FINAL

2000 AIR EMISSIONS INVENTORY

YELLOWSTONE NATIONAL PARK

IDAHO-WYOMING-MONTANA

U.S. NATIONAL PARK SERVICE

MARCH 2003

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YELLOWSTONE NATIONAL PARK
WYOMING/MONTANA/IDAHO

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MARCH 2003

Cover Photo: Old Faithful

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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. Development of an in-park air emissions inventory for Yellowstone National Park (NP) 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 and fireplaces, campfires, and wildland fires and prescribed burning. Mobile sources may include vehicles operated by visitors, tour operators, and NPS and concessioner employees, and nonroard vehicles and equipment.

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 October 2001, interviews with Yellowstone NP[1] and concessionaire personnel, 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

[1] See Appendix A

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* and *PART5* mobile source emissions model. The year 2000 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 and wildland fires, and other activities. Additional information on emission estimation methodology, including emission factors, are provided in other sections of this report.

1.4 PARK DESCRIPTION

Yellowstone NP was established in 1872 as the world's first national park. Located in the central Rocky Mountains in northwestern Wyoming and extending into Montana and Idaho, the park is known for its spectacular geysers, hot springs, canyons, and fossil forests. Yellowstone NP is a broad volcanic plateau surrounded by mountain ranges, encompasses 2,221,722 acres or approximately 3,470 square miles, and has an average elevation of 7,500 feet. The park was designated an International Biosphere Reserve in 1976 and a World Heritage Site in 1978 by the United Nations Educational, Scientific and Cultural Organization (UNESCO).

The geysers of Yellowstone NP are grouped in basins located in the western half of the park. These include Norris, West Thumb, Lower, Midway, and Upper geyser basins. The most famous geyser, Old Faithful, erupts on the average of every 75 minutes for up to 5 minutes, expelling 10,000 to 12,000 gallons of water in a column of steam and hot water as high as 170 feet. The Yellowstone River, which is 692 miles long, crosses the region from south to north, flowing into Yellowstone Lake and through the Grand Canyon of the Yellowstone. Covering 83,800 acres, Yellowstone Lake is the highest and largest mountain lake in North America.

The park contains 350 miles of roads, and there are 1,200 miles of trails for hiking and horseback riding. The Grand Loop, the park's major road, extends for more than 140 miles in a figure eight within the park and provides access for the motoring public to most of the major thermal and other natural features during the non-winter months. Yellowstone, Shoshone, and Lewis Lakes offer boating, and fishing is permitted in most of the park's lakes and streams. During the winter season, most major park roads are closed to wheeled vehicles but are groomed to provide access to oversnow vehicles, such as snowmobiles and snowcoaches. The latter are van-like vehicles that are equipped with motorized tracks and can carry passengers to Old Faithful and a few other

destinations.

Developed areas in the park are noted in Figure 1, and information on these areas is summarized in Table 1. Site maps of many of these developed areas also are provided in Appendix B. Commercial services in the park that are authorized under concession contracts that may generate air emissions include lodging, food services, campstores and other retail establishments, boat tours and small boat rentals, and some transportation tours and services.

TABLE 1: YELLOWSTONE NP DEVELOPED AREAS

Name/Location	Function/Facilities
Gardiner – North Entrance	Xanterra Parks & Resorts Service Center and Warehouse
Mammoth Hot Springs (Upper)	Visitor Center, Park Headquarters, Hotel, Restaurant, Hamilton Store, Public Gasoline Service Station, Medical Clinic, Post Office, NPS Maintenance Shops, NPS Garage, Employee Housing
Mammoth Hot Springs (Lower)	Employee Housing, Campground
Tower-Roosevelt	Roosevelt Lodge, Hamilton Store, Public Service Station, Employee Housing
Canyon Village	Visitor Center, Canyon Lodge, Hamilton Store, Public Gasoline Service Station, Post Office, Employee Housing
Fishing Bridge	Visitor Center, Hamilton Store, Public Gasoline Service Station, RV Park, Employee Housing,
Lake Village	Lake Lodge, Lake Hotel, Lake Hospital, Marina, Ranger Station, Employee Housing
Grant Village/West Thumb	Visitor Center, Public Gasoline Service Station, Post Office, Hamilton Store, Employee Housing
Old Faithful	Visitor Center, Old Faithful Inn, Old Faithful Lodge, Snow Lodge, Post Office, Public Gasoline Service Station, Medical Clinic, Bus Barn, Employee Housing
West Yellowstone	Ranger Station, Fire Cache, Garage, Hamilton Store Warehouse, Employee Housing

1.5 AIR QUALITY STATUS

The majority of Yellowstone NP is located in Park County, WY, and there are small portions in Park and Gallatin Counties, MT and Fremont County, ID. The Wyoming Department of Environmental Quality (DEQ) is the governing authority for regulating air pollution from stationary sources in Wyoming. Since there is little industrial activity and a relatively low population in northwestern WY, overall air quality in the park is good. Park County, WY, Park and Gallatin Counties, MT, and Fremont County, ID are all in attainment for all national and state ambient air quality standards (AAQS), including ozone and particulate matter (PM_{10}). There is one ozone monitor near Lake Yellowstone, and data from that station indicate that there have been no exceedences of the ozone AAQS in the last six years. The nearest PM_{10} monitor is in Cody, WY, which is east of the park, and data indicate that there have been no exceedences of the PM_{10} AAQS in the last six years.

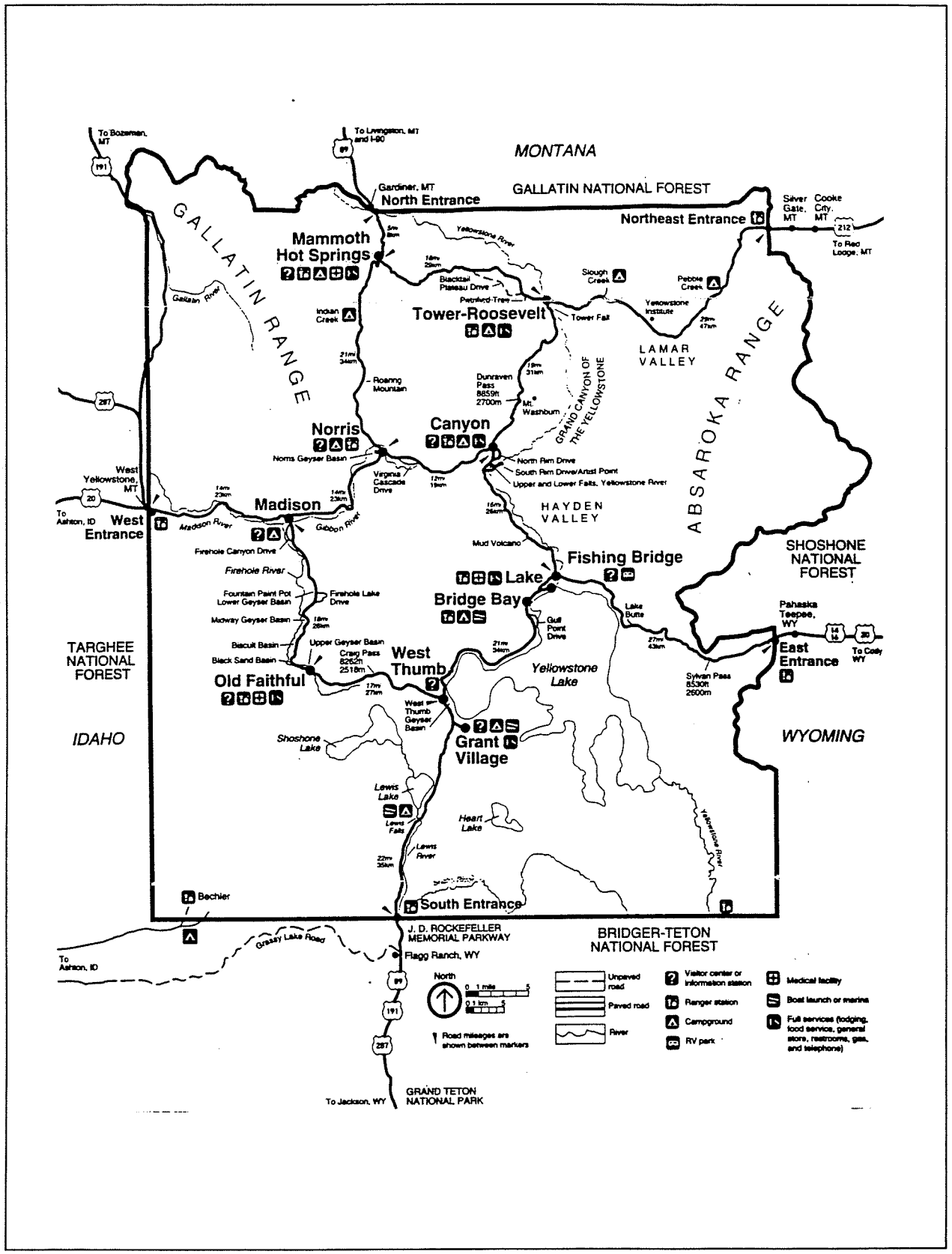


FIGURE 1. YELLOWSTONE NATIONAL PARK

In 1998, the Montana DEQ, Monitoring and Data Management Bureau installed an ambient CO monitoring station near the West Yellowstone entrance station. Monitoring data in 1999 found CO levels close to the 8-hour AAQS of 9 ppm on February 13-14 (GYA, 1999). This was President's Day weekend, which traditionally is the busiest snowmobile weekend of the park's winter season.

Yellowstone NP is one of 49 NPS units that are designated as Class I areas by the Clean Air Act and its Amendments. A Class I area is one that receives the most stringent degree of air quality protection within and around its borders. For example, potential new or modified sources of significant pollution that plan to locate near a Class I area must obtain a permit from the applicable air quality regulatory agency. The NPS has significant input to the permitting process to ensure that potential air emissions do not pose a threat to visibility or other park resources.

2. STATIONARY AND AREA SOURCE EMISSIONS

This section summarizes emissions from stationary sources at Yellowstone NP for the year 2000. 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 (PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO_2), and volatile organic compounds (VOCs). Emission factors and other calculation procedures are provided in Appendices C and D.

2.1 STATIONARY SOURCES

2.1.1 Space And Water Heating Equipment

Stationary combustion sources at Yellowstone NP include approximately 500 NPS No. 2 fuel oil, propane, and natural gas space and water heating units, including approximately 485 employee housing heating units. The principal concessionaire, Xanterra Parks & Resorts, operates an additional 600 heating units. Table 2 provides any inventory of these heating units.

Criteria air emissions were calculated using the appropriate residential and commercial unit emission factors. For example, PM emissions from a No. 2 fuel oil boiler at the Administration Building in Mammoth Hot Springs are calculated as follows:

$$12{,}600\ gal/yr\ x \left[\frac{2.0\ lb\ PM}{1{,}000\ gal}\right] = 25\ lb\ PM/yr$$

Actual criteria pollutant emissions from space and water heating equipment are summarized in Table 3. Potential emissions also were calculated by assuming that the heating units were operated continuously during the year or 8,760 hours per year, and these emissions are summarized in Table 4.

TABLE 2: HEATING EQUIPMENT AT YELLOWSTONE NP

Location	Capacity (Btu/hr)	Number	Fuel Type
Yellowstone National Park			
Mammoth Administration/Canteen	1,900,000	2	No. 2 Fuel Oil
Mammoth Visitor Center/Residences 2 & 3/Clinic	1,900,000	2	No. 2 Fuel Oil
Mammoth YCR Supplies/Officers Row Residences	1,900,000	2	No. 2 Fuel Oil
Mammoth Fire Cache/Grounds Shop/Paint Shop	1,900,000	1	No. 2 Fuel Oil
Mammoth Supply Center/Radio Shop/4 Residences	1,900,000	2	No. 2 Fuel Oil
Mammoth 11 Residences/Jail	1,900,000	2	No. 2 Fuel Oil
Mammoth Apartment Bldg/Plumbing Shop	1,900,000	2	No. 2 Fuel Oil
Mammoth Elementary School	1,670,000	1	No. 2 Fuel Oil
Lake Hospital	1,900,000	2	No. 2 Fuel Oil
Canyon Village Visitor Center	651,000	2	No. 2 Fuel Oil
Old Faithful Visitor Center	994,000	2	No. 2 Fuel Oil
Parkwide Residences	100,000	90	No. 2 Fuel Oil
Mammoth New Garage	1,900,000	2	Propane
Canyon Village Garage	1,900,000	1	Propane
Lake Village Garage	1,900,000	1	Propane
Madison Garage	1,900,000	1	Propane
Old Faithful Emergency Services	1,900,000	1	Propane
Parkwide Residences	100,000	380	Propane
West Yellowstone Fire Cache/Ranger Station	100,000	1	Natural Gas
West Yellowstone Employee Housing	100,000	1	Natural Gas
West Yellowstone Garage	100,000	1	Natural Gas
West Yellowstone Employee Housing	100,000	1	Natural Gas
West Yellowstone 4-Plex Housing	100,000	4	Natural Gas
West Yellowstone 4-Plex Housing	100,000	4	Natural Gas
Xanterra Parks & Resorts			
Gardiner Laundry	8,000,000	3	No. 2 Fuel Oil
Gardiner Residence 5	140,000	1	No. 2 Fuel Oil
Mammoth	4,184,000	3	No. 2 Fuel Oil
Mammoth Residence 3	140,000	1	No. 2 Fuel Oil
Mammoth Residence 24	140,000	1	No. 2 Fuel Oil
Mammoth Residence 89	120,000	1	No. 2 Fuel Oil
Mammoth Spruce Dorm	1,900,000	1	No. 2 Fuel Oil
Lake Village Lake Hotel	5,230,000	3	No. 2 Fuel Oil
Lake Village Lake Hotel Kitchen	839,000	1	No. 2 Fuel Oil
Lake Village Lake Lodge	2,092,000	3	No. 2 Fuel Oil
Lake Village Lake Lodge Kitchen	837,000	1	No. 2 Fuel Oil
Old Faithful Inn	6,277,000	3	No. 2 Fuel Oil
Old Faithful Inn Kitchen	8,370,000	1	No. 2 Fuel Oil
Old Faithful Lodge	4,184,000	3	No. 2 Fuel Oil
Old Faithful Snow Lodge	2,930,000	3	No. 2 Fuel Oil
Canyon Village Lodge	3,350,000	2	No. 2 Fuel Oil
Canyon Village Lodge Kitchen	2,510,000	1	No. 2 Fuel Oil

