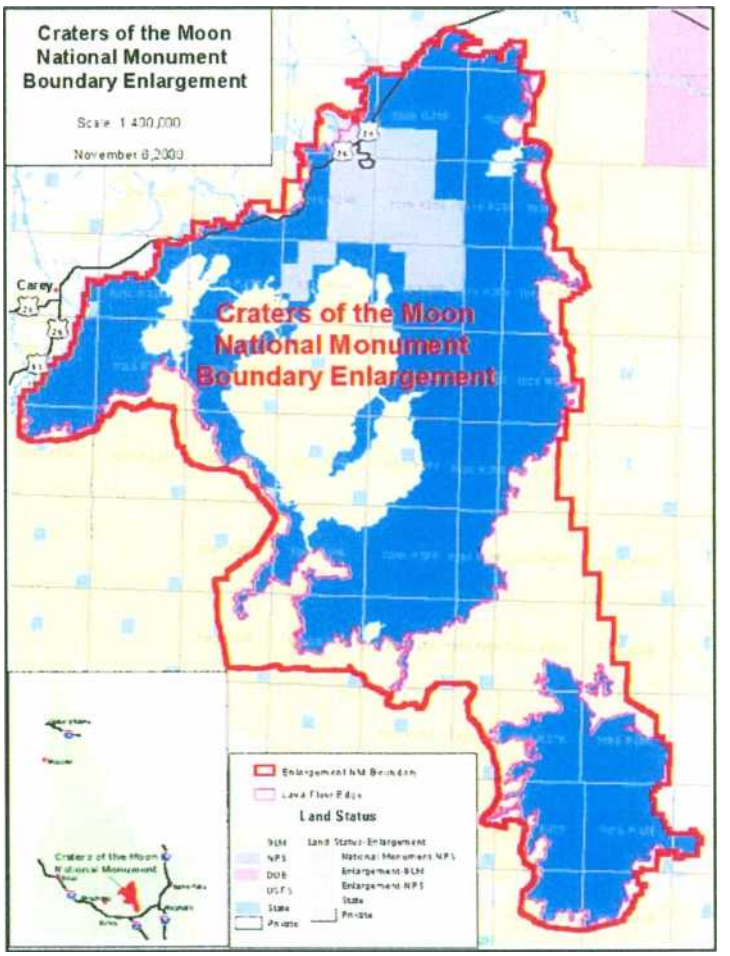


FIGURE 1. CRATERS OF THE MOON NM & PREs LOCATION AND BOUNDARIES

TABLE 1: CRATERS OF THE MOON NM & PREs DEVELOPED AREAS

Name/Location	Function/Facilities
Headquarters Area	Visitor Center/Headquarters, Maintenance Shop, Resource/Rangers Offices, Employee Residences, Entrance Kiosk at Loop Road, Campground

1.5 **AIR** QUALITY STATUS

The original Monument was located in Butte and Blaine Counties, Idaho. The establishment of the Preserve added land in Power and Minidoka Counties and a small fraction in the southwest part on the park in Lincoln County. The area is in attainment for all the national ambient air quality standards (NAAQS). Craters of the Moon NM & Pres is designated a Class I airshed under the Clean Air Act, which requires the highest level of air-quality protection.

The Idaho Depai talent of Environmental Quality is the governing authority for regulating air pollution from stationary sources in Idaho. There are two air monitoring stations in the park. The U.S. Depaituient of Energy (DOE) operates a station adjacent to the park headquarters to monitor PM10 and radionuclides. The latter is part of a larger network operated by the Idaho National Engineering and Environmental Laboratory (INEEL), which is located approximately 40 miles northeast of the park (Figure 3). The park operates a monitoring station, with Interagency Monitoring of Protected Visual Environments (IMPROVE) and National Atmospheric Deposition Program (NADP) monitors, approximately one-half mile south of the park.

An NPS ozone monitor is located at the DOE monitoring site, and a digital display of the latest ozone reading is provided in the Visitor Center. Recent ozone data indicated that the highest 1-hour maximum ozone concentration in 2001 was 79 ppb, which compares with the 120 ppb standard. The highest 3-year average daily maximum 8-hour concentration was 63 ppb, which compares to the 80 ppb standard. Although these values are below the standard, there has been a significant degradation trend between 1993-2002 for both the 1-hour and 8-hour ozone standard (NPS 2003).

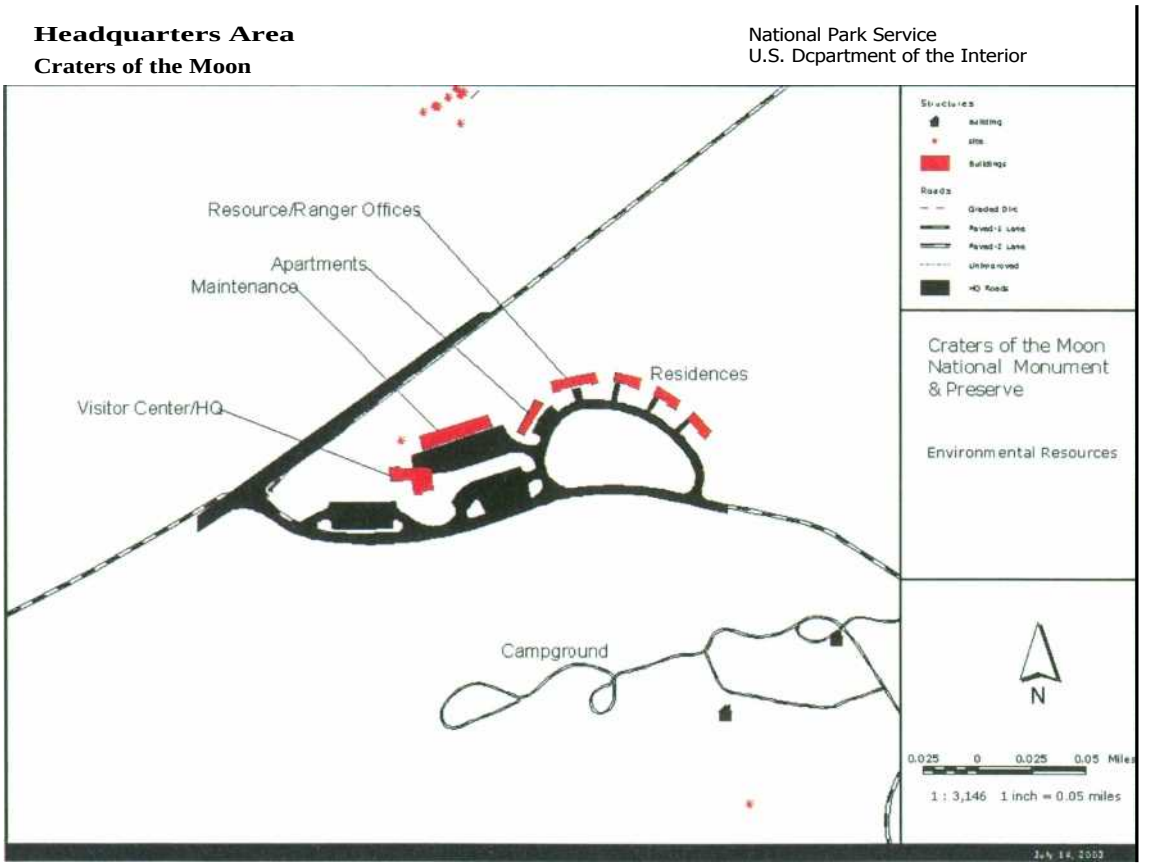


FIGURE 2. PARK HEADQUARTERS AREA

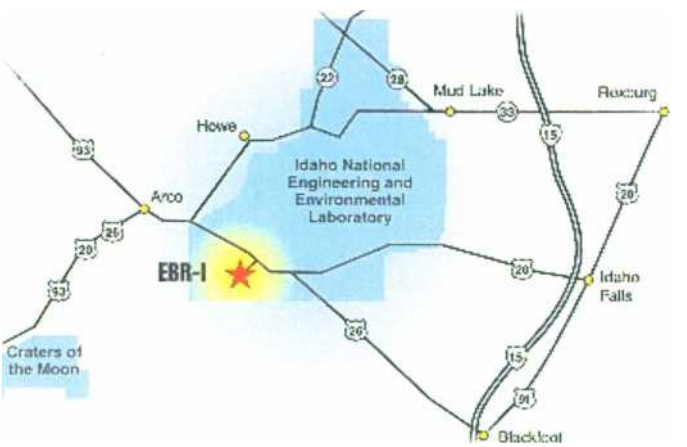


FIGURE 3. LOCATION OF THE INEEL

2. STATIONARY AND AREA SOURCE EMISSIONS

This section summarizes emissions from stationary sources at the Monument for the year 2001. The discussion is divided into sections covering emissions from combustion sources, fuel storage sources, and area sources. The following emissions were calculated for each source: particulate matter (PM10), sulfur dioxide (SO2), nitrogen oxides (NO,,), carbon monoxide (CO), carbon dioxide (CO2), and volatile organic compounds (VOCs).

2.1 STATIONARY SOURCES

2.1.1 Space And Water Heating Equipment

All heating units in the monument are electric. No fossil fuels, such as propane or No. 2 fuel oil, are used to provide space or water heating.

2.1.2 Generators

There are no generators in the monument.

2.1.3 Fuel Storage Tanks

Craters of the Moon NM & Pres has one gasoline and one diesel fuel underground fuel storage tanks for NPS vehicles and other motorized equipment. There are no public automotive service stations in the monument.