TABLE 2: HEATING EQUIPMENT AT YELLOWSTONE NP (CONTINUED)

Location	Capacity (Btu/hr)	Number	Fuel Type
Xanterra Parks & Resorts (Continued)			
Gardiner Personnel/Service Center	126,000	1	Propane
Gardiner Residence 1 & 2	118,000	2	Propane
Gardiner Support Services/Warehouse/Residence	100,000	2	Propane
Mammoth Residence 1 & 2	715,000	1	Propane
Mammoth Residence 3	100,000	1	Propane
Mammoth Residence Duplex	113,000	2	Propane
Mammoth Roosevelt Kitchen	250,000	1	Propane
Mammoth Roosevelt Cookout	50,000	1	Propane
Lake Hotel Kitchen/Residence	150,000	1	Propane
Lake Lodge Kitchen/Residence	150,000	2	Propane
Fishing Bridge RV Park	100,000	1	Propane
Bay Bridge Store/Office/Repair Shop	45,000	2	Propane
Old Faithful Inn Kitchen/Residence	150,000	2	Propane
Old Faithful Lodge Kitchen/Residence	150,000	2	Propane
Old Faithful Snow Lodge	150,000	1	Propane
Canyon Village Lodge Kitchen	150,000	1	Propane
Canyon Village Residences	50,000	3	Propane
Canyon Village Lodge Cabins	50,000	550	Propane
Grant Village Lake House	140,000	2	Propane

TABLE 3: 2000 ACTUAL CRITERIA EMISSIONS FROM HEATING EQUIPMENT AT YELLOWSTONE NP

Location	Fuel Type	Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NOx (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service								
Mammoth Administration/ Canteen	Fuel Oil	12,600	25	895	252	63	270,897	4
Mammoth Visitor Center/ Residences 2 & 3/Clinic	Fuel Oil	12,600	25	895	252	63	270,897	4
Mammoth YCR Supplies/ Officers Row Residences	Fuel Oil	12,600	25	895	252	63	270,897	4
Mammoth Fire Cache/ Grounds Shop/Paint Shop	Fuel Oil	6,300	13	447	126	31	135,449	2
Mammoth Supply Center/ Radio Shop/4 Residences	Fuel Oil	12,600	25	895	252	63	270,897	4
Mammoth 11 Residences/ Jail	Fuel Oil	12,600	25	895	252	63	270,897	4
Mammoth Apartment Bldg/Plumbing Shop	Fuel Oil	12,600	25	895	252	63	270,897	4
Mammoth Elementary School	Fuel Oil	5,537	11	393	111	28	119,052	2
Lake Hospital	Fuel Oil	12,600	25	895	252	63	270,897	4
Canyon Village Visitor Center	Fuel Oil	4,317	9	307	86	22	92,818	1
Old Faithful Visitor Center	Fuel Oil	6,592	13	468	132	33	141,722	2
Parkwide Residences	Fuel Oil	29,842	12	2,119	537	149	641,599	21
	Subtotal	140,787	234	9,996		704	3,026,921	59
Mammoth New Garage	Propane	13,120	5	0	184	26	164,000	4
Canyon Village Garage	Propane	6,560	3	0	92	13	82,000	2
Lake Village Garage	Propane	6,560	3	0	92	13	82,000	2
Madison Garage	Propane	6,560	3	0	92	13	82,000	2
Old Faithful Emergency Services	Propane	6,560	3	0	92	13	82,000	2
Parkwide Residences	Propane	131,200	52	2	1,837	262	1,640,000	39
	Subtotal	170,560	68	3	2,388	341	2,132,000	51
		(cu ft/yr)						
West Yellowstone Fire Cache/Ranger Station	Nat. Gas	86,208	1	0	9	4	1,078	1
West Yellowstone Employee Housing	Nat. Gas	86,208	1	0	9	4	1,078	1
West Yellowstone Garage	Nat. Gas	86,208	1	0	9	4	1,078	1
West Yellowstone Employee Housing	Nat. Gas	86,208	1	0	9	4	1,078	1
West Yellowstone 4-Plex Housing	Nat. Gas	344,833	3	0	38	16	4,310	3
West Yellowstone 4-Plex Housing	Nat. Gas	344,833	3	0	38	16	4,310	3
	Subtotal	1,034,500	9	1	113	48	12,931	9
		NPS Totals	311	10,000	5,257	1,093	5,171,852	119

TABLE 3: 2000 ACTUAL CRITERIA EMISSIONS FROM HEATING EQUIPMENT AT YELLOWSTONE NP (CONTINUED)

Location	Fuel Type	Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Xanterra Parks & Resorts								
Gardiner Laundry	Fuel Oil	114,066	228	8,099	2,281	570	2,452,419	39
Gardiner Residence 5	Fuel Oil	1,195	2	85	24	6	25,693	0
Mammoth	Fuel Oil	133,012	266	9,444	2,660	665	2,859,758	45
Mammoth Residence 3	Fuel Oil	1,796	4	128	36	9	38,614	1
Mammoth Residence 24	Fuel Oil	557	1	40	11	3	11,976	0
Mammoth Residence 89	Fuel Oil	784	2	56	16	4	16,856	0
Mammoth Spruce Dorm	Fuel Oil	13,182	26	936	264	66	283,413	4
Lake Village Lake Hotel	Fuel Oil	43,152	86	3,064	863	216	927,768	15
Lake Hotel Kitchen	Fuel Oil	2,308	5	164	46	12	49,622	1
Lake Village Lake Lodge	Fuel Oil	23,146	46	1,643	463	116	497,639	8
Lake Lodge Kitchen	Fuel Oil	3,087	6	219	62	15	66,371	1
Old Faithful Inn	Fuel Oil	71,670	143	5,089	1,433	358	1,540,905	24
Old Faithful Inn Kitchen	Fuel Oil	30,716	61	2,181	614	154	660,394	10
Old Faithful Lodge	Fuel Oil	41,820	84	2,969	836	209	899,130	14
Old Faithful Snow Lodge	Fuel Oil	53,661	107	3,810	1,073	268	1,153,712	18
Canyon Village Lodge	Fuel Oil	27,700	55	1,967	554	139	595,550	9
Canyon Village Lodge Kitchen	Fuel Oil	10,255	21	728	205	51	220,483	3
	Subtotal	572,107	1,144	40,620	11,442	2,861	12,300,301	195
Gardiner Service Center	Propane	9,660	4	0	135	19	120,750	3
Gardiner Residence 1 & 2	Propane	18,095	7	0	253	36	226,188	5
Gardiner Support Services/ Warehouse/ Residence	Propane	10,132	4	0	142	20	126,650	3
Mammoth Residence 1 & 2	Propane	8,930	4	0	125	18	111,625	3
Mammoth Residence 3	Propane	418	0	0	6	1	5,225	0
Mammoth Res. Duplex	Propane	3,963	2	0	55	8	49,538	1
Mammoth Roosevelt Kitchen	Propane	16,897	7	0	237	34	211,213	5
Mammoth Roosevelt Cookout	Propane	1,509	1	0	21	3	18,863	0
Lake Hotel Kitchen	Propane	8,612	3	0	121	17	107,650	3
Lake Lodge Kitchen	Propane	18,868	8	0	264	38	235,850	6
Fishing Bridge RV Park	Propane	8,576	3	0	120	17	107,200	3
Bay Bridge Store/Shop	Propane	946	0	0	13	2	11,825	0
Old Faithful Inn Kitchen	Propane	13,754	6	0	193	28	171,925	4
Old Faithful Lodge Kit.	Propane	4,610	2	0	65	9	57,625	1
Old Faithful Snow Lodge	Propane	13,671	5	0	191	27	170,888	4
Canyon Lodge Kitchen	Propane	13,908	6	0	195	28	173,850	4
Canyon Village Residences	Propane	954	0	0	13	2	11,925	0
Canyon Lodge Cabins	Propane	67,587	27	1	946	135	844,838	20
Grant Village Lake House	Propane	4,920	2	0	69	10	61,500	1
	Subtotal	226,010	90	4	3,164	452	2,825,125	68
Xanterra Parks & Resorts Totals			1,235	40,624	14,606	3,313	15,125,426	262
Yellowstone NP Totals			1,546	50,623	19,863	4,406	20,297,277	382

TABLE 4: 2000 POTENTIAL CRITERIA EMISSIONS FROM HEATING EQUIPMENT AT YELLOWSTONE NP

Location	Fuel Type	Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service								
Mammoth Administration/ Canteen	Fuel Oil	237,771	476	16,882	4,755	1,189	5,112,086	81
Mammoth Visitor Center/ Residences 2 & 3/Clinic	Fuel Oil	237,771	476	16,882	4,755	1,189	5,112,086	81
Mammoth YCR Supplies/ Officers Row Residences	Fuel Oil	237,771	476	16,882	4,755	1,189	5,112,086	81
Mammoth Fire Cache/ Grounds Shop/Paint Shop	Fuel Oil	118,886	238	8,441	2,378	594	2,556,043	40
Mammoth Supply Center/ Radio Shop/4 Residences	Fuel Oil	237,771	476	16,882	4,755	1,189	5,112,086	81
Mammoth 11 Residences/ Jail	Fuel Oil	237,771	476	16,882	4,755	1,189	5,112,086	81
Mammoth Apartment Bldg/Plumbing Shop	Fuel Oil	237,771	476	16,882	4,755	1,189	5,112,086	81
Mammoth Elementary School	Fuel Oil	104,494	209	7,419	2,090	522	2,246,627	36
Lake Hospital	Fuel Oil	237,771	476	16,882	4,755	1,189	5,112,086	81
Canyon Village Visitor Center	Fuel Oil	81,468	163	5,784	1,629	407	1,751,562	28
Old Faithful Visitor Center	Fuel Oil	124,392	249	8,832	2,488	622	2,674,428	42
Parkwide Residences	Fuel Oil	563,143	225	39,983	10,137	2,816	12,107,571	402
	Subtotal	2,656,783	4,413	188,632	52,009	13,284	57,120,831	1,113
Mammoth New Garage	Propane	363,803	146	7	5,093	728	4,547,541	109
Canyon Village Garage	Propane	181,902	73	3	2,547	364	2,273,770	55
Lake Village Garage	Propane	181,902	73	3	2,547	364	2,273,770	55
Madison Garage	Propane	181,902	73	3	2,547	364	2,273,770	55
Old Faithful Emergency Services	Propane	181,902	73	3	2,547	364	2,273,770	55
Parkwide Residences	Propane	3,638,033	1,455	65	50,932	7,276	45,475,410	1,091
	Subtotal	4,729,443	1,892	85	66,212	9,459	59,118,033	1,419
		(cu ft/yr)						
West Yellowstone Fire Cache/Ranger Station	Nat. Gas	834,286	6	1	78	33	100,114	6
West Yellowstone Employee Housing	Nat. Gas	834,286	6	1	78	33	100,114	6
West Yellowstone Garage	Nat. Gas	834,286	6	1	78	33	100,114	6
West Yellowstone Employee Housing	Nat. Gas	834,286	6	1	78	33	100,114	6
West Yellowstone 4-Plex Housing	Nat. Gas	3,337,143	25	2	314	133	400,457	25
West Yellowstone 4-Plex Housing	Nat. Gas	3,337,143	25	2	314	133	400,457	25
	Subtotal	10,011,429	76	6	941	400	1,201,371	
		NPS Totals	6,380	18,893	119,163	23,143	117,440,236	2,608

TABLE 4: 2000 POTENTIAL CRITERIA EMISSIONS FROM HEATING EQUIPMENT AT YELLOWSTONE NP (CONTINUED)

Location	Fuel Type	Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Xanterra Parks & Resorts								
Gardiner Laundry	Fuel Oil	1,501,714	3,003	106,622	30,034	7,509	32,286,857	511
Gardiner Residence 5	Fuel Oil	8,760	18	622	175	44	188,340	3
Mammoth	Fuel Oil	785,397	1,571	55,763	15,708	3,927	16,886,026	267
Mammoth Residence 3	Fuel Oil	8,760	18	622	175	44	188,340	3
Mammoth Residence 24	Fuel Oil	8,760	18	622	175	44	188,340	3
Mammoth Residence 89	Fuel Oil	7,509	15	533	150	38	161,434	3
Mammoth Spruce Dorm	Fuel Oil	118,886	238	8,441	2,378	594	2,556,043	40
Lake Village Lake Hotel	Fuel Oil	981,746	1,963	69,704	19,635	4,909	21,107,533	334
Lake Hotel Kitchen	Fuel Oil	52,497	105	3,727	1,050	262	1,128,695	18
Lake Village Lake Lodge	Fuel Oil	392,698	785	27,882	7,854	1,963	8,443,013	134
Lake Lodge Kitchen	Fuel Oil	52,372	105	3,718	1,047	262	1,126,004	18
Old Faithful Inn	Fuel Oil	1,178,283	2,357	83,658	23,566	5,891	25,333,075	401
Old Faithful Inn Kitchen	Fuel Oil	523,723	1,047	37,184	10,474	2,619	11,260,041	178
Old Faithful Lodge	Fuel Oil	785,397	1,571	55,763	15,708	3,927	16,886,026	267
Old Faithful Snow Lodge	Fuel Oil	550,003	1,100	39,050	11,000	2,750	11,825,061	187
Canyon Village Lodge	Fuel Oil	419,229	838	29,765	8,385	2,096	9,013,414	143
Canyon Lodge Kitchen	Fuel Oil	157,054	314	11,151	3,141	785	3,376,667	53
	Subtotal	7,532,787	15,066	534,828	150,656	37,664	161,954,911	
Gardiner Service Center	Propane	12,063	5	0	169	24	150,787	4
Gardiner Residence 1 & 2	Propane	22,594	9	0	316	45	282,426	7
Gardiner Support Services/ Warehouse/Residence	Propane	19,148	8	0	268	38	239,344	6
Mammoth Residence 1 & 2	Propane	68,452	27	1	958	137	855,656	21
Mammoth Residence 3	Propane	9,574	4	0	134	19	119,672	3
Mammoth Res. Duplex	Propane	21,637	9	0	303	43	270,459	6
Mammoth Roosevelt Kit.	Propane	23,934	10	0	335	48	299,180	7
Mammoth Roosevelt Cookout	Propane	4,787	2	0	67	10	59,836	1
Lake Hotel Kitchen	Propane	14,361	6	0	201	29	179,508	4
Lake Lodge Kitchen	Propane	28,721	11	1	402	57	359,016	9
Fishing Bridge RV Park	Propane	9,574	4	0	134	19	119,672	3
Bay Bridge Store/Shop	Propane	8,616	3	0	121	17	107,705	3
Old Faithful Inn Kitchen	Propane	28,721	11	1	402	57	359,016	9
Old Faithful Lodge Kit.	Propane	28,721	11	1	402	57	359,016	9
Old Faithful Snow Lodge	Propane	14,361	6	0	201	29	179,508	4
Canyon Lodge Kitchen	Propane	14,361	6	0	201	29	179,508	4
Canyon Village Residences	Propane	14,361	6	0	201	29	179,508	4
Canyon Lodge Cabins	Propane	2,632,787	1,053	47	36,859	5,266	32,909,836	790
Grant Village Lake House	Propane	26,807	11	0	375	54	335,082	8
	Subtotal	3,003,579	1,201	54	42,050	6,007	37,544,738	
Xanterra Parks & Resorts Totals			16,267	534,882	192,706	43,671	199,499,649	3,462
Yellowstone NP Totals			22,647	723,605	311,868	66,814	316,939,885	6,070

2.1.2 Generators

2.1.2.1 Generator Emissions – Actual

Emissions were calculated by multiplying the unit rating (kW) of the generators by an estimated annual run time (hr/yr) to get the kW-hr/yr, and the appropriate emission factors were then applied. For example, actual PM emissions from the 30 kW generator at the Beartooth Road Camp are calculated as:

$$30\ kW\ x\left[\frac{24\ hours}{year}\right]x\left[\frac{1.34\ hp}{kW}\right]x\left[\frac{0.00220\ lb\ PM}{hp\text{-}hr}\right]=2\ lb\ PM/yr$$

Actual generator criteria emissions are summarized in Table 5.

2.1.2.2 Generator Emissions – Potential

Potential emissions were also calculated for the generators, and the same emission factors that were used to calculate the actual emissions were used to calculate these potential emissions. To calculate potential emissions, EPA guidance on the number of hours of operation to assume was adopted:

> EPA does not recommend the use of 8,760 hours per year (i.e., full-year operation) for calculating PTE (potential to emit) for emergency generators...The EPA believes that 500 hours is an appropriate default assumption for estimating the number of hours that an emergency generator could be expected to operate under worst-case conditions.[1]

Potential operating hours used for generators that were actually operated more than 500 hours a year were assumed to be 8,760. Potential criteria generator emissions are summarized in Table 6.

[1] *Calculating Potential to Emit (PTE) for Emergency Generators*, Office of Air Quality Planning and Standards (MD-10), U.S. Environmental Protection Agency, 06 September 1995.

TABLE 5: 2000 ACTUAL YELLOWSTONE NP GENERATOR CRITERIA EMISSIONS

Facility	Fuel	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service										
Beartooth Road Camp	Diesel	30	24	720	2	2	2	30	1,110	2
Beartooth Road Camp	Diesel	45	3,600	162,000	478	445	445	6,729	249,642	545
Canyon Maintenance	Diesel	500	120	60,000	56	325	325	1,930	92,460	51
Canyon WWTP	Diesel	150	100	15,000	44	41	41	623	23,115	50
Fishing Bridge Lift Stn	Diesel	135	100	13,500	40	37	37	561	20,804	45
Grant Village Maint	Diesel	500	50	25,000	23	136	136	804	92,460	51
Grant Village Lift Stn	Diesel	100	100	10,000	29	27	27	415	15,410	34
Grant Village Marina	Diesel	75	100	7,500	22	21	21	312	11,558	25
Lake Maintenance	Diesel	500	200	100,000	94	542	542	3,216	154,100	86
Lake Hospital	Diesel	100	200	20,000	59	55	55	831	30,820	67
Mammoth Equip Repair	Diesel	45	50	2,250	7	6	6	93	3,467	8
South Entrance	Diesel	100	200	20,000	59	55	55	831	30,820	67
West Yellowstone	Diesel	125	0	0	0	0	0	0	0	0
West Yell Lift Station	Diesel	15	50	750	2	2	2	31	1,156	3
Diesel Generator Totals					916	1,694	16,406	3,617	726,921	1,035
Bechler Ranger Station (2)	Propane	12	2,160	51,840	11	94	245	60	--	13
Lamar Ranger Station (2)	Propane	12	2,160	51,840	11	94	245	60	--	13
Lewis Lake Quarters	Propane	10	240	2,400	0	4	11	3	--	1
Lewis Lake Pumphouse	Propane	5	240	1,200	0	2	6	1	--	0
Madison Maintenance	Propane	275	100	27,500	6	50	130	32	--	7
Propane Generator Totals					28	245	638	155	--	35
Mammoth Clinic	Gasoline	25	100	2,500	2	2	37	1,471	3,618	74
Northeast Entrance	Gasoline	9	5	43	0	0	1	25	62	1
Gasoline Generator Totals					2	2	37	1,496	3,680	75
NPS Totals					946	1,941	17,081	5,268	730,600	1,145

TABLE 5: 2000 ACTUAL YELLOWSTONE NP GENERATOR CRITERIA EMISSIONS (CONTINUED)

Facility	Fuel	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Xanterra Parks & Resorts										
Mammoth-Roosevelt	Diesel	140	75	10,500	31	29	436	94	16,181	35
Lake Lodge	Diesel	175	142	24,850	73	68	1,032	222	38,294	84
Old Faithful Snow Lodge	Diesel	685	45	30,825	29	167	991	227	47,501	26
Canyon Lodge	Diesel	140	131	18,340	54	50	762	164	28,262	62
Xanterra Parks & Resorts Totals					187	315	3,222	708	130,238	207
Quest Telephone Co.										
Mount Washburn	Diesel	50	200	10,000	29	27	415	90	15,410	34
Montana Power Co.										
Old Faithful Snow Lodge	Diesel	1,000	52	104,000	98	564	3,345	766	160,264	89
Grant Village	Diesel	1,600	52	166,400	156	902	5,351	1,226	256,422	143
Lake Yellowstone	Diesel	2,750	52	143,000	134	775	4,599	1,054	220,363	123
Montana Power Co. Totals					388	2,241	13,295	3,047	637,049	355
Yellowstone National Park Totals				lbs/yr	1,550	4,524	34,013	9,112	1,513,297	1,740
				tons/yr	0.78	2.26	17.01	4.56	756.65	0.87

TABLE 6: 2000 POTENTIAL YELLOWSTONE NP GENERATOR CRITERIA EMISSIONS

Facility	Fuel	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service										
Beartooth Road Camp	Diesel	30	500	15,000	44	41	623	134	23,115	50
Beartooth Road Camp	Diesel	45	8,760	394,200	1,162	1,083	16,375	3,529	607,462	1,326
Canyon Maintenance	Diesel	500	500	250,000	235	1,355	8,040	1,843	385,250	214
Canyon WWTP	Diesel	150	500	75,000	221	206	3,116	671	115,575	252
Fishing Bridge Lift Stn	Diesel	135	500	67,500	199	185	2,804	604	104,018	227
Grant Village Maint	Diesel	500	500	250,000	235	1,355	8,040	1,843	385,250	214
Grant Village Lift Stn	Diesel	100	500	50,000	147	137	2,077	448	77,050	168
Grant Village Marina	Diesel	75	500	37,500	111	103	1,558	336	57,788	126
Lake Maintenance	Diesel	500	500	250,000	235	1,355	8,040	1,843	385,250	214
Lake Hospital	Diesel	100	500	50,000	147	137	2,077	448	77,050	168
Mammoth Equip Repair	Diesel	45	500	22,500	66	62	935	201	34,673	76
South Entrance	Diesel	100	500	50,000	147	137	2,077	448	77,050	168
West Yellowstone	Diesel	125	500	62,500	184	172	2,596	559	96,313	210
West Yell Lift Station	Diesel	15	500	7,500	22	21	312	67	11,558	25
Diesel Generator Totals					3,155	6,350	58,669	12,972	2,437,400	3,441
Bechler Ranger Station (2)	Propane	12	8,760	210,240	43	381	995	242	--	54
Lamar Ranger Station (2)	Propane	12	8,760	210,240	43	381	995	242	--	54
Lewis Lake Quarters	Propane	10	500	5,000	1	9	24	6	--	1
Lewis Lake Pumphouse	Propane	5	500	2,500	1	5	12	3	--	1
Madison Maintenance	Propane	275	500	137,500	28	249	651	159	--	35
Propane Generator Totals					117	1,026	2,676	652	--	146
Mammoth Clinic	Gasoline	25	500	12,500	12	10	184	7,353	18,090	369
Northeast Entrance	Gasoline	9	500	4,250	4	3	63	2,500	6,151	125
Gasoline Generator Totals					16	13	247	9,853	24,241	494
NPS Totals					3,288	7,389	61,591	23,477	2,461,640	4,080

TABLE 6: 2000 POTENTIAL YELLOWSTONE NP GENERATOR CRITERIA EMISSIONS (CONTINUED)

Facility	Fuel	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Xanterra Parks & Resorts										
Mammoth-Roosevelt	Diesel	140	500	70,000	206	192	2,908	627	107,870	235
Lake Lodge	Diesel	175	500	87,500	258	240	3,635	783	134,838	294
Old Faithful Snow Lodge	Diesel	685	500	342,500	321	1,856	11,015	2,524	527,793	294
Canyon Lodge	Diesel	140	500	70,000	206	192	2,908	627	107,870	235
Xanterra Parks & Resorts Totals					992	2,481	20,465	4,561	878,370	1,059
Quest Telephone Co.										
Mount Washburn	Diesel	50	500	25,000	74	3	1,039	224	38,525	84
Montana Power Company										
Old Faithful Snow Lodge	Diesel	1,000	500	1,000,000	938	5,420	32,160	7,370	1,541,000	858
Grant Village	Diesel	1,600	500	1,600,000	1,501	8,672	51,456	11,792	2,465,600	1,372
Lake Yellowstone	Diesel	2,750	500	1,375,000	1,290	7,453	44,220	10,134	2,118,875	1,179
Montana Power Company Totals					3,729	21,546	127,836	29,296	6,125,475	3,409
Yellowstone National Park Totals				**lbs/yr**	8,082	31,485	210,931	57,558	9,504,010	8,632
				tons/yr	4.04	15.74	105.47	28.78	4,752	4.32

2.1.3 Fuel Storage Tanks

Yellowstone NP and its concessionaires, Yellowstone Park Service Stations and Xanterra Parks & Resorts, operate numerous gasoline and diesel fuel underground storage tanks (USTs) and aboveground storage tanks (ASTs) that serve NPS and concessionaire vehicles and other motorized equipment and the general public. There are also numerous No. 2 fuel oil, diesel fuel, and propane tanks that serve heating equipment and generators throughout the park. Table 7 summarizes the number of gasoline, diesel, and fuel oil tanks by organization.

TABLE 7: YELLOWSTONE NP PETROLEUM FUEL TANKS

Owner	Gasoline	Diesel	No. 2 Fuel Oil
National Park Service	18	27	42/90[1]
Yellowstone Park Service Stations	16	5	--
Xanterra Parks & Resorts	4	3	15
Total	38	35	147

[1] Approximate number of employee residences utilizing no. 2 fuel oil heating units

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 tank turnovers.

VOC emissions from the park fuel storage tanks were calculated using the USEPA *TANKS4* software program. *TANKS4* 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. Since the public service stations operated by Yellowstone Park Service Stations are closed during the winter season, except the station at Upper Old Faithful and the snowmobile fuel facility near Mammoth, emissions were not calculated for the winter months. Emissions from diesel tanks are extremely small since the volatility of diesel fuel is extremely low compared to gasoline. Therefore, only emissions from gasoline USTs and ASTs were calculated and are summarized in Table 8.