There are two basic types of VOC emissions from storage tanks: working losses and standing losses. Working losses are composed of both withdrawal and refilling loss emissions. Withdrawal loss emissions result from the vaporization of liquid fuel residue on the inner surface of tank walls as the liquid levels in the tank are decreased and air is drawn into the tank. Refilling losses refer to fuel vapor releases to the air during the process of refilling the tank as the liquid level in the tank increases and pressurizes the vapor space. Standing losses describe those tank emissions from the vaporization of the liquid fuel in storage due to changes in ambient temperatures. VOC losses are also a direct function of the annual product throughput or turnovers. Emissions from diesel tanks are extremely small since the volatility of diesel fuel is extremely low compared to gasoline. VOC emissions from the NPS fuel storage tanks were calculated using the USEPA *TANKS* software program. *TANKS* is based on the emission

estimation procedures from Chapter 7 of EPA's Compilation of Air Pollutant Emission Factors (AP-42) and uses chemical, meteorological, and other data to generate emission estimates for different types of storage tanks. Table 2 summarizes the calculated emissions from the gasoline tanks.

TABLE 2: 2001 CRATERS OF THE MOON NM & PRES FUEL TANK EMISSIONS

Location (No.)	**Product**	**Tank Type**	**Volume** al	**Throughput al/ r**	VOC lbs/ r
Maintenance Shop	Gasoline	UST	1,000	2,535	12

2.1.4 Wastewater Treatment Plants

The only wastewater facilities in the monument are septic tanks. Since these are passive systems rather than mechanical processes, such as primary wastewater treatment plants, few VOC emissions are generated.

2.2 AREA SOURCES

2.2.1 Woodstoves/Fireplaces

There is one woodstove in the Maintenance Shop and two in employee residences. The Maintenance Shop consumes an estimated one cord a year, and monument officials indicated that the two residential units are seldom, if ever, used. Table 3 summarizes emissions from the woodstove in the Maintenance Shop.

TABLE 3: WOODSTOVE AIR EMISSIONS FROM CRATERS OF THE MOON NM AND PRES

Location	**Number**	**Fuel Consumption**	PM19 **(lbs/yr)**	**SO_2 (lbs/yr)**	**NO_X (Ibs/yr)**	**CO** (lbs/yr)	VOC **(lbs/yr)**
W odstoves							
Maintenance Sho a		1.76 on/yr	61			443	402

2.2.2 Campfires

There is one front-country campground near the Visitor Center/Headquarters. However, wood fires are not allowed due to the fire danger presented by generally dry conditions and intermittent high winds.

2.2.3 Wildfires and Prescribed Burning

Wildland fire consists of both wildfires and prescribed fires. Wildfires are ignited naturally, usually by lightening, are typically unwanted, and therefore suppressed. On the other hand, prescribed burning is a land treatment process to accomplish natural resource management objectives, including reducing the potential for destructive wildfires, eliminating excessive fuel buildup, controlling insects and disease, improving wildlife habitat and forage production, maintaining natural succession of plant communities, and restoring natural processes. Prescribed burning can be for either ecological restoration or ecological maintenance. By policy, only prescribed burning for ecological restoration is considered an anthropogenic source of emissions; however, for the purposes of this emissions inventory, all prescribed burning has been treated as an anthropogenic source.

The monument does not conduct prescribed fires, but wildfires have consumed approximately 200 acres a year on average. Fuel types include Mountain Sagebrush and Threetip Sage. The First Order Fire Effects Model (FOFEM) was used to estimate emissions. FOFEM is a computer program developed by the Intermountain Fire Sciences Lab, U.S. Forest Service to predict the effects of prescribed fire and wildfire in forests and rangelands throughout the U.S. In particular, it quantifies emissions of PM_{10}, $PM2_{-5}$, CO, CO2, and VOCs (as CH4) for wildlfires, which are summarized in Table 4.

TABLE 4: WILDFIRE AIR EMISSIONS FROM CRATERS OF THE MOON NM & PRES

Mountain Sagebrush	100	1,100	900	5,600	401,300	400
Threetip Sage	100	1,100	900	5,600	401,300	400
Total	200	2,200	1,800	11,200	802,600	800

As methane

2.2.4 Miscellaneous Area Sources

Miscellaneous area sources include food preparation, degreasers, paints and other surface coatings, lighter fluid consumption, consumer solvents, and propane use by visitors in recreational vehicles. However, there are no data on the consumption of these materials whose emissions are negligible.

2.3 SUMMARY OF STATIONARY AND AREA SOURCE EMISSIONS

Table 5 summarizes the stationary and area source emissions calculated above in a format that allows comparison between the various sources as well as providing totals for each pollutant or pollutant category under consideration.

TABLE 5: SUMMARY OF 2001 STATIONARY AND AREA SOURCE EMISSIONS AT CRATERS OF THE MOON NM & PRES

Activity	Particulates (PM,		Sulfur Dioxide		Nitro en Oxides		Carbon Monoxide		Carbon Dioxide		VOCs	
	lbs/	tons/	lbs/ r	tons/ r	Ibs/ r	tons/ r	Ibs/	tons/ r	lbs/ r	tons/	lbs/	tons/ r
Stationary Sources												
Gasoline Storage Tanks			--	--							12	<0.01
Area Sources												
Woodstoves	61	0.03	[1]	<0.01	5	<0.01	443	0.22	--	--	402	0.20
Wildfires	2,200	1.10	--	--	--	--	11,200	5.60	802,600	401	800	0.40[1]
Totals'-;												
	Particulates (PM)		Sulfur Dioxide		N tro en Oxides		Carbon Monoxide		Carbon Dioxide		VOCs	
	Ibs/ r	tons/ r	Ibs/ r	tons/ r	Ibs/ r	tons/ r	Ibs/ r	tons/ r	lbs/ r	tons/ r	lbs/ r	tons/ r
Totals without Wildfires		0.03		<0.01		<0.01	443	0.22	--		402	0.20
Totals with Wildfires	2,261	1.13		<0.01		<0.01	11,643	5.82	802,600	401	1,202	0.60

[1] As methane

3. MOBILE SOURCE EMISSIONS

This section summarizes emissions from mobile sources at Craters of the Moon NM & Pres for 2001. Mobile emission sources include highway and nonroad vehicles.

3.1 HIGHWAY VEHICLES

3.1.1 Visitor Vehicles

An estimated 185,800 visitors entered the park during 2001. The park Visitor Center is directly off Highway 26/93, and there is a seven-mile loop road that takes visitors into scenic attractions. Assuming a typical NPS visitor to vehicle ratio of 2.8 and that 80 percent of the visitors traverse the loop road, the estimated visitor vehicles and associated vehicle miles traveled are summarized in Table 6. There were also 17 tour buses that visited the park in 2001; however, their emissions would be negligible considering the low bus volume and low mileage traveled.

TABLE 6: ESTIMATED VISITOR VEHICLE TRAVEL IN CRATERS OF THE MOON NM & PRES

Destination	Vehicles	Vehicle Miles Traveled
Loop Road	66,355	498,000

The majority of mobile source emissions can be categorized as either exhaust or evaporative emissions. Exhaust emissions are related to the combustion of fuel in the engine and include VOC, NOx, CO, and PM10. Exhaust emissions are dependent on a number of factors, including engine load, engine design and age, combustion efficiency, emissions equipment such as catalytic converters, and other factors. Evaporative emissions, which can occur while the vehicle is running or at rest, are related to the volatilization of fuel from vapor expansion, leaks and seepage, and fuel tank vapor displacement. Evaporative emissions are primarily dependent on daily temperature cycles and fuel volatility. In addition to vehicle exhaust, PM_{10} emissions also result from brake and tire wear, as well as the re-entrainment of dust from paved and unpaved roads (referred to as fugitive dust).

Emission factors produced by the USEPA MOBILE6.2 model were used in conjunction with VMT data in order to estimate mobile source emissions for VOC (both exhaust and evaporative), NOx, CO, and PM_{10} (exhaust, brake, and tire) for visitor vehicles. MOBILE6.2 produces exhaust and evaporative emission factors for light duty gasoline vehicles, light duty gasoline trucks, heavy duty gasoline vehicles, light duty diesel vehicles, light duty diesel trucks, heavy duty diesel

vehicles, and motorcycles. It also produces a composite emission factor for all vehicles based on the vehicle VMT mix supplied to the model. Inputs to the model include average vehicle speed, vehicle VMT mix, inspection and maintenance (UM) program information, fuel information, ambient temperature data, elevation, and others. Fugitive PM_{10} emissions resulting from tire-roadway interaction were based on EPA's road dust emission factors.

The MOBILE6.2 model is typically used to support planning and modeling efforts in urban or regional areas and include default inputs suited for these applications. Therefore, it is suitable for applications over large, regional transportation networks. Application of the MOBILE6.2 model required the utilization of unique inputs that were representative of mobile source activity within the park. In particular, it was necessary to utilize unique inputs for the visitor vehicle VMT mix and the vehicle age distribution. The Center for Environmental Research and Technology within the College of Engineering at the University of California's Riverside Campus (CE-CERT) established park-specific vehicle fleet characterizations in developing air emission inventories for Zion National Park (CE-CERT, 2001). CE-CERT found that the distribution of vehicle ages in the park reflected a larger fraction of newer vehicles compared to the general vehicle population. The park-specific mix vehicle types and vehicle age distribution developed by CE-CERT have been applied in the mobile modeling for Craters of the Moon NM & Pres.

In addition to park-specific age distribution, CE-CERT also developed park-specific modeling inputs for driving patterns that differ significantly from the default driving patterns typically used in mobile modeling, such as the Federal Test Procedure (FTP). In particular, they found that the FTP reflects both higher speeds and a wider range of speeds than observed in national parks. However, since the MOBILE6.2 model is not designed to readily incorporate unique driving pattern data, the default driving cycle remains the basis for the mobile source emission estimates provided here.

Other important mobile modeling inputs that can significantly affect mobile emission factors are the average speed, fuel characteristics, and UM program parameters. The average speed input to the mobile model was 35 mph, and fuel volatility was assumed to be Reid vapor pressure (RVP) of 8.0 in the summer and 13.4 in the winter'. Finally, I/M program inputs were not included since there are no I/M programs in the areas near the park.