TABLE 8: YELLOWSTONE NP GASOLINE STORAGE TANK EMISSIONS

Location	Type	Volume (gal)	Throughput (gal/yr)	VOC (lbs/yr)	
National Park Service					
Beartooth Road Camp	UST	2,000	8,440	51	
Bechler Ranger Station	AST	500	2,110	92	
Canyon Fuel Station	UST	6,000	25,320	154	
East Entrance	UST	2,000	8,440	51	
Grant Village Fuel Station	UST	6,000	25,320	154	
Grant Boat Operations	AST	550	2,321	93	
Lake Fuel Station-Maint Area	UST	6,000	25,320	153	
Mammoth Clinic Generator	UST	550	2,321	14	
Mammoth New Fuel Station - YCC Camp	UST	4,000	16,880	102	
Madison Fuel Station	UST	6,000	25,320	153	
Northeast Fuel Station	UST	2,000	8,440	51	
Norris Fuel Station	UST	2,000	8,440	51	
Old Faithful Fuel Station	UST	6,000	25,320	154	
South Entrance Fuel Station	UST	2,000	8,440	51	
Tower Falls Fuel Station	UST	2,000	8,440	51	
West Entrance Fuel Station	UST	4,000	16,880	102	
		NPS Total	226,400	1,477	
Yellowstone Park Service Station					
Canyon Village SS E10	UST	28,500	524,377	3,517	
Canyon Village SS Mid-Grade	UST	15,250	65,547	453	
Canyon Village SS Super Unleaded	UST	28,500	65,547	440	
Fishing Bridge SS E10	UST	28,000	313,153	1,838	
Fishing Bridge SS Super Unleaded	UST	11,000	78,288	525	
Grant Village E10	UST	11,400	274,125	1,838	
Grant Village Super Unleaded	UST	7,600	68,531	391	
Mammoth Hot Springs E10	UST	9,500	210,236	823	
Mammoth Hot Springs Super Unleaded	UST	9,500	52,560	206	
Mammoth Hot Springs – Snowmobiles	UST	4,000	30,555	53	
Old Faithful Lower E10	UST	15,000	352,675	2,365	
Old Faithful Lower Super Unleaded	UST	5,000	12,383	48	
Old Faithful Upper E10	UST	85,000	168,800	1,023	
Old Faithful Upper Super Unleaded	UST	20,000	42,200	256	
Tower E10	UST	9,500	77,546	303	
Tower Super Unleaded	UST	9,500	19,386	76	
		YPSS Total	2,355,909	14,155	
Xanterra Parks & Resorts					
Bridge Bay Marina	UST	10,000	45,810	179	
Old Faithful Bus Barn	UST	10,000	6,715	45	
Old Faithful Bus Barn	UST	10,000	6,715	45	
Gardiner Service Center	UST	10,000	53,076	208	
		Xanterra Total	112,316	477	
		Yellowstone NP Total	2,694,625	lbs	16,110
				tons	8.06

2.1.4 Wastewater Treatment Plants

The NPS operates five mechanical, secondary wastewater treatment facilities in Yellowstone NP. Using a VOC emission factor of 8.9 lbs VOC/million gallons of influent treated, the estimated actual emissions are summarized in Table 9. Potential emissions based on the design capacity of the plant also are noted in Table 9.

TABLE 9: WASTEWATER TREATMENT PLANT EMISSIONS

Location	Design Capacity (gal/day)	Wastewater Treated (gal/yr)	VOC (lbs/yr)	
			Actual	Potential
Madison Junction	75,000	5,600,000	50	244
Old Faithful	510,000	52,000,000	463	1,657
Grant Village	200,000	13,000,000	116	650
Lake/Fishing Bridge	500,000	31,000,000	276	1,624
Canyon	400,000	60,000,000	534	1,299
	Totals	161,600,000	1,439	5,474

2.2 AREA SOURCES

2.2.1 Woodstoves/Fireplaces

Park officials estimated that approximately one-half of the five hundred employee residences in the park had operational woodstoves and consumed approximately five cords of wood per household per year. The estimated emissions are summarized in Table 10.

TABLE 10: WOODSTOVE AND FIREPLACE AIR EMISSIONS FROM YELLOWSTONE NP

Location	Number	Fuel Consumption	PM (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	VOC (lbs/yr)
Woodstoves							
Employee Residences	250	1,250 cords/yr	75,904	878	5,704	554,141	502,369

2.2.2 Campfires

There are eleven campgrounds with about 2,200 campsites in Yellowstone NP. The Yellowstone NP Visitor Services office provided monthly statistics on the number of occupied campsites at each of the eleven campgrounds. Assuming that approximately 90 percent had an evening or morning campfire at each occupied site and that each campfire site consumes approximately 15 lbs of wood, air emissions from campsites in 2000 were calculated and are summarized in Table 11.

TABLE 11: 2000 YELLOWSTONE NP CAMPFIRE EMISSIONS

Location	Campfires	Fuel (tons/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	VOC (lbs/yr)
Bridge Bay	13,838	104	3,591	42	270	26,215	23,766
Canyon	12,754	96	3,310	38	249	24,162	21,905
Grant Village	11,346	85	2,944	34	221	21,496	19,487
Indian Creek	2,659	20	690	8	52	5,037	4,566
Lewis Lake	2,701	20	701	8	53	5,117	4,639
Madison	13,937	105	3,617	42	272	26,403	23,936
Mammoth	4,253	32	1,104	13	83	8,058	7,305
Norris	5,508	41	1,429	17	107	10,435	9,460
Pebble Creek	1,628	12	422	5	32	3,084	2,796
Slough Creek	2,251	17	584	7	44	4,264	3,866
Tower Falls	2,014	15	523	6	39	3,816	3,459
Total	72,888	547	18,915	219	1,421	138,087	125,186
			tons/yr				
			9.46	0.11	0.71	69.04	62.59

2.2.3 Wildfires and Prescribed Burning

Wildland fires are ignited naturally, usually by lightening and are typically suppressed, while prescribed fires are ignited intentionally in order to achieve fire management objectives. 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. Only prescribed burning emissions are considered as anthropogenic emissions; however, to the extent that prescribed burning is conducted to achieve ecological benefit, the emissions could be considered natural.

Due to NPS restrictions imposed on prescribed fires, none were conducted in the year 2001, the latest year for which data were available. Of the 36 wildland fires in Yellowstone in 2001, only six were larger than 0.5 acres in size, and all were suppressed. 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}, $PM_{2.5}$, CH_4, CO, and CO_2, which are summarized in Table 12.

TABLE 12: WILDFIRE AIR EMISSIONS FROM YELLOWSTONE NP

Fire Name	Acres	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)	VOC[1] (tons/yr)	CO (tons/yr)	CO_2 (tons/yr)
Arthur	2,504	819	694	419	9,171	41,786
Falco	720	235	199	121	2,637	12,015
Little Joe	110	36	30	18	403	1,836
Little	55	18	15	9	201	918
Sulphur	825	270	229	138	3,022	13,767
Stone	128	42	35	21	469	2,136
Total	4,342	1,420	1,200	727	15,900	72,458

[1] As methane (CH_4)

2.2.4 Miscellaneous Area Sources

Miscellaneous area sources include food preparation, degreasers, paints and other surface coatings, lighter fluid consumption, consumer solvents, propane use by visitors in recreational vehicles, and highway maintenance, such as paving materials. There is woodworking dust collection system in the carpentry shop in Mammoth Hot Springs. The woodworking dust collection system is ventilated to a cyclone dust collector, and a visual inspection of the unit revealed no evidence of wood dust.

2.3 SUMMARY OF STATIONARY AND AREA SOURCE EMISSIONS

Table 13 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 13: SUMMARY OF 2000 STATIONARY AND AREA SOURCE EMISSIONS AT YELLOWSTONE NP

Activity	Particulates		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		Carbon Dioxide		VOCs	
	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr
Stationary Sources												
Space and Water Heating Units	1,546	0.77	50,623	25.31	19,863	9.93	4,406	2.20	20,297,277	10,150	382	0.19
Generators	1,550	0.78	4,524	2.26	34,013	17.01	9,112	4.56	1,513,297	757	1,740	0.87
Gasoline Storage Tanks	--	--	--	--	--	--	--	--	--	--	16,110	8.06
Wastewater Treatment Plant	--	--	--	--	--	--	--	--	--	--	1,439	0.72
Subtotal	3,096	1.55	55,147	27.57	53,876	26.94	13,518	6.76	21,810,574	10,905	19,671	9.84
Area Sources												
Woodstoves	75,904	37.95	878	0.44	5,704	2.85	554,141	277.07	--	--	502,370	251.18
Campfires	18,915	9.46	219	0.11	1,421	0.71	138,087	69.04	--	--	125,186	62.59
Wildland Fires	2,840,000	1,420	--	--	--	--	31,800,000	15,900	144,914,250	72,457	1,455,000	727
Subtotal	2,934,820	1,467.4	1,097	0.55	7,125	3.56	32,492,230	16,246	144,914,250	72,457	2,082,556	1,041
Totals												
	Particulates		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		Carbon Dioxide		VOCs	
	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr
Totals without Wildland Fires	97,915	48.96	56,244	28.12	61,001	30.50	705,746	352.87	21,810,574	10,905	647,227	323
Totals with Wildland Fires	2,937,915	1,469	56,244	28.12	61,001	30.50	32,505,746	16,253	166,724,824	83,362	2,102,227	1,051

3. MOBILE SOURCE EMISSIONS

This section summarizes emissions from mobile sources at Yellowstone NP for 2000. Mobile emission sources include highway and nonroad vehicles, including snowmobiles.

3.1 HIGHWAY VEHICLES

3.1.1 Visitor Vehicles

The park contains approximately 350 miles of roads, including the Grand Loop road that extends for more than 140 miles in a figure eight within the park and provides access for the motoring public to most of the major thermal and other natural features during the non-winter months. A comprehensive transportation analysis was conducted at the park in 1992 (Yellowstone, 1994), and in particular, average daily traffic (ADT) counts on the park's road segments were estimated. In order to calculate visitor vehicle miles traveled (VMT) for this analysis, these 1992 ADT estimates were adjusted to reflect an increase in visitation of approximately 10 percent between 1992 and 2000. These year 2000 ADT estimates were then multiplied by the specific roadway lengths to quantify annual visitor VMT, which are summarized in Table 14.

TABLE 14: ESTIMATED VISITOR VEHICLE TRAVEL IN YELLOWSTONE NP

Roadway	Roadway Length (mi)	Vehicle Miles Traveled	
		Summer	Winter[1]
Norris-Canyon	13.1	5,132,747	--
Mammoth-Norris	22.6	12,130,093	--
Gardiner-Mammoth	4.8	2,962,748	1,469,232
Mammoth-Tower	18.5	13,901,302	6,893,678
Tower-NE Entrance	32.7	19,920,458	--
Tower-Canyon	18.2	5,665,720	--
Canyon North	2	692,381	--
Canyon South	3	515,261	--
Canyon-Lake	15.7	7,836,792	--
Lake-East Entrance	25.4	11,383,502	--
Lake-West Thumb	20	9,124,407	--
West Thumb-South Entrance	22	13,933,506	--
West Thumb-Old Faithful	17.8	11,321,242	--
Old Faithful-Madison	16.6	9,756,138	--
West Yell-Madison	13.7	7,831,156	--
Madison-Norris	13.7	6,948,772	--
	Subtotals	139,056,224	8,362,910
	Total	147,419,134	

[1] Only the two northern road segments are open to wheeled vehicles in the winter

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, NO_X, CO, and PM_{10}. 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), NO_X, and CO for visitor vehicles. Similarly, emission factors produced by the PART5 model were used in conjunction with VMT data to estimate PM_{10} emissions. MOBILE6.2 produces exhaust and evaporative emission factors for the following classes of vehicles: Light Duty Gasoline Vehicles (LDGV), Light Duty Gasoline Trucks 1 (LDGT1), Light Duty Gasoline Trucks 2 (LDGT2), Heavy Duty Gasoline Vehicles (HDGV), Light Duty Diesel Vehicles (LDDV), Light Duty Diesel Trucks (LDDT), Heavy Duty Diesel Vehicles (HDDV), 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, annual mileage accumulation rates and registration distributions by age, inspection and maintenance (I/M) program information, fuel information, ambient temperature data, and others.

Both the MOBILE6.2 and PART5 models are 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 MOBILE5b 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 Yellowstone NP.

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 I/M program parameters. The average speed input to the mobile model was 35 mph, fuel volatility was assumed to be Reid vapor pressure (RVP) 13.5 (winter) and 8.5 (summer), and reformulated gasoline (RFG) was not assumed to be present. Finally, I/M program inputs were not included since there are no I/M programs in the areas near the park.

In order to account for seasonal differences in mobile emissions, separate MOBILE5b 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 Yellowstone NP also were calculated based on VMT.

A summary of visitor vehicle emissions is provided in Table 20 at the end of this section.

3.1.2 GSA/NPS/Concessionaire Highway Vehicles

Yellowstone NP operates a fleet of highway vehicles that are owned by the NPS or leased from the General Services Administration (GSA), and the principal concessionaire, Xanterra Parks & Resorts, operates a fleet of highway vehicles. A summary of NPS, GSA, and concessionaire vehicles and their estimated annual mileage is provided in Table 15, and emissions are summarized in Table 20 at the end of this section.

TABLE 15: NPS, GSA, AND CONCESSIONAIRE ROAD VEHICLES AT YELLOWSTONE NP

Vehicle Type	Number	Annual Usage (mi/yr)
NPS/GSA		
Light-Duty Gasoline Vehicles/Trucks	398	2,013,600
Medium Duty Gasoline Trucks	36	197,200
Heavy Duty Diesel Trucks	40	147,100
Total	474	2,357,900
Xanterra Parks & Resorts		
Light-Duty Gasoline Vehicles/Trucks	N.A.	1,560,000
Medium Duty Gasoline Trucks	N.A.	80,000
Heavy Duty Diesel Trucks	N.A.	60,000
Buses	N.A.	128,300
Total		1,828,300

N.A. – Not Available

3.2 SNOWMOBILES

With the exception of the northern most roadway, park roads are closed to wheeled vehicle travel during the winter months due to the large quantity of snowfall. The first snowcoaches to visit the park in the winter occurred in 1955, and in 1963, the first private snowmobiles entered the park (Yellowstone NP, 1999). Beginning in the late 1960s, the park began grooming selected roadways to accommodate the increasing demand for visitation by snowmobiles and snowcoaches. Winter visitation grew from less than 1,000 in 1963 to a peak of 143,000 during the 1993-94 winter, and then declined slightly to about 120,000 today.

Data on the number of snowmobiles and snowcoaches entering the park were not systematically kept until the early 1990s. In 1992, approximately 59,570 and 1,110 snowmobiles and snowcoaches, respectively, entered the park (NPS, 2000a). This increased to 77,110 and 1,705 in 1993 and fell slightly to 66,730 and 1,590 snowmobiles and snowcoaches, respectively, in 2001 In addition to visitor snowmobiles, the NPS and Xanterra Parks & Resorts operate snowmobiles and snowcoaches. Data on these machines are summarized in Table 16.

TABLE 16: NPS, GSA, AND CONCESSIONAIRE SNOWMOBILES AND SNOWCOACHES AT YELLOWSTONE NP

Vehicle Type	Number	Annual Usage (mi/yr)
NPS		
Snowmobiles	120	160,000
Xanterra Parks & Resorts		
Snowmobiles	75	222,000
Snowcoaches	30	181,197

As part of the development of a recent Final Supplemental Environmental Impact Statement (NPS 2003), emissions associated with winter use snowmobiles and snowcoaches in Yellowstone NP were estimated. These are provided in the mobile source emission summary Table 20 at the end of this section.

3.3 RECREATIONAL VEHICLE GENERATORS

The NPS Office of Visitor Services collects data on the estimated number of overnight visitor recreational vehicles (RVs) that visit the park. In 2000, approximately 112,000 RVs spent at least a night at one of 11 RV camping sites, and over 90 percent of these visits occurred during the June-September peak visitation period. Assuming that each overnight RV visit resulted in the use of an auxiliary gasoline-powered generator that operated an estimated two hours, emissions were estimated and are noted in Table 17.

TABLE 17: VISITOR RV GENERATOR EMISSIONS

Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM	SO_2	NO_x	CO	VOC
				(lbs/yr)				
111,820	20	2	4,472,800	4,255	3,542	65,929	2,631,169	131,858

3.4 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 Yellowstone NP equipment inventory, and the larger pieces of equipment for which there are usage data are noted in Table 18. Annual usage and mission factors from the USEPA nonroad emission database were used to calculate annual emissions that are provided in Table 20.

TABLE 18: NPS NONROAD VEHICLES AT YELLOWSTONE NP

Vehicle Type	Number	Annual Usage (hrs/yr)
Tractors	6	640
Backhoe	6	2,155
Dozer	3	430
Grader	5	795
Sweeper	1	40
Forklift	5	790
Roller/Compactor	2	280
Loader/Bucket	13	2,077
Crane	1	26
		(mi/yr)
Various	42	123,464

3.5 MARINE VESSELS

Non-motorized boats can be used on many park lakes, but boats, canoes, kayaks, and rafts have been prohibited on park rivers and streams since 1950, except for the four-mile channel between Lewis and Shoshone Lakes. Water-skiing and personal watercraft or jet skies are prohibited on all waterways in the park. Most boating activity occurs on Yellowstone Lake where visitors can launch their own boats or rent a boat at the Bay Bridge marina. Commercial outfitters that are licensed to provide boating trips in Yellowstone include 15 for canoeing and kayaking, six for motorized boats, and 62 for fishing.

Compared to overall visitation, boat use in the park has not increased over time. In 1963, records indicate that approximately 4,000 boat permits were issued (Yellowstone NP, 1999), and this has declined slightly to about 3,600 permits in 1999. Of these, about 35 percent or 1,200 permits were issued for motorized boats. For emission estimation purposes, it was assumed that the public boats are single-engine, two-stroke gasoline engines and that they operate an average of 10 hours per year.

The NPS operates a fleet of marine vessels, ranging in size from 18 feet to 32 feet, and Xanterra Parks & Resorts operates several boats, including a cruise boat that operates on northern Lake Yellowstone. NPS and concessionaire personnel provided information on the vessels and their operating characteristics. Marine equipment and operational data and estimated emissions are summarized in Table 19 for the various boating categories.

TABLE 19: YELLOWSTONE NP MARINE VESSEL EMISSIONS

Marine Vessels	No. of Engines	Engine Power (hp)	Hours of Operation	HC (lb/yr)	CO (lb/yr)	NO_x (lb/yr)	PM (lb/yr)	SO_2 (lb/yr)
National Park Service								
32-ft Mahn[1]	2	385	200	1,062	24,150	531	4	--
25-ft Bertram[1]	2	170	200	469	10,664	235	2	--
20-ft Bertram[1]	1	170	40	47	1,066	23	0	--
20-ft Bertram[1]	1	170	40	47	1,066	23	0	--
18.5 ft Glassmaster[1]	1	185	200	255	5,802	128	1	--
32-ft Gillnet Tug[1]	1	205	300	424	9,644	212	2	--
32-ft Munson[1]	2	225	200	621	14,114	310	2	--
22-ft Metalcraft[2]	1	150	150	1,211	2,406	12	80	--
25-ft New Boston[2]	2	225	250	6,053	12,029	62	401	--
32-ft Munson[2]	2	225	250	6,053	12,029	62	401	--
19-ft Workskiff[2]	1	150	150	1,211	2,406	12	80	--
23-ft Workskiff[2]	1	225	150	1,816	3,609	19	120	--
23-ft Workskiff[2]	1	225	150	1,816	3,609	19	120	--
32-ft Cutthroat[3]	1	200	150	17	26	124	8	23
			Total	21,102	102,620	1,772	1,221	23
Xanterra Parks & Resorts								
Single Engine Inboards[1]	1	200	3,970	5,474	124,450	2,737	22	--
Twin Engine Inboards[1]	2	125	600	1,035	23,523	517	4	--
Single Engine Outboards[2]	1	125	4,145	27,879	55,398	285	1,845	--
Tri- Engine Diesel (Lake Queen)[3]	3	200	500	175	265	1,237	78	--
			Subtotal	34,563	203,636	4,777	1,949	--
Public Boating								
General Public[2]	1	125	10,000	67,259	133,651	688	4,450	--
			Total	122,925	439,905	7,237	7,620	--

1 Four-stroke gasoline engines
2 Two-stroke gasoline engines
3 Diesel engines

3.6 SUMMARY OF MOBILE SOURCE EMISSIONS

Table 20 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 20: SUMMARY OF 2000 MOBILE SOURCE EMISSIONS AT YELLOWSTONE NP

Activity	Particulates		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	283,440[1]	141.7	--	--	406,050	203.0	5,896,170	2,948	289,457	143
NPS/GSA Road Vehicles	4,612[1]	2.3	--	--	10,715	5.4	88,880	44.4	4,030	2.0
Xanterra Parks & Resorts Vehicles	3,560[1]	1.8	--	--	8,360	4.2	86,080	43.0	3,970	2.0
Road Vehicle Subtotal	291,610	145.8	--	--	425,125	212.6	6,071,130	3,035	297,457	148.7
Nonroad Vehicles										
Visitor Snowmobiles/Snowcoaches	18,000	9	--	--	8,000	4	3,266,000	1,633	1,226,000	613
NPS/Xanterra Parks & Resorts Snowmobiles	1,060	.53	--	--	200	0.1	194,000	97	72,000	36
Visitor Recreational Vehicle Generators	4,255	2.1	3,542	1.8	65,930	33.0	2,631,170	1,315.6	131,860	65.9
NPS Nonroad Vehicles	3,450	1.7	--	--	22,110	11.1	16,425	8.2	4,130	2.1
NPS Marine Vessel	1,221	0.6	--	--	1,772	0.9	102,618	51.3	21,100	10.6
Xanterra Parks & Resorts Marine Vessels	1,949	1.0	--	--	4,777	2.4	203,640	101.8	34,563	17.3
General Public Boats	4,450	2.2	--	--	688	0.3	133,650	66.8	67,260	33.6
Nonroad Vehicle Subtotal	34,385	17.2	3,542	1.8	103,477	51.7	6,547,503	3,273.7	1,556,913	778.5
Totals										

Totals	Particulates		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
	325,995	163.0	3,542	1.8	528,600	264.3	12,618,630	6,309	1,854,370	927.2

[1] Includes exhaust PM_{10} and road dust

4. YELLOWSTONE NP AND REGIONAL EMISSIONS

4.1 YELLOWSTONE NP SUMMARY

A summary of Yellowstone NP emissions is provided in Table 21.

TABLE 21: ESTIMATED ANNUAL EMISSIONS FROM YELLOWSTONE NP

Source	PM_{10} (tons/yr)	SO_2 (tons/yr)	NO_X (tons/yr)	CO (tons/yr)	VOCs (tons/yr)
Point Sources					
Heating Equipment	0.77	25.31	9.93	2.2	0.19
Generators	0.78	2.26	17.01	4.56	0.87
Gasoline Storage Tanks	--	--	--	--	8.06
Wastewater Treatment Plant	--	--	--	--	0.72
Subtotal	1.55	27.57	26.94	6.76	9.84
Area Sources					
Woodstoves/Fireplaces	37.95	0.44	2.85	277	251
Campfires	9.46	0.11	0.71	69	63
Wildland Fires	1,420	--	--	15,900	727[1]
Subtotal	1,467	0.55	3.56	16,246	1,041
Mobile Sources					
Road Vehicles	145.8	--	213	3,035	149
Nonroad Vehicles	17.2	1.8	52	3,274	779
Subtotal	163	1.8	264	6,309	927
Totals					
Totals	1,632	30	295	22,562	1,978

[1] As methane

4.2 REGIONAL AIR EMISSIONS

Emission estimates for Park County, WY, Park and Gallatin Counties, MT, Fremont County, ID, and the state of Wyoming 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, gasoline storage tanks, which account for over 75 percent of VOC stationary source emissions in the park, have been included as stationary sources for Yellowstone NP, while the NEI treats them as area sources. It also does not appear that residential wood burning is included as an area source in the NEI. Table 22 provides a comparison of Yellowstone NP emissions with those from the surrounding counties and the State of Wyoming.

TABLE 22: ESTIMATED ANNUAL EMISSIONS FROM YELLOWSTONE NP, SURROUNDING COUNTIES, AND THE STATE OF WYOMING

Area	PM_{10} (tons/yr)	SO_2 (tons/yr)	NO_X (tons/yr)	CO (tons/yr)	VOC (tons/yr)
Point Sources					
Yellowstone NP	1.55	27.57	26.94	6.76	9.84
Park County, WY	75	2,000	1,152	1,280	1,214
Park County, MT	28	15	64	81	20
Gallatin County, MT	298	2,341	1,648	113	178
Fremont County, ID	117	35	31	887	571
Surrounding Counties	518	4,391	2,895	2,361	1,983
Wyoming	31,308	154,907	142,390	75,072	21,144
Area Sources					
Yellowstone NP	1,467	0.55	3.56	16,246	1,041
Park County, WY	3,136	11	72	1,460	864
Park County, MT	7,245	26	666	18,788	1,242
Gallatin County, MT	8,990	116	1,725	31,139	3,721
Fremont County, ID	7,309	1	14	517	415
Surrounding Counties	26,680	154	2,477	51,904	6,242
Wyoming	56,195	15,197	61,723	51,368	19,468
Mobile Sources					
Yellowstone NP	163	1.8	264	6,309	927
Park County, WY	19,957	211	3,141	11,263	1,316
Park County, MT	58	99	1,656	5,789	596
Gallatin County, MT	11,379	381	5,175	26,968	3,721
Fremont County, ID	71	124	1,220	5,598	841
Surrounding Counties	31,465	815	11,192	49,618	6,474
Wyoming	319,935	4,274	71,353	250,450	27,839

5. COMPLIANCE AND RECOMMENDATIONS

5.1 COMPLIANCE

The Wyoming Department of Environmental Quality (DEQ) Air Quality Division administers air quality regulations in the State of Wyoming. Park personnel should continue to 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 Wyoming Air Quality Standards and Regulations (WAQS&R) should be consulted regarding the need to obtain a permit to construct or a permit to operate such sources. According to the WAQS&R Chapter 6, current exemptions to these permits include:

- Fuel burning equipment of less than 10 million Btu per hour heat input
- Mobile internal combustion engines.

In 1992, Yellowstone was issued a permit to construct an asphalt plant, which was originally moved to the park in 1980. The plant is rated at 160 tons per hour and is fired with No. 2 fuel oil. It is equipped with a baghouse to control particulate emissions, which the Wyoming DEQ considered to represent best available control technology (BACT). It is not considered a major source and was not subject to prevention of significant deterioration (PSD) analysis.