[1] Office of Transportation and Air Quality, U.S. Environmental Protection Agency, EPA420-R-02-011, February 2002

In order to account for seasonal differences in mobile emissions, separate MOBILE6.2 runs were performed to produce emission factors for winter and summer. A composite emission factor for each season, reflecting a park specific VMT mix adapted from CE-CERT, served as the basis for mobile source emission estimates. Additional particulate emissions (or entrained road dust) from vehicles operating on paved roads in Craters of the Moon NM & Pres also were calculated based on VMT. A summary of visitor vehicle emissions is provided in Table 9 at the end of this section.

3.1.2 NPS Highway Vehicles

Craters of the Moon NM & Pres operates a fleet of highway vehicles that are owned by the NPS. Emission factors specific to vehicle classes (e.g., LDGVs) were used to estimate emissions from the NPS vehicles. Since exact vehicle mileages were not available, park officials estimated that based on their experience, Ranger vehicles were driven approximately 7,000 miles per year and all others 3,000 miles per year. A summary of NPS vehicles and their estimated annual mileage is provided in Table 7, and emissions are summarized in Table 9 at the end of this section.

TABLE 7: NPS ROAD VEHICLES AT CRATERS OF THE MOON NM & PRES

Vehicle Type	Number	Annual Usage (mi/yr)
Motorcycles (MC)		
Motorcycles		6,000
Light Duty Gasoline Trucks (LDGT)		
Sport Utility Vehicles	121	48,000
Duty Gasoline Vehicles (LDDT)		
Trucks		3,000
Heavy Duty Diesel Trucks (HDDT)		
Fire Truck		3,000
Park Totall	161	60,000

3.2 NPS NONROAD VEHICLES

The NPS also owns and operates nonroad motorized equipment that is used to maintain roads and grounds and for other purposes. There are records of the Craters of the Moon NM & Pres equipment inventory, and the larger pieces of equipment are noted in Table 8. Annual usage and emission factors from the USEPA nonroad emission database were used to calculate annual emissions that are provided in Table 9.

TABLE 8: NPS NONROAD VEHICLES AT CRATERS OF THE MOON NM & PRES

Vehicle Type	Number	Annual Usage
Mower	1	100 hrs
ATVs	3	150 hrs
Front-End Loader	1	100 hrs
Tractor	1	100 hrs
Snowmobiles	2	200 mi

3.3 SUMMARY OF MOBILE SOURCE EMISSIONS

Table 9 summarizes the mobile source emissions calculated above in a format that allows comparison between the various sources as well as providing totals for each pollutant or pollutant category under consideration.

TABLE 9: SUMMARY OF 2001 MOBILE SOURCE EMISSIONS AT CRATERS OF THE MOON NM & PRES

Activity	Particulates (PM,o)		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		VOCs	
	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr
Road Vehicles										
Visitor Vehicles	957	0.48	--	--	1,372	0.69	19,862	9.93	976	0.49
NPS/GSA Road Vehicles	117	0.06	--	--	269	0.13	2,634	1.32	150	0.07
Road Vehicle Emission Subtotal	1,074	0.54	--		1,641	0.82	22,496	11.25	1,126	0.56
Nonroad0 Vehicles										
NPS Nonroadl ``chicks										
Totals										
	Particulates (PM,o)		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		VOCS	
	lbs/ r									tons/ r
Totals	1,211	0.61	--	--	2,308	1.15	22,964	11.48	1,284	0.64

[1] Includes exhaust, brake, and tire $PM_{1}p$ and dust from paved and unpaved roads

4. CRATERS OF THE MOON NM & PRES AND REGIONAL EMISSION SUMMARY

4.1 CRATERS OF THE MOON NM & PRES SUMMARY

A summary of Craters of the Moon NM & Pres emissions is provided in Table 10.

TABLE 10: ESTIMATED ANNUAL EMISSIONS FROM CRATERS OF THE MOON NM & PRES

Source	***PM*$_{10}$** (tons)	SO_2 (tons)	**NO_X (tons)**	**CO** (tons)	**VOCs (tons)**
Point Sources					
Gasoline Storage Tank					<0.01
Area Sources					
Woodstove	0.03	<0.01	<0.01	0.22	0.20
Wildland Fires	1.10			5.60	0.40
Subtotal	1.13	<0.01	<0.01	5.82	0.60'
Mobile Sources					
Road Vehicles	0.54		0.82	11.25	0.56
Nonroad Vehicles	0.07		0.33	0.23	0.08
Subtotal	0.61		1.15	11.48	0.64
Totals					
Totals	1.74	<0.01	1.15	17.30	1.24

' As methane

4.2 REGIONAL AIR EMISSIONS

Emission estimates for Butte, Blaine, Power, Minidoka, and Lincoln Counties and the State of Idaho were obtained from the 1999 National Emission Inventory (NEI) maintained by USEPA. It is important to note that differences may exist between the methodologies used to generate the park emission inventory and those used to generate the NEI. For example, here gasoline storage tanks have been included as stationary sources, while the NEI treats them as area sources. Table 11 provides a comparison of Craters of the Moon NM & Pres emissions with those from the surrounding counties and the State of Idaho. For all pollutants, Craters of the Moon NM & Pres emissions account for less than 1 percent of the surrounding counties point source emissions.

TABLE 11: ESTIMATED ANNUAL EMISSIONS FROM CRATERS OF THE MOON NM & PRES, SURROUNDING COUNTIES, AND THE STATE OF IDAHO

Area	PM_{10} (tons/yr)	SO_2 **(tons/yr)**	NO_X **(tons/yr)**	**CO (tons/yr)**	**VOC (tons/yr)**
Point Sources					
Craters of the Moon NM & Pres	--	--	--	--	<0.01
Butte County	5	658	519	8	0
Blaine County	N.D.	N.D.	N.D.	N.D.	N.D.
Power County	1,964	10,069	1,021	14	0
Minidoka County	630	511	432	131	2
Lincoln County	N.D.	N.D.	N.D.	N.D.	N.D.
Surrounding County Totals	2,599	11,238	1,972	153	2
Idaho Totals (	12,492 I	23,671 (	6,051	4,408	451
Area Sources					
Craters of the Moon NM & Pres	1.13	<0.01 `	<0.01 ~	5.82	0.60
Butte County	863	13	21	446	189
Blaine County	1,764	154	496	4,216	670
Power County					569
Minidoka County	2,068	186	544	736	991
Lincoln County	954	16	30	463	177
Surrounding County Totals	9,119	442	1,349	6,423	2,596
Idaho Totals	158,405	7,936	32,216	578,602	71,740
Mobile Sources					
Craters of the Moon NM & Pres	0.61	--	1.15	11.48	0.64
Butte County	1,949	34	376	1,160	128
Blaine County	4,985	132	1,174	8,733	1,007
Power County	2,288	118	1,596	5,211	618
Minidoka County					741
Lincoln County	2,215	38	423	1,307	144
Surrounding County Totals	18,763	468	5,333	23,843	2,638
Idaho Totals	293,608	6,950	86,384	478,789	60,014

N.D.-No Data

5. COMPLIANCE AND RECOMMENDATIONS

5.1 COMPLIANCE

The Idaho Depaitinent of Environmental Quality (DEQ) is the governing authority for regulating air pollution in the park. Park personnel should coordinate with the agency on permit issues relating to stationary sources, as well as prescribed burning activities. Prior to replacing or adding relatively large heating units, generators, and fuel storage tanks, the Idaho DEQ should be consulted regarding the need to obtain a permit to construct or a permit to operate such sources. For example, the Idaho Administrative Code 58.01.01 exempts from its permit requirements:

- Fuel burning equipment that uses gaseous (natural gas or propane) fuel and has a design rate of less than fifty (50) million Btus per hour heat input (222.02c)
- Other fuel burning equipment that has a design rate of less than one (1) million Btus per hour heat input (222.02d)
- Emergency standby generators that are operated less than 200 hours per year (222.01d)
- Stationary internal combustion engines that are rated at less than or equal to 600 hp (222.01c).

Section 607 authorizes "...fires used for preparation of food or for recreational purposes (e.g., campfires, ceremonial fires, and barbecues..." These regulations are included in Appendix D of this report.

The Idaho DEQ has a statewide woodstove program that encourages the use of cleaner-burning woodstoves and is designed to help homeowners burn wood more efficiently and create less pollution. Idaho law requires DEQ to verify that old woodstoves are not reused. DEQ helps prevent the reuse of old woodstoves by managing drop-off sites for owners of old woodstoves. Operators of DEQ-approved drop-off sites must agree to destroy the old woodstoves that are typically recycled for scrap.

The park has developed a Wildland Fire Management Plan that provides a detailed program of action to carry out fire management policies and objectives (Craters of the Moon 2000). Development of an approved fire management plan facilitates the goal of managing wildfire fires in portions of the park for resource benefits. As outlined in the plan, the park coordinates on smoke management issues with the Idaho DEQ and confoims to the requirements of the South Idaho Cooperative Smoke Management Plan, which is a voluntary program that emphasizes spring and fall prescribed burning. The program is being expanded to include smoke emissions from wildfire use, and the park will stay informed on the program's development and comply with its recommended actions.

The use of prescribed fire within Craters of the Moon National Monument is not contemplated in their plan since the potential resource objectives of a prescribed fire program have not been sufficiently documented as yet, and the park currently lacks qualified staff to develop and implement such a program. This does not indicate a decision regarding the appropriateness of prescribed fire in the park nor does it preclude incorporation of a prescribed fire program in future revisions of the plan.

5.2 RECOMMENDATIONS

Actions to promote sustainable development in the design, retrofit, and construction of park facilities have associated air quality benefits. These include actions that reduce or replace consumption of conventional fossil fuels and/or reduce the consumption of other resources. Reductions in potable and non-potable water consumption also achieve concurrent reductions in energy consumption and associated air emissions. Acquisition of energy efficient appliances whenever possible also is an incremental energy saving measure that has associated air quality benefits.