5.2 ALTERNATIVE FUEL VEHICLE INITIATIVES

The park has initiated a number of alternative fuel vehicle initiatives both in the park and in cooperation with other organizations beginning in the mid-1990s. In August 2002, Yellowstone NP, together with Grand Teton NP, three National Forests, three states, six counties, seven cities and towns, and dozens of private businesses, were formally designated as the Greater Yellowstone-Teton Clean Cities Coalition by the U.S. Department of Energy (DOE). This designation formally unites the Coalition and the DOE and provides for mutual agreements, responsibilities, and procedures necessary to carry out the objectives of the DOE Clean Cities program, as guided by the Energy policy Act of 1992 and the Clean Air Act Amendments of 1990. The immediate goal of the Coalition is to expand alternative fuel infrastructure and alternative fuel vehicle use in the region.

Additional alternative fuel and clean engine initiatives include:

Yellowstone National Park

- A 100 percent rapeseed (canola) ethyl ester fuel has been used successfully in a 1995 Dodge pickup based in Mammoth Hot Springs; the truck has gone over 130,000 miles.
- A 20 percent rapeseed/80 percent diesel fuel, referred to as B20 and biodiesel, is used in three passenger buses, including one commuter bus that transports 35 employees 100 miles/day to Livingston, MT.
- B20 is used in five garbage packer trucks.
- Combined B20 and B100 refueling tanks are located at Mammoth Hot Springs, Old Faithful, and Lake.
- Plans are to begin using B20 in all park diesel vehicles by mid-2002.
- E10 gasoline (10 percent ethanol/90 percent gasoline that is also known as gasohol) has been used by all park vehicles for the last three years.
- Five administrative E85 fuel flexible vehicles (FFVs) arrived May 2001 and five more are on order.
- An E85 aboveground fuel storage tank is located at the new garage in Mammoth Hot Springs.
- E10 is sold at all seven public gasoline service stations in the park since April 2001, and the concessionaire reported excellent public response.

Greater Yellowstone Area

- There is one E85 public service station in West Yellowstone, MT.
- Grand Teton NP uses B10 in administrative diesel vehicles.
- City of Jackson uses B10 in administrative diesel vehicles.
- City of Jackson has E10 public service stations.
- Propane public service stations are in Cody, WY.
- Shoshone National Forest has a B20 refueling tank.
- Caribu National Forest has purchased a B20 refueling tank.

5.3 SUSTAINABLE DEVELOPMENT

In addition to the alternative fuel vehicle initiatives, the park has undertaken a number of energy conservation, water conservation, recycling, and other initiatives that directly and indirectly reduce air emissions and around the park. Some of these include:

- Installation of 7-kilowatt (kW) photoelectric systems at Lamar Buffalo Ranch and Lewis Lake.

- Heating, insulation, and lighting energy-saving upgrades in numerous facilities.
- Completed preliminary design for new 150-200 kW hydroelectric power plant at Mammoth Hot Springs.
- Two 5-kW solid oxide fuel cells are planned for the spring of 2002, including one at West Yellowstone entrance station.
- Developed a Sustainable Design, Building & Development Resource Directory.
- Energy and water conservation marketing programs have been implemented by concessionaires.
- Partnership with Grand Teton NP, Montana, Wyoming, Idaho, USEPA, and SAE International to support annual Clean Snowmobile Challenge.
- Worked with Montana and U.S. DOE to demonstrate prototype electric snowmobile.
- Utilized biodegradable synthetic lubrication oils in park-owned snowmobiles.
- Partnered with adjoining Montana counties to create a recycling network, the Headwaters Cooperative Recycling Project.
- Partnered with four counties and three cities to form the Southwest Montana Composting Project to characterize compostable solid waste.
- Switched from 130 cleaning and other janitorial products that had health or environmental risk components to less than 10 bio-based or otherwise environmentally preferable products.

In 2001, Yellowstone NP was awarded the Department of the Interior Environmental Achievement Award. The Departmental award recognizes DOI bureaus, employees, and contractors for their exceptional achievements or contributions in a broad range of environmental disciplines including pollution prevention, recycling, sustainable design, environmentally preferable purchasing, facility environmental excellence, environmental stewardship,, auditing and environmental management, and education and outreach.

5.4 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.

The park has assessed and implemented several renewable energy initiatives, and this should continue, particularly for applications in remote locations. In addition to reducing the consumption of conventional fossil fuels, renewable energy systems obviate the need to transport, handle, and store fossil fuels and the associated potential for fuel spills. Of the park's stationary air emission sources, residential woodstoves are estimated to be the largest emitters. Park officials are aware of this issue and have discussed measures that include woodstove removal, phase-out, and/or replacement with units that meet USEPA New Source Performance Standards for residential woodstoves. In recent years, the park and principal concessionaire also have switched from No. 2 fuel oil to cleaner burning propane as heating equipment is replaced.

With respect to mobile sources, the park has been very proactive in implementing some forms of alternative fuel vehicles, particularly in light of its relative isolated location, the closure of most park roads to wheeled vehicles from December to March, and limited access to some alternative fuel supplies. For example, the implementation of compressed and/or liquefied natural gas (LNG/CNG) vehicles has been undertaken by a number of national park units, including Grand Canyon NP, Lake Mead NRA, and Channel Islands NP. Although, natural gas supplies are available only in the West Yellowstone area of the park, some parks, most notably Grand Canyon NP, also have no natural gas supply lines, but have implemented natural gas vehicles. In the case of GRCA, LNG is trucked to the park and dispensed as both CNG and LNG to park-owned/ concessionaire-operated shuttle buses.

The park has also begun acquiring snowmobiles and marine vessels that incorporate cleaner-burning four-stroke engines relative to conventional two-stroke engines. For example, approximately half of the NPS and Xanterra Parks & Resorts marine vessels now have four-stroke gasoline engines, and the NPS had ordered two dozen two-stroke engine snowmobiles to replace an equal number of four-stroke machines during the 2001-2002 winter season. This replacement trend should continue and even accelerate where possible since two-stroke engines are significant contributors to mobile source emissions.

The continuing use of snowmobiles operating in the park has been the subject of litigation and resulting environmental impact studies. In the most recent Final Supplemental Environmental Impact Statement (FSEIS) for Winter Use in Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway (NPS 2003), the NPS notes that the preferred alternative in the FSEIS strikes a balance between phasing out all snowmobile use-as required under the November 2000 Record of Decision-and allowing for the unlimited snowmobile use of the past. Critical elements of the preferred alternative include: reduced numbers of snowmobiles through daily limits; implementing best available technology requirements for snowmobiles;

implementation of an adaptive management program; guided access for both snowmobiles and snowcoaches; a reasonable phase-in period; a new generation of snowcoaches; and funding to effectively manage the winter use program.

6. REFERENCES

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

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

Greater Yellowstone Area Clean Air Partnership. 1999. *Greater Yellowstone Area Air Quality Assessment Document.* April.

National Park Service. 2000a. *Air Quality Concerns Related to Snowmobile Usage in National Parks.* Air Resources Division. February.

National Park Service, 2000b. *Winter Use Plans, Final Environmental Impact Statement for Yellowstone and Grand Teton National Parks and John D. Rockefeller, Jr., Memorial Parkway.* August

National Park Service, 2003. *Winter Use Plans, Final Supplemental Environmental Impact Statement for Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway.* March.

USEPA, 1991. *Nonroad Engine and Vehicle Emission Study Report.* EPA-21A-2001 and EPA460/3-91-02. November.

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 "PART5".* Office of Transportation and Air Quality.

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.

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.

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

Yellowstone National Park. 1994. *Alternative Transportation Modes Feasibility Study, Volume III.* July.

Yellowstone National Park. 1997. *Transportation Study Dunraven Road.* July.

Yellowstone National Park. 1998. *Traffic Analysis Grand Loop Road from Madison Junction to Norris Junction*. June.

Yellowstone National Park. 1999. *The State of the Park.* National Park Service, Mammoth Hot Springs, Wyoming.

APPENDIX A

YELLOWSTONE NATIONAL PARK
AIR EMISSIONS INVENTORY CONTACTS

YELLOWSTONE NP AIR EMISSIONS INVENTORY CONTACTS

Information	Contact	Phone Number
General	Mary Hektner, Resource Management Specialist	(307) 344-2151
	Tim Hudson, Chief of Maintenance	(307) 344-2301
	Rick Caron, Assistant Chief of Maintenance	(307) 344-2305
Space and Water Heating Equipment	Mike McCoy	(307) 344-2333
Fuel Storage Tanks	Jim Evanoff	(307) 344-2311
Generators	Harold Anderson	(307) 344-2332
Fuel Consumption	Paula Tobin, Budget Office	(307) 344-2328
	John Gruber	
Prescribed Burning	Roy Renkin	(307) 344-2161
	Phil Perkins	(307) 344-2161
Campfires	Tammy Wert	(307) 344-2115
Wastewater Treatment Plants	Tim Hudson, Chief of Maintenance	(307) 344-2301
Visitor Data	Tammy Wert	(307) 344-2115
NPS Vehicles	Mark Foster, Facility Manager	(307) 344-2320
	Jim Owen	(307) 344-2320
NPS Marine Vessels	Bruce Sefton, Lake District Supervisor	(307) 344-2430
Concessions	Edna Good, Business Manager	(307) 344-2270
Amfac Parks & Resorts	Barry Cantor, Director Engineering	(307) 344-5342
Yellowstone Park Service Stations	Hal Broadhead	(307) 848-7333

APPENDIX B

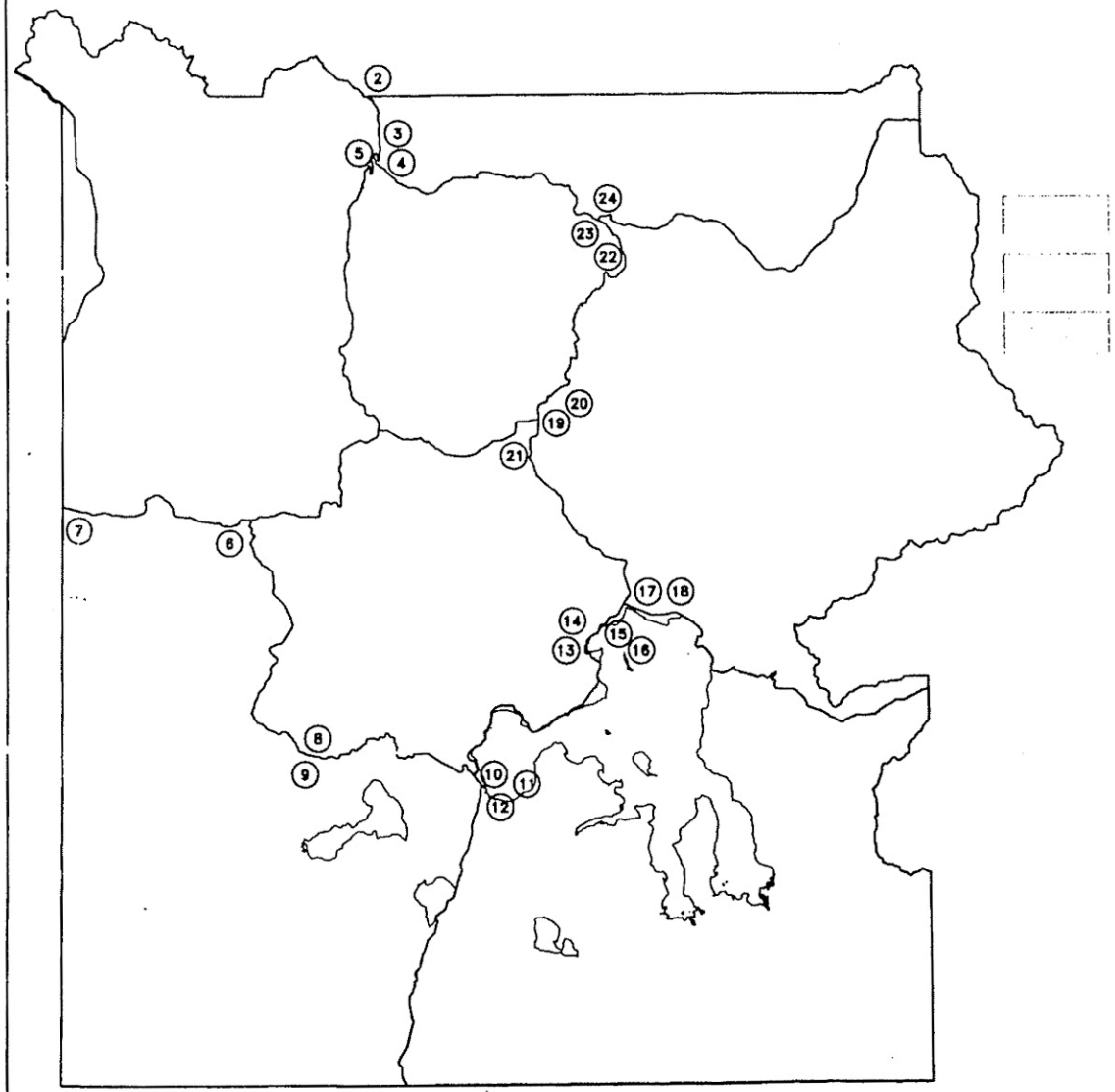
DEVELOPED AREAS IN YELLOWSTONE NATIONAL PARK, WY

LAND ASSIGNMENTS

SUPPLEMENT TO CONTRACTUAL MAINTENANCE PLAN

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

YELLOWSTONE
NATIONAL
PARK



CONCESSIONER CODE

A	AMFAC
B	HAMILTON STORES, INC.
C	YELLOWSTONE PARK SERVICE STATIONS
D	YELLOWSTONE PARK MEDICAL SERVICE WEST PARK HOSPITAL
E	US WEST --Does not have maintenance plan under existing permit.
F	US POSTAL SERVICE --Does not have maintenance plan under existing permit.
G	MONTANA POWER --Does not have maintenance plan under existing permit.