Park initiatives include motion sensors in the Visitor Center restrooms and a drastic reduction in lawn irrigation. A number of years ago, park officials determined that lawn irrigation was responsible for two-thirds of their summer water consumption and decided to curtail the majority of it. None of the park buildings are air-conditioned, which saves significant energy costs. There is no recycling program in the park due to the relatively low volume of potential recyclable materials and the distance to a recycling facility. There is minimal potential for the utilization of alternative fuels in park-owned vehicles due the relatively few vehicles and low mileages compared to other western parks.

The only air quality issue that was noted by the park superintendent was the receipt of a visitor complaint about a tour bus idling for an extended time at the Visitor Center. With the exception of the INEEL, there is no industry in the vicinity of the park. Although the INEEL once produced its own power, there are no longer any air issues, other than potential radionuclides, associated with its operation.

6. REFERENCES

College of Engineering at the University of California's Riverside Campus (CE-CERT). 2001. *Air Emissions Inventory for Zion National Park.*

Craters of the Moon National Monument. 2000. *Wildland Fire Management Plan.*

EA Engineering, Science, and Technology. 2001. *Air Emission Inventory Preparation Plan.* Prepared for the National Park Service. November.

National Park Service. 2003. National Park Service Air Quality Trends 1993-2002. Air Resources Division.

National Park Service. 2002. *Air Quality in the National Parks.* Second edition. September.

USEPA, 1995a. *Compilation of Air Pollution Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources.*

USEPA, 1995b. *Highway Vehicle Particulate Emission Modeling Software "PARTS".* Office of Transportation and Air Quality.

USEPA, 2002. *User's Guide to MOBILE6.1 and MOBILE6.2 Mobile Source Emission Factor Model.* EPA420-R-02-010. Office of Air and Radiation. March.

USEPA, 2000a. *Factor Information REtrieval (FIRE) Data System.* Office of Air Quality Planning and Standards.

USEPA, 2000b. *TANKS 4.09a.* Office of Air Quality Planning and Standards.

U.S. Forest Service. 1997. *First Order Fire Effects Model (FOFEM) 4.0 User's Guide.* January.

APPENDIX A

FUEL DATA AND EMISSION FACTORS

FUEL DATA

Fuel	Heating Value	Sulfur Content
No. 2 Distillate Fuel Oil/Diesel	140,000 Btu/gal	0.05% by weight
Natural Gas	1,050 Btu/ft'	2,000 grains/10^6 ft^3
Propane	91,500 Btu/gal	0.18 grains/100 ft^3

STATIONARY SOURCE EMISSION FACTORS - BOILERS/HEATING UNITS

DISTILLATE OIL (DF-2) - CRITERIA POLLUTANTS

Combustor Type	Emission Factor (lb/1,000 gal fuel burned)				
	PM[a]	SO_2[b]	NO_x[e]	CO	VOC[d]
Residential Furnace[e]	0.4	142S	18	5	0.713
Boilers < 100 Million Btu/hr (Commercial/Institutional Combust.[c])	2	142S	20	5	0.34
Boilers < 100 Million Btu/hr (Industrial Boilers[s])	2	142S	20	5	0.2
Boilers > 100 Million Btu/hr (Utility Boilers[b])	2	157S	24	5	--

Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Tables 1.3-1 and 1.3-3.

NATURAL GAS - CRITERIA POLLUTANTS

Combustor Type (MMBtu/hr Heat Input)	Emission Factor (lb/10^6 ft^3 fuel burned)				
	pMG)	$S0_2$	NO_X[e]	CO	VOC
Residential Furnaces (<0.3)					
-Uncontrolled	7.6	0.6	94	40	5.5
Tangential-Fired Boilers (All Sizes)					
-Uncontrolled	7.6	0.6	170	24	5.5
-Controlled-Flue gas recirculation	7.6	0.6	76	98	5.5
Small Boilers (<100)					
-Uncontrolled	7.6	0.6	100	84	5.5
-Controlled-Low NO, burners	7.6	0.6	50	84	5.5
-Controlled-Low NO,, burners/Flue gas recirculation	7.6	0.6	32	84	5.5
Large Wall-Fired Boilers (>100)					
-Uncontrolled (Pre-NSPS)[,k]	7.6	0.6	280	84	5.5
-Uncontrolled (Post-NSPS)[k]	7.6	0.6	190	84	5.5
-Controlled-Low NO,, burners	7.6	0.6	140	84	5.5
-Controlled-Flue gas recirculation	7.6	0.6	100	84	5.5

Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Tables 1.4-1 and 1.4-2.

STATIONARY SOURCE EMISSION FACTORS - BOILERS/HEATING UNITS (Continued)

PROPANE (LPG) - CRITERIA POLLUTANTS					
Combustor Type	Emission Factor (lb/1,000			al fuel burned)	
	PM[a]	S02[b]	NO_X[c]	CO	VOCP
Commercial Boilers[f]	0.4	0.10S	14	1.9	0.3
Industrial Boilers[9]	0.6	0.105	19	3.2	0.3
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 1.5-1.					

STATIONARY SOURCE EMISSION FACTORS - GENERATORS

For generators rated at less than or equal to 448 kW (600 hp):

	Emission Factor (lb/h -hr)				
Fuel Type	PM	So,,	NO,,	CO	VOC
DF-2	2.20 E-03	2.05 E-03	0.031	6.68 E-03	2.51 E-03
Gasoline	7.21 E-04	5.91 E-04	0.011	0.439	0.022
Natural Gas/Propane	1.54 E-04	7.52 E-03(S)	3.53 E-03	8.6 E-04	1.92 E-04
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 3.3-1 and 3.1-1					

For generators rated at greater than 448 kW (600 hp):

Fuel Type	Emission Factor (lb/hp-hr)				
	PM	SO_X[b]	NO,,	CO	VOC
DF-2	0.0007	(8.09 E-03)S	0.024	5.5 E-03	6.4 E-04
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 3.4-1.					

FIREPLACE EMISSION FACTORS

Fuel Type	Emission Factor (lb/ton)				
	PM°)	SO_X	NO_X[c]	CO	VOC
Wood	34.6	0.4	2.6	252.6	229.0
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 1.9-1.					

WOODSTOVE EMISSION FACTORS

Stove Type	Emission Factor (lb/ton)				
	PM[a]	SO_X[b]	NO_X[c]	CO	VOC[d]
Conventional	30.6	0.4	2.8	230.8	53
Noncatalytic	19.6	0.4	--	140.8	12
Catalytic	20.4	0.4	2.0	104.4	15

Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 1.10-1.

STATIONARY SOURCE EMISSION FACTORS - SURFACE COATING OPERATIONS

Surface Coating Type	VOC Emission Factor (lb/gal)
Paint: Solvent Base	5.6
Paint: Water Base	1.3
Enamel: General	3.5
Lacquer: General	6.1
Primer: General	6.6
Varnish/Shellac: General	3.3
Thinner: General	7.36
Adhesive: General	4.4

Source: *Calculation Methods for Criteria Air Pollutant Emission Inventories,* AL/OE-TR-1994-0049, July 1994. Armstrong Laboratory.

(a) PM = Filterable Particulate Matter.
(b) These factors must be multiplied by the fuel sulfur content (for example, if the sulfur content is 0.05%, then S equals 0.05).
(c) Expressed as NO2.
(d) Emission factors given in AP-42 are actually for non-methane total organic compounds (NMTOC) which includes all VOCs and all exempted organic compounds (such as ethane, toxics and HAPs, aldehydes and semivolatile compounds) as measured by EPA reference methods.
(e) Unit Rating <300,000 Btu/hr.
(f) Unit Rating 3300,000 Btu/hr, but <10,000,000 Btu/hr.
(g) Unit Rating 310,000,000 Btu/hr, but <100,000,000 Btu/hr.
(h) Unit Rating 3100,000,000 Btu/hr.
(i) POM = Particulate POM only.
(j) PM = Filterable Particulate Matter + Condensible Particulate Matter.
(k) NSPS = New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction, modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction, modification, or reconstruction after June 19, 1984.
(l) Emission factors are given on a fuel input basis (lb/MMBtu). To convert to a power output basis (lb/hp-hr), use an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr.

APPENDIX B

EMISSION CALCULATIONS

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Craters of the Moon
City:	Pocatello
State:	Idaho
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	1,00 gal gasoline tank

Tank Dimensions

Shell Length (ft):	10.75
Diameter (ft):	4.00
Volume (gallons):	1,000.00
Turnovers:	0.00
Net Throughput (gal/yr):	2,535.00
Is Tank Heated (yin):	N
Is Tank Underground (y/n):	Y

Paint Characteristics

Shell Color/Shade:	
Shell Condition:	

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig):	0.00

Meteorological Data used in Emissions Calculations: Pocatello, Idaho (Avg Atmospheric Pressure = 12.53 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 8)	All	45.79	45.79	45.79	45.35	3.0194	3.0194	3.0194	68.0000			92.00	Option 4: RVP=8, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 8)	12.39	0.00	12.39

2001 ACTUAL EMISSIONS FROM WOODSTOVES AT **CRATERS OF THE MOON NM** & **PRES**

Woodstoves

Location	Number	Cords	tons/yr	PM (lbs/yr)	S02 (lbs/yr)	NOx (Ibs/yr)	Co (Ibs/yr)	VOC (lbs/yr)
Emplyee Residences	1	1	1.76	61	1	5	443	402
				(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
				0.03	0.00	0.00	0.22	0.20

TITLE:-Results- of FOFEM model execution on date: 7/21/2003

FUEL CONSUMPTION CALCULATIONS

Region: Interior West
Cover Type: SAF/SRM - SRM 402 - Mountain Big Sagebrush
Fuel Type: Natural
Fuel Reference; FOFEM 461