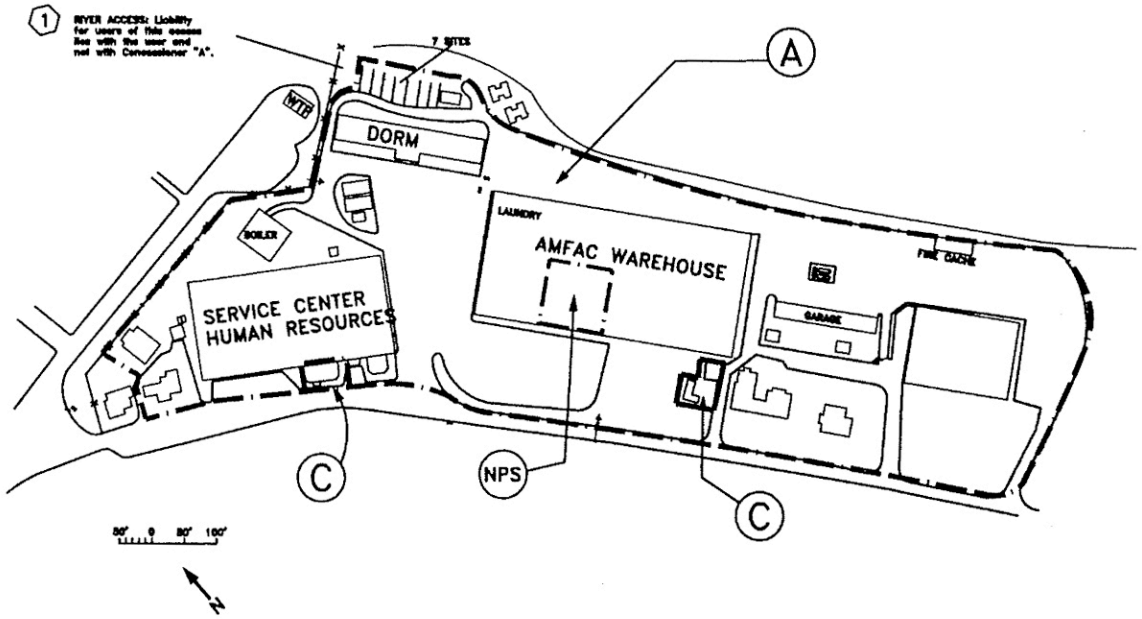
SHEET INDEX

1. COVER AND INDEX
2. GARDINER
3. UPPER MAMMOTH ADMINISTRATION AND RESIDENTIAL AREA
4. LOWER MAMMOTH RESIDENTIAL AREA
5. MAMMOTH CORRAL AND WARMING HUT
6. MADISON JUNCTION CAMPGROUND
7. WEST YELLOWSTONE / MADISON WARMING HUT
8. OLD FAITHFUL – NORTH
8A. OLD FAITHFUL – INN DETAIL
8B. OLD FAITHFUL – LODGE DETAIL
8C. OLD FAITHFUL – SNOWLODGE DETAIL
9. OLD FAITHFUL UTILITY AREA
10. GRANT VILLAGE
11. GRANT VILLAGE TRAILER COURT
12. GRANT VILLAGE CAMPGROUND
13. BRIDGE BAY MARINA
14. BRIDGE BAY CAMPGROUND
15. LAKE LODGE AREA
16. LAKE HOTEL AND HOSPITAL AREA
17. FISHING BRIDGE
18. FISHING BRIDGE R.V. PARK
19. CANYON VILLAGE
20. CANYON VILLAGE CAMPGROUND
21. CANYON JUNCTION AND CORRAL AREA
22. TOWER FALLS
23. TOWER JUNCTION (ROOSEVELT LODGE)
24. YANCY'S HOLE

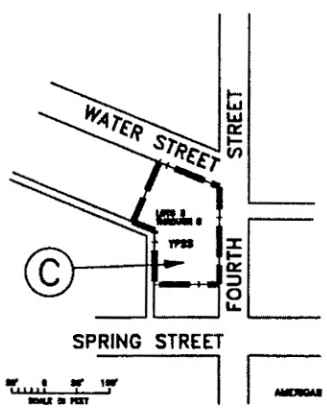
KEY:

—·—·—·— BORDER OF ASSIGNMENTS

REVISED		PREPARED	TITLE OF SHEET	DRAWING NO.
BY	DATE	M. HUDSON	LAND ASSIGNMENTS – CONCESSIONS	101
		DESIGNED	LOCATION WITHIN PARK	26350
		M. HUDSON	INDEX	SHEET
		DRAWN	NAME OF PARK	1
		CHECKED	YELLOWSTONE NATIONAL PARK	OF 24
		MARCH 1999		
		DATE		

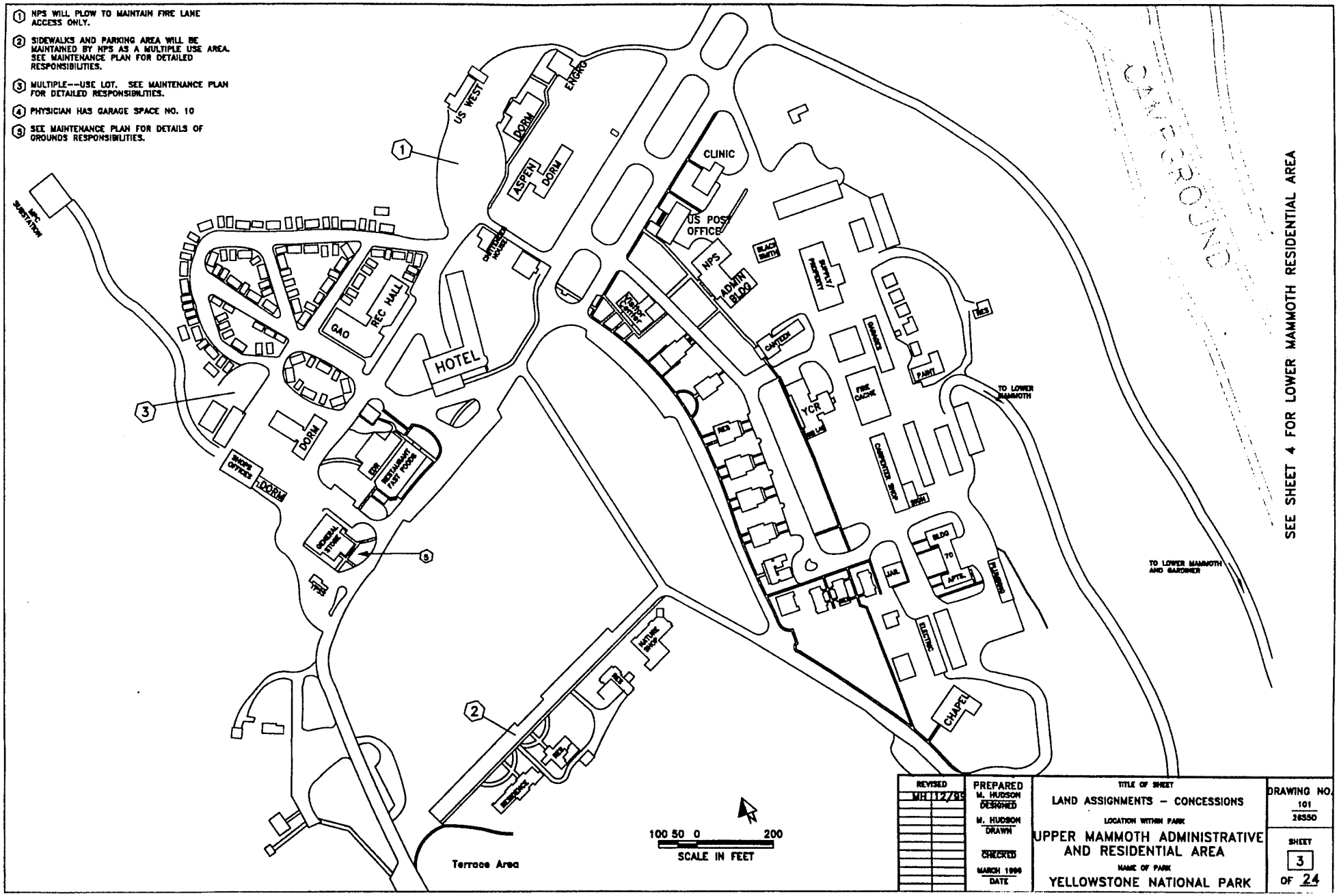


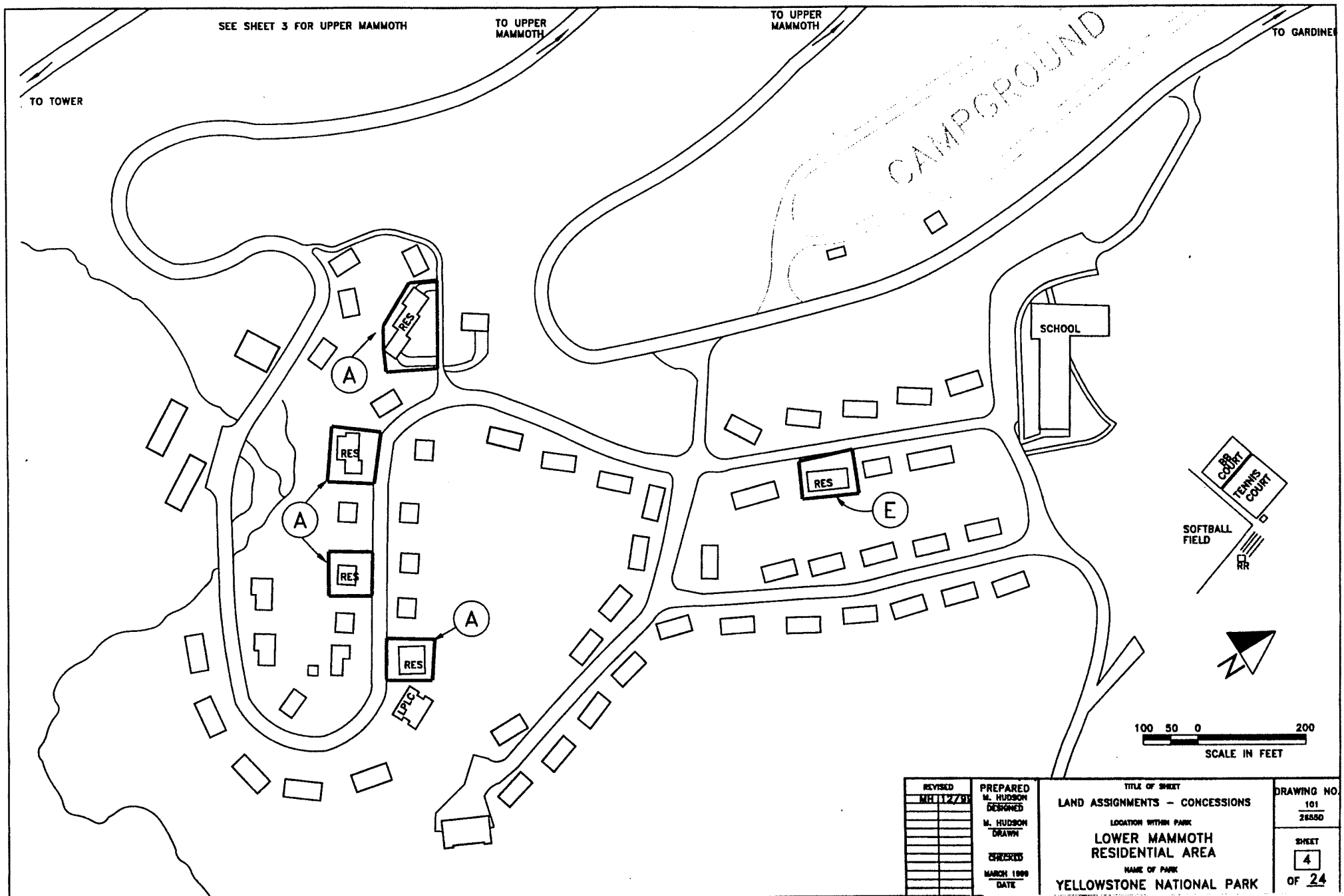
NOTES:
DRAWINGS REFERENCED:
101/41221B, 101/41247