FUEL CONSUMPTION TABLE

Fuel Component Name	Preburn Load (t/acre)	Consumed Load (t/acre)	Postburn Load (t/acre)	Percent Reduced (%)	Equation Reference Number	Moistur
Litter	0.07	0.07	0.00	100.0	999	
Wood (0-1/4 inch)	0.00	0.00	0.00	0.0	999	
Wood (1/4-1 inch)	0.00	0.00	0.00	0.0	999	25.0
Wood (1-3 inch)	0.00	0.00	0.00	0.0	999	
Wood (3+ inch) Sound	0.00	0.00	0.00	0.0	999	20.0
3->6	O.OD	0.00	0.00	0.0		
6->9	0.00	0.00	0.00	0.0		
9-y''20	0.00	0.00	0.00	0.0		
20=>	0.00	0.00	0.00	0.0		
Wood (3+ inch) Rotten	0.00	0_00	0.00	0.0	999	20.0
3->6	0_00	0.00	0.00	0.0		
6->9	0.00	0.00	0.00	0.0		
9->20	0.00	0.00	0.00	0.0		
20->	0.00	0_00	0.00	0_0		
Duff	0.00	0.00	0.00	0.0	2	100.0
Herbaceous	0.45	0.45	0.00	100.0	22	
Shrubs	1.26	0.63	0.63	50_0	232	
Crown foliage	0.00	0.00	0.00	0_0	37	
Crown branchwood	0.00	0.00	0.00	0.0	38	
Total Fuels	1.78	1.15	0.63	64.6		

FIRE EFFECTS ON FOREST FLOOR COMPONENTS

Forest Floor Component	Preburn Condition	Amount Consumed	Postburn Condition	Percent Reduced	Equation Number
Duff Depth (in)	0.0	0.0	0.0	0.0	6.
Min Soil Exp (%)	.0	21.9	21.9	21.9	10

	Emissions -- lbs/acre flaming	smoldering	total
PM 10	7	4	11
PM 2.5	6	3	9
CH 4	2	2	4
CO	14	42	56
CO 2	3841	172	4013

	Consumption tons/acre	Duration hour:min:sec
Flaming:	1.08	00.01:00
Smoldering:	0.07	00:01:00
Total:	1.15	

TITLE: Results of FOFEM model execution on date: 7/21/2003

FUEL CONSUMPTION CALCULATIONS

Region: Interior West
Cover Type: SAF/SRM - SRM 324 Threetip Sage Idaho Fescue
Fuel Type: Natural
Fuel Reference: FOFEM 461

vs

FUEL CONSUMPTION TABLE

Fuel Component Name	Preburn Load (t/acre)	Consumed Load (t/acre)	Postburn Load (t/acre)	Percent Reduced (%)	Equation Reference Number	Moistux
Litter	0.07	0.07	0.00	100.0	999	
Wood (0-1/4 inch)	0.00	0.00	0.00	0.0	999	
Wood (1/4-1 inch)	0.00	0.00	0.00	0.0	999	25.0
Wood (1-3 inch)	0.00	0.00	0.00	0.0	999	
Wood (3+ inch) Sound	0.00	0.00	0.00	0.0	**999**	20.G
3->6	0.00	0.00	0.00	0.0		
6->9	0.00	0.00	0.00	0.0		
ti->20	0.00	0.00	0.00	0.0		
20->	0.00	0.00	0.00	0.0		
Wood (3+ inch) Rotten	0.00	0.00	0.00	0.0	999	20.0
3->6	0.00	0.00	0.00	0.0		
6->9	0.00	0.00	0.00	0.0		
9->20	0.00	0.00	0.00	0.0		
20->	0.00	0.00	0.00	0.0		
Duff	0.00	0.00	0.00	0.0	2	100.0
Herbaceous	0.45	0.45	0.00	100.0	22	
Shrubs	1.26	0.63	0.63	50.0	232	
Crown foliage	0.00	0.00	0.00	0.0	37	
Crown branchwood	0.00	0.00	0.00	0.0	38	
Total Fuels	1.78	1.15	0.63	64.6		

FIRE EFFECTS ON FOREST FLOOR COMPONENTS

Forest Floor Component	Preburn Condition	Amount Consumed	Postburn Condition	Percent Reduced	Equation Number
Duff Depth (in)	0.0	0.0	0.0	0.0	. 6
Min Soil Exp (%)	.0	21.9	21.9	21.9	10

	Emissions -- lbs/acre flaming	smoldering	total
PM 10	7	4	11
PM 2.5	6	3	9
CH 4	2	2	4
CO	14	42	56
CO 2	3841	172	4013

	Consumption tons/acre	Duration hour:min:sec
Flaming:	1.08	00:01:00
Smoldering:	O. CW	00:01:00
Total:	1.15	

2001 WILDLAND FIRE EMISSIONS AT CRATERS OF THE MOON NM & PRES

Fuel Type	Acres	PM,p (Ibs/yr)	$PM_{2.5}$ (lbs/yr)	CH_4 (Ibs/yr)	CO (lbs/yr)	CO_2 (Ibs/yr)	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)	CH_4 (tons/yr)	CO (tons/yr)	CO_2 (lbs/yr)
Mountain Sagebrush	100	1,100	900	400	5,600	401,300	0.55	0.45	0.20	2.80	200.65
Threetip Sage	100	1,100	900	400	5,600	401,300	0.55	0.45	0.20	2.80	200.65
Totals	200	2,200	1,800	800	11,200	802,600	1.10	0.90	0.40	5.60	401.30
		Emission Factors (lbs/acre)									
Mountain Sagebrush		11	9	4	56	4,013					
Threetip Sage		11	9	4	56	4,013					

```
# # # # # # # # # # # # # # # # # # # # # # # # # # # # #
Craters of the Moon NM Winter Conditions.
File 1, Run 1, Scenario 21.
# # # # # # # # # # # # # # # # # # # # # # # # # # # # #
M584 Warning:
           The user supplied area wide average speed of 35.0
           will be used for all hours of the day. 100% of VMT
           has been assigned to a fixed combination of freeways,
           freeway ramps, arterial/collector and local roadways
           for all hours of the day and all vehicle types.

Reading PM Gas Carbon ZML Levels
from the external data file PMGZML.CSV

Reading PM Gas Carbon DR1 Levels
from the external data file PMGDR1.CSV

Reading PM Gas Carbon DR2 Levels
from the external data file PMGDR2.CSV

Reading PM Diesel Zero Mile Levels
from the external data file PMDZML.CSV

Reading the First PM Deterioration Rates
from the external data file PMDDR1.CSV

Reading the Second PM Deterioration Rates
from the external data file PMDDR2.CSV

        User supplied gasoline sulfur content = 300.0 ppm.

M616 Comment:
             User has supplied post-1999 sulfur levels.
M 48 Warning:
            there are no sales for vehicle class HDGV8b

                  Calendar Year:   2001
                          Month:   Jan.
                       Altitude:   High
            Minimum Temperature:   10.0  (F)
```

Maximum Temperature: 29.0 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 13.4 psi
Weathered RVP: 13.4 psi
Fuel Sulfur Content: 299. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	0.879	1.221	1.102	1.171	0.991	0.433	0.439	0.509	2.62	0.992
Composite CO	22.08	29.09	26.00	27.77	29.28	1.308	0.931	6.582	28.21	23.365
Composite NOX :	0.917	1.337	1.557	1.431	3.971	1.267	1.212	16.834	1.29	1.359

Veh. Type:	LDGT1	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016
Composite Emission Factors (g/mi):						
Composite VOC :	1.143	1.245	1.072	1.169	2.424	0.391
Composite CO	28.34	29.32	25.86	26.29	6.522	0.795
Composite NOX :	1.052	1.424	1.406	1.892	2.555	1.180

Veh. Type:	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGVBA	HDGV8B
VMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Composite Emission Factors (g/mi):								
Composite VOC :	0.991	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO	29.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Composite NOX :	3.971	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B

```
            VMT Mix:     0.0020     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000
-------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.378      0.000      0.000      0.000      0.000      0.000      0.000      0.000
     Composite CO          1.942      0.000      0.000      0.000      0.000      0.000      0.000      0.000
     Composite NOX :      4.150      0.000      0.000      0.000      0.000      0.000      0.000      0.000
-------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Craters of the Moon NM Summer Conditions.
* File 1,  Run 1, Scenario 22.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M584 Warning:
             The user supplied area wide average speed of 35.0
             will be used for all hours of the day. 100% of VMT
             has been assigned to a fixed combination of freeways,
             freeway ramps, arterial/collector and local roadways
             for all hours of the day and all vehicle types.

• Reading PM Gas Carbon ZML Levels
• from the external data file PMGZML.CSV

• Reading PM Gas Carbon DR1 Levels
• from the external data file PMGDR1.CSV

• Reading PM Gas Carbon DR2 Levels
• from the external data file PMGDR2.CSV

• Reading PM Diesel Zero Mile Levels
• from the external data file PMDZML.CSV

• Reading the First PM Deterioration Rates
• from the external data file PMDDR1.CSV

• Reading the Second PM Deterioration Rates
• from the external data file PMDDR2.CSV

          User supplied gasoline sulfur content = 300.0 ppm.

  M616 Comment:
               User has supplied post-1999 sulfur levels.
```

M 48 Warning:
there Are no sales for vehicle class HDGV8b

Calendar Year:	2001
Month:	July
Altitude:	High
Minimum Temperature:	51.0 (F)
Maximum Temperature:	84.0 (F)
Absolute Humidity:	75. grains/lb
Nominal Fuel RVP:	8.0 psi
Weathered RVP:	7.9 psi
Fuel Sulfur Content:	299. ppm
Exhaust I/M Program:	No
Evap I/M Program:	No
ATP Program:	No
Reformulated Gas:	No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	0.689	0.854	0.853	0.853	0.790	0.405	0.461	0.490	2.96	0.789
Composite CO	11.95	14.93	14.51	14.75	22.00	1.277	0.945	6.500	23.27	12.893
Composite NOX :	0.740	1.017	1.288	1.132	3.635	1.170	1.239	16.586	0.96	1.146

Veh. Type:	LDGT1	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016
Composite Emission Factors (g/mi):						
Composite VOC :	0.813	0.867	0.834	0.893	2.512	0.418
Composite CO	14.53	15.05	14.42	14.70	6.775	0.824
Composite NOX :	0.807	1.082	1.160	1.570	2.574	1.212

Veh. Type:	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
VMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):								
Composite VOC :	0.790	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO	22.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Composite NOX :	3.635	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B
VMT Mix:	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):								
Composite VOC :	0.374	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO	1.957	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite NOX :	4.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000

. ##########################
• Craters of the Moon NM Winter Conditions.
• File 1, Run 1, Scenario 21.
* #

Calendar Year: 2001
Month: Jan.
Gasoline Fuel Sulfur Content: 299. ppm
Diesel Fuel Sulfur Content: 500. ppm
Particle Size Cutoff: 10.00 Microns
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0042	0.0047	0.0044	0.0046	0.0523	------	------	------	0.0205	0.0050
ECARBON:	------	------	------	------	------	0.1244	0.0488	0.1250		0.0024
OCARBON:	------	------	------	------	------	0.0351	0.0703	0.0997		0.0019
S04:	0.0028	0.0049	0.0047	0.0048	0.0118	0.0049	0.0106	0.0540	0.0010	0.0043
Total Exhaust PM:	0.0071	0.0096	0.0091	0.0094	0.0640	0.1644	0.1297	0.2786	0.0215	0.0136
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0115	0.0040	0.0080
Total PM:	0.0276	0.0302	0.0297	0.0300	0.0846	0.1849	0.1503	0.3027	0.0380	0.0341
S02:	0.0684	0.0804	0.1134	0.0944	0.1603	0.0939	0.2028	0.7715	0.0328	0.0872
NH3:	0.1016	0.1005	0.1015	0.1009	0.0451	0.0068	0.0068	0.0270	0.0113	0.0970
Idle Emissions (g/hr)										
PM Idle:	------	------	------	------	------	------	------	1.0557		0.0190

Veh. Type:	LDGTJ	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016
Composite Emission Factors (g/mi):						
Lead:	0.0000	0.0000	0.0000	0.0000		
GASPM:	0.0047	0.0047	0.0044	0.0044		
ECARBON:					0.1498	0.0464
OCARBON:					0.2156	0.0668

S04:	0.0049	0.0049	0.0047	0.0047	0.0062	0.0107
Total Exhaust PM:	0.0096	0.0096	0.0091	0.0091	0.3717	0.1238
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Total PM:	0.0302	0.0302	0.0297	0.0297	0.3922	0.1444
S02:	0.0804	0.0804	0.1134	0.1134	0.1196	0.2049
NH3:	0.1005	0.1005	0.1015	0.1015	0.0068	0.0068

Idle Emissions (g/hr)

PM Idle:	------	------	------	------	------	------

Veh. Type:	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
VMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):

Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GASPM:	0.0523	0.0523	0.0503	0.0504	0.0503	0.0503	0.0503	0.0000
ECARBON:	------	------	------	------	------	------	------	
OCARBON:	------	------	------	------	------	------	------	------
S04:	0.0118	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.0640	0.0523	0.0503	0.0504	0.0503	0.0503	0.0503	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total PM:	0.0846	0.0523	0.0503	0.0504	0.0503	0.0503	0.0503	0.0000
S02:	0.1603	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3:	0.0451	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Idle Emissions (g/hr)

PM Idle:	------	------	------	------	------	------

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B
VMT Mix:	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):

Lead:	------	------	------	------	------	------	------	------
GASPM:	------	------	------	------	------	------		
ECARBON:	0.0514	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OCARBON:	0.0535	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S04:	0.0172	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.1221	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total PM:	0.1426	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S02:	0.2452	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3	0.0270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Idle Emissions (g/hr)								
PM Idle:	1.0617	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

* #
* Craters of the Moon NM Summer Conditions.
* File 1, Run 1, Scenario 22.
* #

Calendar Year: 2001
Month: July
Gasoline Fuel Sulfur Content: 2 ppm
Diesel Fuel Sulfur Content: 5 ppm
Particle Size Cutoff: 10.00 Microns
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0042	0.0046	0.0044	0.0045	0.0523	------	------	------	0.0205	0.0050
ECARBON:	------	------	------	------	------	0.1192	0.0485	0.1160	------	0.0023
OCARBON:	------	------	------	------	------	0.0336	0.0698	0.0926	------	0.0018
SO4:	0.0028	0.0049	0.0047	0.0048	0.0120	0.0049	0.0106	0.0540	0.0010	0.0042
Total Exhaust PM:	0.0070	0.0095	0.0091	0.0093	0.0643	0.1576	0.1289	0.2626	0.0215	0.0133
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0116	0.0040	0.0080
Total PM:	0.0276	0.0300	0.0297	0.0299	0.0848	0.1782	0.1494	0.2867	0.0380	0.0338
S02:	0.0684	0.0804	0.1134	0.0944	0.1601	0.0929	0.2031	0.7714	0.0328	0.0872
NH3:	0.1016	0.1007	0.1015	0.1010	0.0451	0.0068	0.0068	0.0270	0.0113	0.0970
Idle Emissions (g/hr)										
PM Idle:	------	------	------	------	------	------	------	1.0472	------	0.0189

Veh. Type:	LDGT1	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016

Conpooite Emission Factors (g/mi):

Lead:	0.0000	0.0000	0.0000	0.0000	------	------
GASPM:	0.0046	0.0046	0.0044	0.0044	------	------
ECADBO0:	------	------	------	------	0.1498	0.0464
OCARBON:	------	------	------	------	0.2156	0.0668
G04:	0.0049	0.0049	0.0047	0.0047	0.0062	0.0107
Total Exhaust PM:	0.0095	0.0095	0.0091	0.0091	0.3717	0.1238
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Total PM:	0.0300	0.0300	0.0297	0.0297	0.3922	0.1444
S02:	0.0804	0.0804	0.1134	0.1134	0.1196	0.2049
NH3:	0.1007	0.1007	0.1015	0.1015	0.0068	0.0068

Idle Emissions (g/hr)

PM Idle:	------	------	------	------	------	------

Veh. Type:	HDGV2B	HDGV3	HDGV4	8DGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
\OMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Cong?oaite Emission Factors (g/mi):

Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GASPM:	0.0523	0.0523	0.0506	0.0506	0.0506	0.0506	0.0505	0.0000
ECARBON:	------	------	------	------	------	------	------	------
ocARBmN:	------	------	------	------	------	------	------	------
SO4:	0.0120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.0643	0.0523	0.0506	0.0506	0.0506	0.0506	0.0505	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total PM:	0.0848	0.0523	0.0506	0.0506	0.0506	0.0506	0.0505	0.0000
S02:	0.1601	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ne3:	0.0451	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Idle Emissions (g/hr)

PM Idle:	------	------	------	------	------	------	------	------

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	BDDV8B
						- — — —		
vMT Mix:	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):

Lead:	
GaSPm:	- — — —

ECARBON:	0.0503	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OCARBON:	0.0523	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S04:	0.0171	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.1198	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total PM:	0.1403	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S02:	0.2450	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3:	0.0270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Idle Emissions (g/hr)								
PM Idle:	1.0504	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

CRATERS OF THE MOON NM & **PRES VISITOR VEHICLE EMISSIONS**

Paved Road
AnnualVMT
498,000

Emission Factors (g/mi) - All **Vehicles**

				PM_{10} (Paved)		
	NO_X	CO	VOC	Exhaust, Brake, and Tire	Fugitive	Total
Summer	1.146	12.893	0.789	0.0338	0.84	0.8738
Winter	1.359	23.365	0.992	0.0341	0.84	0.8741
Average	1.253	18.129	0.891			0.874

Emissions (tons/yr) - All Vehicles

NO_X	CO	VOC	Paved PM_{10}
0.69	9.93	0.49	0.48

Emissions (lbs/yr) - All Vehicles

NO_X	CO	VOC	Paved PM10
1,372	19,862	976	957

CRATERS OF THE MOON NM & PRES NPS VEHICLES

	MC	LDGT	LDDT	HDDV	Total
Total Miles	6,000	48,000	3,000	3,000	60,000

Emission Factors (glmi) - MC

	NO_x	CO	VOC	PM, Exhaust, Brake, and Tire	PM, Fugitive	PM, Total
Summer	0.9600	23.2700	2.9600	0.0380	0.8400	0.8780
Winter	1.2900	28.2100	2.6200	0.0380	0.8400	0.8780
Average	1.1250	25.7400	2.7900			0.8780

Emissions (tonstyr) - MC

NO_x	CO	VOC	PM_{10}
0.01	0.17	0.02	0.01

Emissions (lbstyr) - MC

15	340	37	12

Emission Factors (glmi) - LDGT

	NOx	CO	VOC	PM,o Exhaust, Brake, and Tire	PM,o Fugitive	PM,o Total
Summer	1.132	14.750	0.853	0.030	0.840	0.870
Winter	1.431	27.770	1.171	0.030	0.840	0.870
Average	1.282	21.260	1.012			0.870

Emissions (tonstyr) - LDGT

NO_x	CO	VOC	PM"
0.07	1.12	0.05	0.05

Emissions (lbstyr) - LDGT

135	2,245	107	92

Emission Factors (glmi) - LOOT

	NOx	CO	VOC	PM, Exhaust, Brake, and Tire	PM, Fugitive	PM, Total
Summer	1.239	0.945	0.461	0.149	0.840	0.989
Winter	1.212	0.931	0.439	0.150	0.840	0.990
Average	1.226	0.938	0.450			0.990

Emissions (tons/yr) - LDDT

NO_x	CO	VOC	PM,
0.0040	0.0031	0.0015	0.0033

Emissions (lbstyr) - LDDT

8	6	3	7

Emission Factors (glmi) - HDDV

	NO_x	CO	VOC	PM,, Exhaust, Brake, and Tire	PM,, Fugitive	PM,, Total
Summer	16.586	6.500	0.490	0.287	0.840	1.127
Winter	16.834	6.582	0.509	0.303	0.840	1.143
Average	16.710	6.541	0.500			1.135

Emissions (tonstyr) - HDDV

NO_x	CO	VOC	PM,,
0.06	0.02	0.00	0.00

Emissions (lbstyr) - HDDV

110	43	3	7

Emissions (tonstyr)-Total

NO,	CO	VOC	PM,,
0.13	1.32	0.07	0.06

Emissions (lbstyr) - Total

NO_x	CO	VOC	PM,,
269	2,634	150	117

2001 CRATERS OF THE MOON NM & PRES NONROAD VEHICLE EMISSIONS

Vehicle	No.	Emission Factors (gm/hp-hr) PM	Nox	CO	VOC	hp	load	hrs/yr	Emissions (lbs/yr) PM	Nox	CO	VOC
ATV	3	2.04	1.03	2.31	2.19	18	0.55	100	13.3	6.7	15.1	14.3
Tractors	1	2.04	1.03	2.31	2.19	40	0.68	100	12.2	6.2	13.8	13.1
Backhoe	1	2.04	1.03	2.31	2.19	70	0.55	250	43.2	21.8	48.9	46.4
Riding Mower	1	1.11	10.3	4.8	1.3	20	0.55	100	2.7	24.9	11.6	3.1
Front End Loader	1	1.11	10.3	4.8	1.3	77	0.55	630	65.2	604.6	281.7	76
		Emission Factors (qr/mi)						mi/yr				
Snowmobiles	2	0.073	2.98	109.9	5.85			200	0.1	2.6	96.7	5.1
							Totals:	(lbs/yr)	137	667	468	158
								(tons/yr)	0.07	0.33	0.23	0.08

APPENDIX C

PUBLIC USE DATA

Monthly Public Use Report

Printed on 01/20/2003

CRATERS of the MOON NM			12/2001	9280
	December 2001			
	Recreational	Non-Recreational	Total	Calendar Year-To-Date
Visits	161	0	161	185,798
Visitor Hours	384		384	539,797
				Fiscal YTD
Total Fiscal YTD Visitor Days				3,827

Recreation O/N stays	Current Month	Year-To-Date	
Concessioner Lodging	0	0	NPS Campgrounds
Concessioner Campgrounds	0	o	Tents 3
NPS Campgrounds	3	10,859	Rens 0
NPS Backcountry	0	145	Total 3
NPS Miscellaneous	0	690	
Non Recreation O/N stays	0	0	
Total Overnight stays	3	11,694	

	This Month	Same Month Last Year	Percent Change
Total Rec	161	1,770	-90.89
Total NonRec	0	0	0.00
Total Visits	161	1,770	-90.89
Total YTD	185,798	211,644	-12.21

APPENDIX D

SELECTED IDAHO AIR QUALITY REGULATIONS

iii. Cause or significantly contribute to a violation of an ambient air quality standard, based upon the applicable air quality models, data bases, and other requirements of 40 CFR Part 51, Appendix W (Guideline on Air Quality Models). No demonstration under this subsection is required for those sources listed at Subsection 222.02. (4-5-00)

b. Combination. The source is not part of a proposed new major facility or part of a proposed major modification. (4-5-00)

02. Record Retention. Unless the source is subject to and the owner or operator complies with Section 385, the owner or operator of the source, except for those sources listed in Subsections 222.02.a. through 222.02.g., shall maintain documentation on site which shall identify the exemption determined to apply to the source and verify that the source qualifies for the identified exemption. The records and documentation shall be kept for a period of time not less than five (5) years from the date the exemption determination has been made or for the life of the source for which the exemption has been determined to apply, which ever is greater, or until such time as a permit to construct or an operating permit is issued which covers the operation of the source. The owner or operator shall submit the documentation to the Department upon request. (4-5-00)

221. **CATEGORY I EXEMPTION.**
No permit to construct is required for a source that satisfies the criteria set forth in Section 220 and the following: (4-5-00)

01. Below Regulatory Concern. The maximum capacity of a source to emit an air pollutant under its physical and operational design considering limitations on emissions such as air pollution control equipment, restrictions on hours of operation and restrictions on the type and amount of material combusted, stored or processed shall be less than ten percent (10%) of the significant emission rates set out in the definition of significant at Section 006. (4-5-00)

02. Radionuclides. The source shall have potential emissions that are less than one percent (1%) of the applicable radionuclides standard in 40 CFR Part 61, Subpart H. (4-5-00)

03. Toxic **Air Pollutants.** The source shall comply with Section 223. (4-5-00)

222. **CATEGORY II EXEMPTION.**
No permit to construct is required for the following sources. (4-5-00)

01. Exempt Source. A source that satisfies the criteria set forth in Section 220 and that is specified below: (4-5-00)

a. Laboratory equipment used exclusively for chemical and physical analyses, research or education, including, but not limited to, ventilating and exhaust systems for laboratory hoods. To qualify for this exemption, the source shall: (5-1-94)

i. Comply with Section 223. (4-5-00)

ii. Have potential emissions that are less than one percent (1%) of the applicable radionuclides standard in 40 CFR Part 61, Subpart H. (4-5-00)

b. Environmental characterization activities including emplacement and operation of field instruments, drilling of sampling and monitoring wells, sampling activities, and environmental characterization activities. (4-5-00)

c. Stationary internal combustion engines of less than or equal to six hundred (600) horsepower and which are fueled by natural gas, propane gas, liquefied petroleum gas, distillate fuel oils, residual fuel oils, and diesel fuel; waste oil, gasoline, or refined gasoline shall not be used. To qualify for this exemption, the source must be operated in accordance with the following: (5-1-94)

i. One hundred (100) horsepower or less -- unlimited hours of operation. (5-1-94)

ii. One hundred one (101) to two hundred (200) horsepower -- less than four hundred fifty (450) hours per month. (5-1-94)

iii. Two hundred one (201) to four hundred (400) horsepower -- less than two hundred twenty-five (225) hours per month. (5-1-94)

iv. Four hundred one (401) to six hundred (600) horsepower -- less than one hundred fifty (150) hours per month. (5-1-94)

d. Stationary internal combustion engines used exclusively for emergency purposes which are operated less than two hundred (200) hours per year and are fueled by natural gas, propane gas, liquefied petroleum gas, distillate fuel oils, residual fuel oils, and diesel fuel; waste oil, gasoline, or refined gasoline shall not be used. (4-5-00)

e. A pilot plant that uses a slip stream from an existing process stream not to exceed ten percent (10%) of that existing process stream or which satisfies the following: (4-5-00)

i. The source shall comply with Section 223. For carcinogen emissions, the owner or operator may utilize a short term adjustment factor of ten (10) by multiplying either the acceptable ambient concentration or the screening emissions level, but not both, by ten (10). (4-5-00)

ii. The source shall have uncontrolled potential emissions that are less than one percent (1%) of the applicable radionuclides standard in 40 CFR Part 61, Subpart H. (4-5-00)

iii. The exemption for a pilot plant shall terminate one (1) year after the commencement of operations and shall not be renewed. (4-5-00)

f. Any other source specifically exempted by the Department. A list of those sources unconditionally exempted by the Department will be maintained by the Department and made available upon written request. (4-5-00)

02. Other Exempt Sources. A source that satisfies the criteria set forth in Section 220 and that is specified below: (4-5-00)

a. Air conditioning or ventilating equipment not designed to remove air pollutants generated by or released from equipment. (5-1-94)

b. Air pollutant detectors or recorders, combustion controllers, or combustion shutoffs. (5-1-94)

c. Fuel burning equipment for indirect heating and for heating and reheating furnaces using natural gas, propane gas, liquified petroleum gas exclusively with a capacity of less than fifty (50) million btu's per hour input. (5-1-94)

d. Other fuel burning equipment for indirect heating with a capacity of less than one million (1,000,000) btu's per hour input. (5-1-94)

e. Mobile internal combustion engines, marine installations and locomotives. (5-1-94)

f. Agricultural activities and services. (5-1-94)

g. Retail gasoline, natural gas, propane gas, liquified petroleum gas, distillate fuel oils and diesel fuel sales. (5-1-94)

h. Used Oil Fired Space Heaters which comply with all the following requirements: (7-1-97)

i. The used oil fired space heater burns only used oil that the owner or operator generates on site, that

is derived from households, such as used oil generated by individuals maintaining their personal vehicles, or on-specification used oil that is derived from commercial generators provided that the generator, transporter and owner or operator burning the oil for energy recovery comply fully with IDAPA 58.01.05.015, "Rules and Standards for Hazardous Waste"; (7-1-97)

(1) For the purposes of Subsection 222.02.h., "used oil" refers to any oil that has been refined from crude oil or any synthetic oil that has been used and, as a result of such use, is contaminated by physical or chemical impurities. (4-5-00)

(2) For the purposes of Subsection 222.02.h., "used oil fired space heater" refers to any furnace or apparatus and all appurtenances thereto, designed, constructed and used for combusting used oil for energy recovery to directly heat an enclosed space. (4-5-00)

ii. Any used oil burned is not contaminated by added toxic substances such as solvents, antifreeze or other household and industrial chemicals; (7-1-97)

iii. The used oil fired space heater is designed to have a maximum capacity of not more than one half (0.5) million BTU per hour; (4-5-00)

iv. The combustion gases from the used oil fired space heater are vented to the ambient air through a stack equivalent to the type and design specified by the manufacturer of the heater and installed to minimize down wash and maximize dispersion; and (7-1-97)

v. The used oil fired space heater is of modern commercial design and manufacture, except that a homemade used oil fired space heater may be used if, prior to the operation of the homemade unit, the owner or operator submits documentation to the Department demonstrating, to the satisfaction of the Department, that emissions from the homemade unit are no greater than those from modern commercially available units. (7-1-97)

03. Any Other Source Specifically Exempted By The Department. A list of those sources unconditionally exempted by the Department will be maintained by the Department and made available upon written request. All sources exempted by the Department shall: (4-5-00)

a. Be analyzed by the Department and determined to meet the requirements of Subsections 220.0l.a.i. and 220.0l.a.ii. (4-5-00)

b. Be analyzed by the Department and determined not to cause or significantly contribute to a violation of any ambient air quality standard. (4-5-00)

223. EXEMPTION CRITERIA AND REPORTING REQUIREMENTS FOR TOXIC AIR POLLUTANT EMISSIONS.

No permit to construct for toxic air pollutants is required for a source that satisfies any of the exemption criteria below, the recordkeeping requirements at Subsection 220.02, and reporting requirements as follows: (4-5-00)

01. Below Regulatory Concern (BRC) Exemption. The source qualifies for a BRC exemption if the uncontrolled emission rate (refer to Section 210) for all toxic air pollutants emitted by the source is less than or equal to ten percent (10%) of all applicable screening emission levels listed in Sections 585 and 586. (4-5-00)

02. Level I Exemption. To obtain a Level I exemption, the source shall satisfy the following criteria: (4-5-00)

a. The uncontrolled emission rate (refer to Section 210) for all toxic air pollutants shall be less than or equal to all applicable screening emission levels listed in Sections 585 and 586; or (4-5-00)

b. The uncontrolled ambient concentration (refer to Section 210) for all toxic air pollutants at the point of compliance shall be less than or equal to all applicable acceptable ambient concentrations listed in Sections 585 and 586. (4-5-00)

02. Air Pollution Episodes. No person shall allow, suffer, cause or permit any open burning to be initiated during any stage of an air pollution episode declared by the Department in accordance with Sections 550, through 562. (3-21-03)

03. Emergency Authority. In accordance with Title 39, Chapter 1, Idaho Code, the Department has the authority to require immediate abatement of any open burning in cases of emergency requiring immediate action to protect human health or safety. (3-21-03)

604. -- 605. (RESERVED).

606. CATEGORIES OF ALLOWABLE BURNING
The purpose of Sections 606 through 617 is to establish categories of open burning that are allowed when done according to prescribed conditions. Unless specifically exempted each category in Sections 606 through 617 is subject to all of the provisions of Sections 600 through 605. (3-21-03)

607. RECREATIONAL AND WARMING FIRES.
Fires used for the preparation of food or for recreational purposes (e.g. campfires, ceremonial fires, and barbecues), or small fires set for handwarming purposes, are allowable forms of open burning. (3-21-03)

608. **WEED CONTROL FIRES.**
Open outdoor fires used for the purpose of weed abatement such as along fence lines, canal banks, and ditch banks is an allowable forms of open burning. (5-1-94)

609. TRAINING FIRES.
Fires used by qualified personnel to train firefighters in the methods of fire suppression and fire fighting techniques, or to display certain fire ecology or fire behavior effects are allowable forms of open burning. Training facilities shall notify the Department prior to igniting any training fires. Training fires shall not be allowed to smolder after the training session has terminated. Training fires are exempt from Subsections 603.01.c. and 603.01.e. through 603.01.j. (3-21-03)

610. INDUSTRIAL FLARES.
Industrial flares, used for the combustion of flammable gases are allowable forms of open burning. Industrial flares are subject to permitting requirements in Sections 200 through 223. (3-21-03)

611. RESIDENTIAL SOLID WASTE DISPOSAL FIRES.

01. Fires Allowed. Open outdoor fires used to dispose of solid waste (e.g. rubbish, tree leaves, yard trimmings, gardening waste, etc.) excluding garbage produced by the operation of a domestic household is an allowable form of open burning when the following provisions are met: (5-1-94)

a. No scheduled house to house solid waste collection service is available; and (5-1-94)

b. The burning is conducted on the property where the solid waste was generated. (5-1-94)

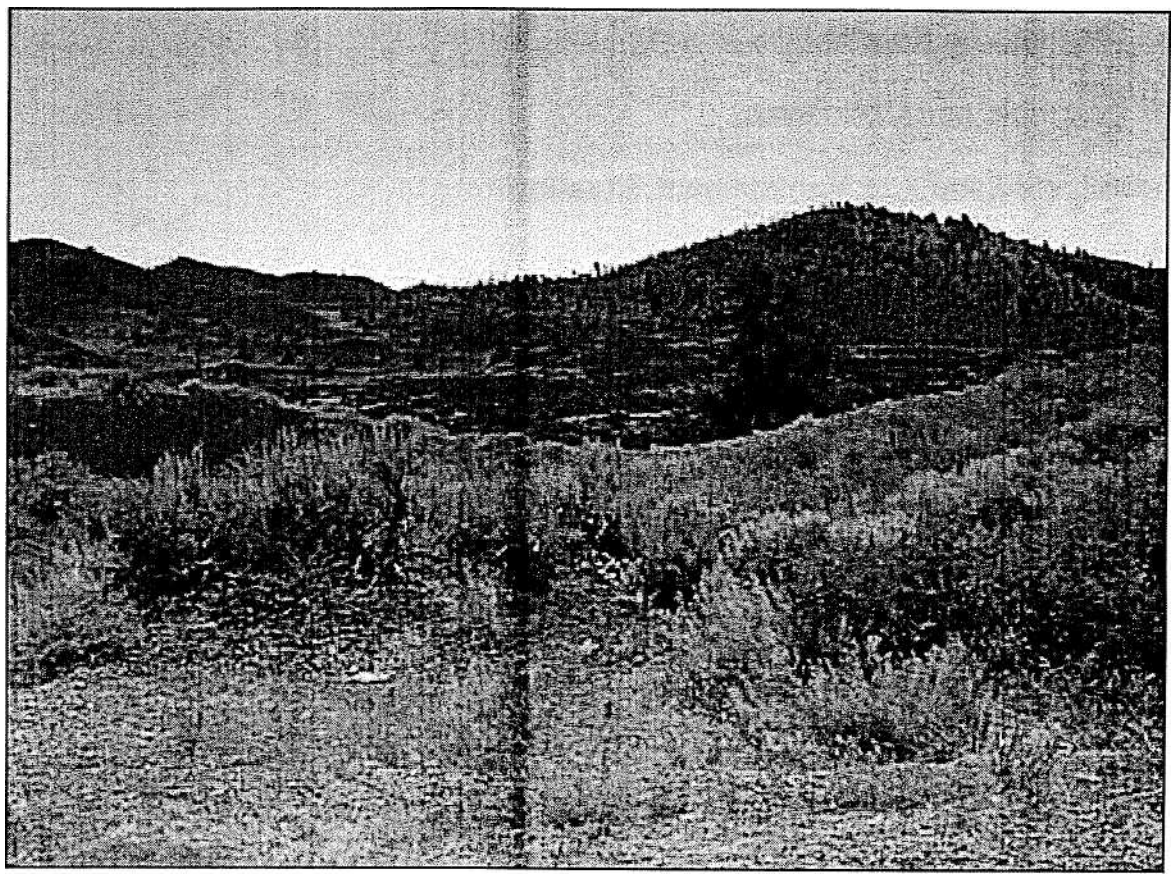
02. Fires Exempt. Open outdoor fires used to dispose of tree leaves, gardening waste or yard trimmings are exempt from Subsection 611.01.a. when conducted in accordance with local governmental ordinances or rules which allow for the open burning of tree leaves, gardening waste or yard trimming during certain periods of the year. (5-1-94)

612. LANDFILL DISPOSAL SITE FIRES.
The use of fires for the disposal of solid waste at any solid waste landfill disposal site or facility is an allowable form of open burning only if conducted in accordance with IDAPA 58.01.06, "Solid Waste Management Rules and Standards" or the Solid Waste Facilities Act, Chapter 74, Title 39, Idaho Code. (3-21-03)

613. ORCHARD FIRES.
The use of heating devices to protect orchard crops from frost damage and the use of fires to dispose of orchard

Wildland Fire Management Plan

Craters of the Moon National Monument, Idaho



Wildland Fire Management Plan

Craters of the Moon National Monument

Table of Contents

II. Compliance with NPS Policy and Relation to Other Plans

A. NPS Management Policies Concerning Fire Management
B. Enabling Legislation and Purpose of Monument
C. General Management Plan Fire Objectives
D. Resource Management Plan Objectives
E. Fire Management Plan Description

III. Description of the Monument

IV. Historic Role of Fire

V. Goals and Objectives

VI. Wildland Fire Management Situation

A. Historic Weather Analysis
B. Fuel Characteristics
C. Fire Season

VII. Scope of Wildland Fire Management Program

A. Wildland Fire
1. Wildland Fire Suppression
2. Wildland Fire Use
3. Prescribed Fire

B. Fire Management Units (FMU)
1. North End / Watershed Protection FMU (FMU 1)
2. Outstanding Natural Features and Interpretive FMU (FMU 2)
3. Wildland Fire Use FMU (FMU 3)

VII. Wildland Fire Management

A. General Management Considerations
1. General Management Plan (GMP) Review
2. Decision criteria checklist for a go/no go decision

B. Wildland Fire Use
1. Rationale for Fire Management Strategies
2. Objectives of Wildland Fire Use
3. General Plan for Wildland Fire Use
4. Staff responsibilities
5. Factors to be Monitored for Decision-Making
6. Relationship of WFU and Step-up Plan
7. Preplanned Implementation Procedures
8. Implementation Procedures not Preplanned
9. Cost Tracking
10. Outline for Project Records
11. Public Information of WFU

Wildland Fire Management Plan

Craters of the Moon National Monument

List of Appendices

Appendix E (Supplemental Information on Fuel Types)

Appendix F (Descriptions of Vegetation Types)

Appendix G (List of Plant Species Names Used in Text)

Appendix H (Definitions)

Appendix I (Wildland Fire Implementation Plan)

Appendix J (Minimum Impact Suppression Techniques)

Appendix K (Cooperative Agreements - NPS/BLM/Local)

Appendix L (Limited Delegation of Authority)

Appendix M (Fire Monitoring Plan - In Development)

Appendix N (Vegetation Maps)

Additional information can be found in the
Environmental Assessment

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http://www.nps.gov/crmo/crmofmp.htm
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