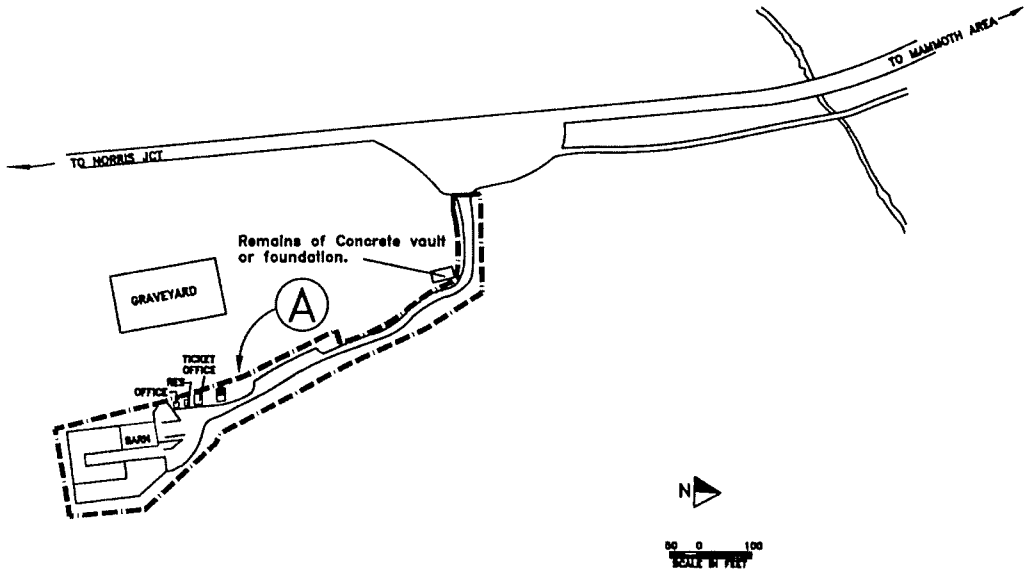
NOTES:
Referenced Survey by Hank Ralt, 1984
text

REVISED		PREPARED	TITLE OF SHEET	DRAWING NO.
MH	12/88	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 28550
		M. HUDSON DRAWN	LOCATION WITHIN PARK	SHEET
		CHECKED	GARDINER	2 OF 24
		MARCH 1988 DATE	NAME OF PARK YELLOWSTONE NATIONAL PARK	


1 NPS WILL PLOW TO MAINTAIN FIRE LANE ACCESS ONLY.
2 SIDEWALKS AND PARKING AREA WILL BE MAINTAINED BY NPS AS A MULTIPLE USE AREA. SEE MAINTENANCE PLAN FOR DETAILED RESPONSIBILITIES.
3 MULTIPLE--USE LOT. SEE MAINTENANCE PLAN FOR DETAILED RESPONSIBILITIES.
4 PHYSICIAN HAS GARAGE SPACE NO. 10
5 SEE MAINTENANCE PLAN FOR DETAILS OF GROUNDS RESPONSIBILITIES.
US WEST
DORM
ENGRS
ASPEN
DORM
CLINIC
US POST OFFICE
NPS
ADMIN BLDG
BLACK SMITH
SUPPLY/ PROPERTY
CHAMBERS HOUSE
GAO
REC HALL
HOTEL
CANTEEN
GARAGES
PAINT
FIRE CACHE
YCR
DORM
LDR
RESTAURANT FAST FOODS
SHOPS OFFICES
DORM
GENERAL STORE
TO LOWER MAMMOTH
CARPENTER SHOP
BLDG 70
APTS.
LAB
ELECTRIC
CHAPEL
HISTORIC SHOP
RESIDENCE
Terrace Area
100 50 0 200
SCALE IN FEET
SEE SHEET 4 FOR LOWER MAMMOTH RESIDENTIAL AREA
TO LOWER MAMMOTH AND GARDINER
REVISED MH 12/95
PREPARED M. HUDSON DESIGNED
M. HUDSON DRAWN
CHECKED
MARCH 1996 DATE
TITLE OF SHEET
LAND ASSIGNMENTS – CONCESSIONS
LOCATION WITHIN PARK
UPPER MAMMOTH ADMINISTRATIVE AND RESIDENTIAL AREA
NAME OF PARK
YELLOWSTONE NATIONAL PARK
DRAWING NO. 101 26550
SHEET 3 OF 24

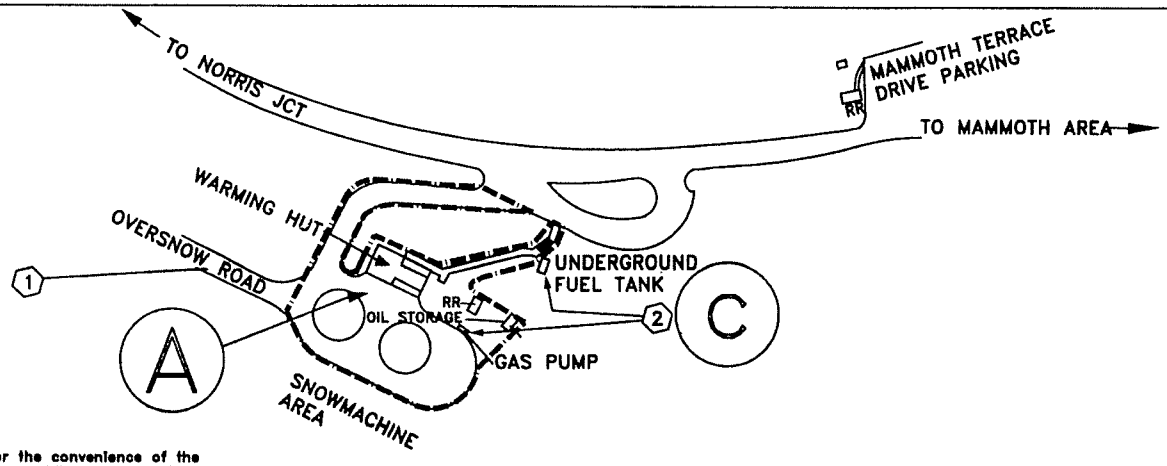


REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/91	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 26550
	M. HUDSON DRAWN	LOCATION WITHIN PARK: LOWER MAMMOTH RESIDENTIAL AREA	SHEET 4 OF 24
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	
	MARCH 1989 DATE		



(1) REFER TO THE MAINTENANCE PLAN FOR HORSE TRAIL MAINTENANCE RESPONSIBILITIES.

MAMMOTH CORRAL



(1) For the convenience of the snowmobile customer, Concessioner A packs this road to access the main road.

(2) Concessioner C provided the tank and pumps and maintains them. Concessioner A buys fuel from Concessioner C (not Conoco) and operates the system and pays for power. All records for the pump and tank are maintained by Concessioner C.

MAMMOTH WARMING HUT

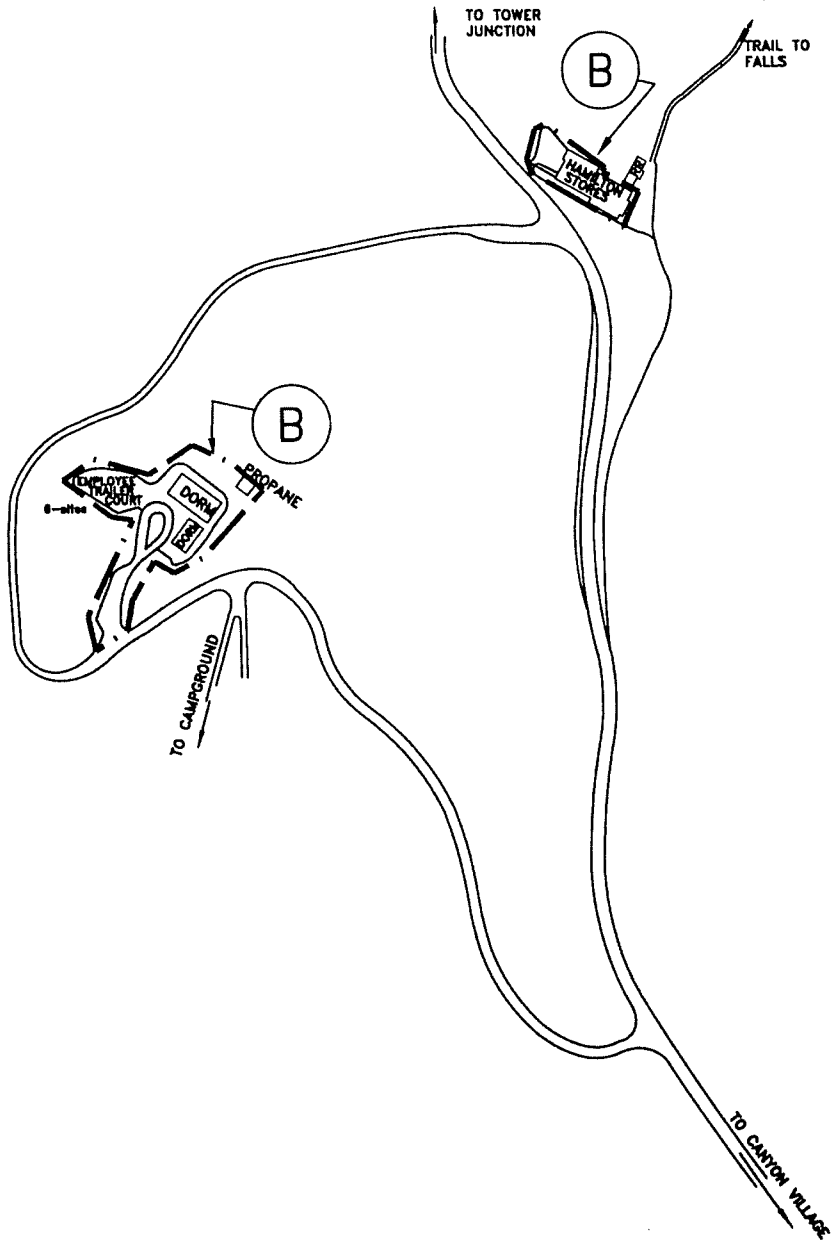
REVISED	
MH	12/98

PREPARED M. HUDSON DESIGNED M. HUDSON DRAWN CHECKED MARCH 1998 DATE

TITLE OF SHEET
LAND ASSIGNMENTS – CONCESSIONS
LOCATION WITHIN PARK
MAMMOTH CORRAL & MAMMOTH WARMING HUT
NAME OF PARK
YELLOWSTONE NATIONAL PARK

DRAWING NO. 101 / 26580

SHEET 5 OF 24

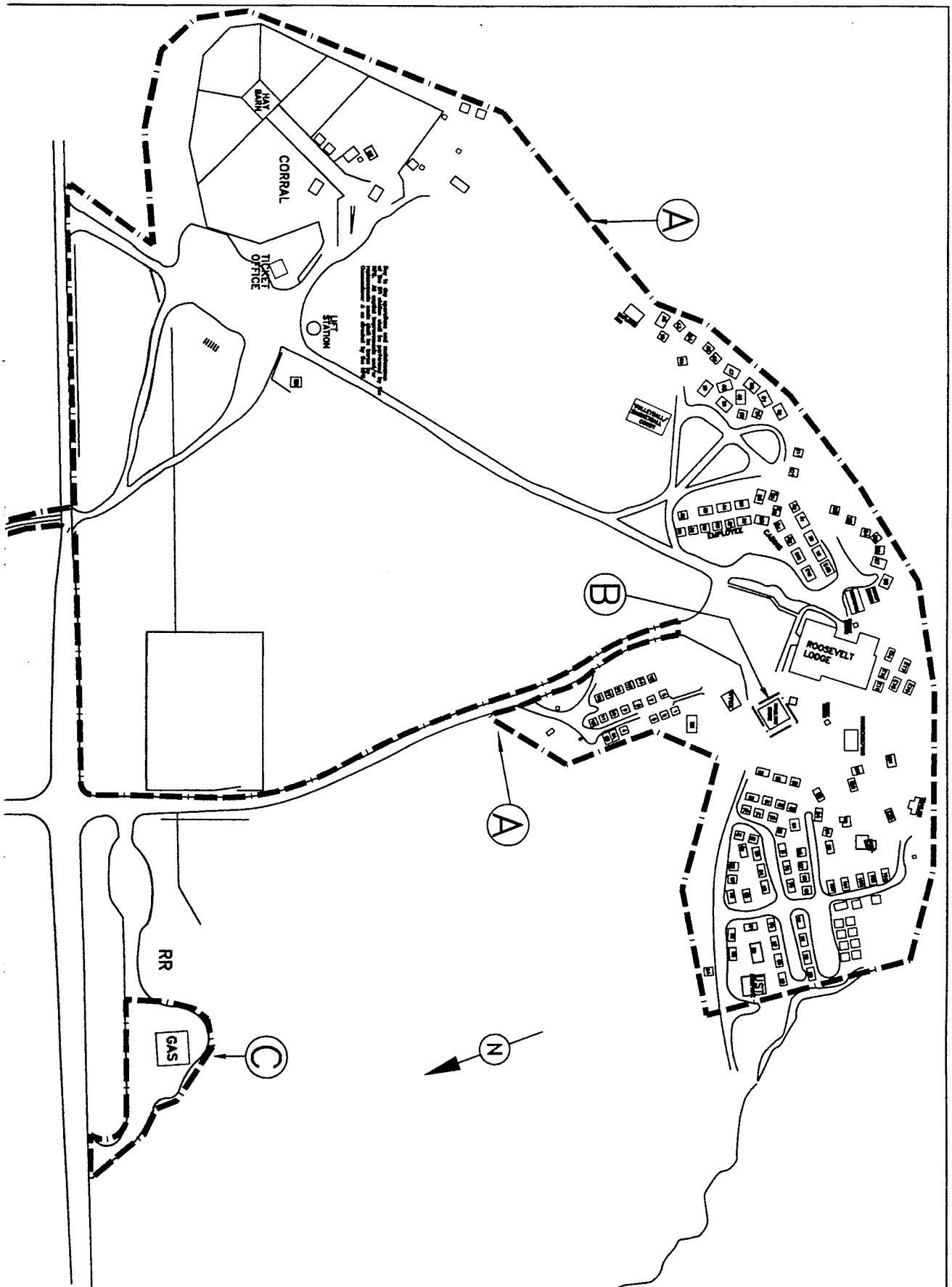


0 100 200 300 400

SCALE IN FEET

N

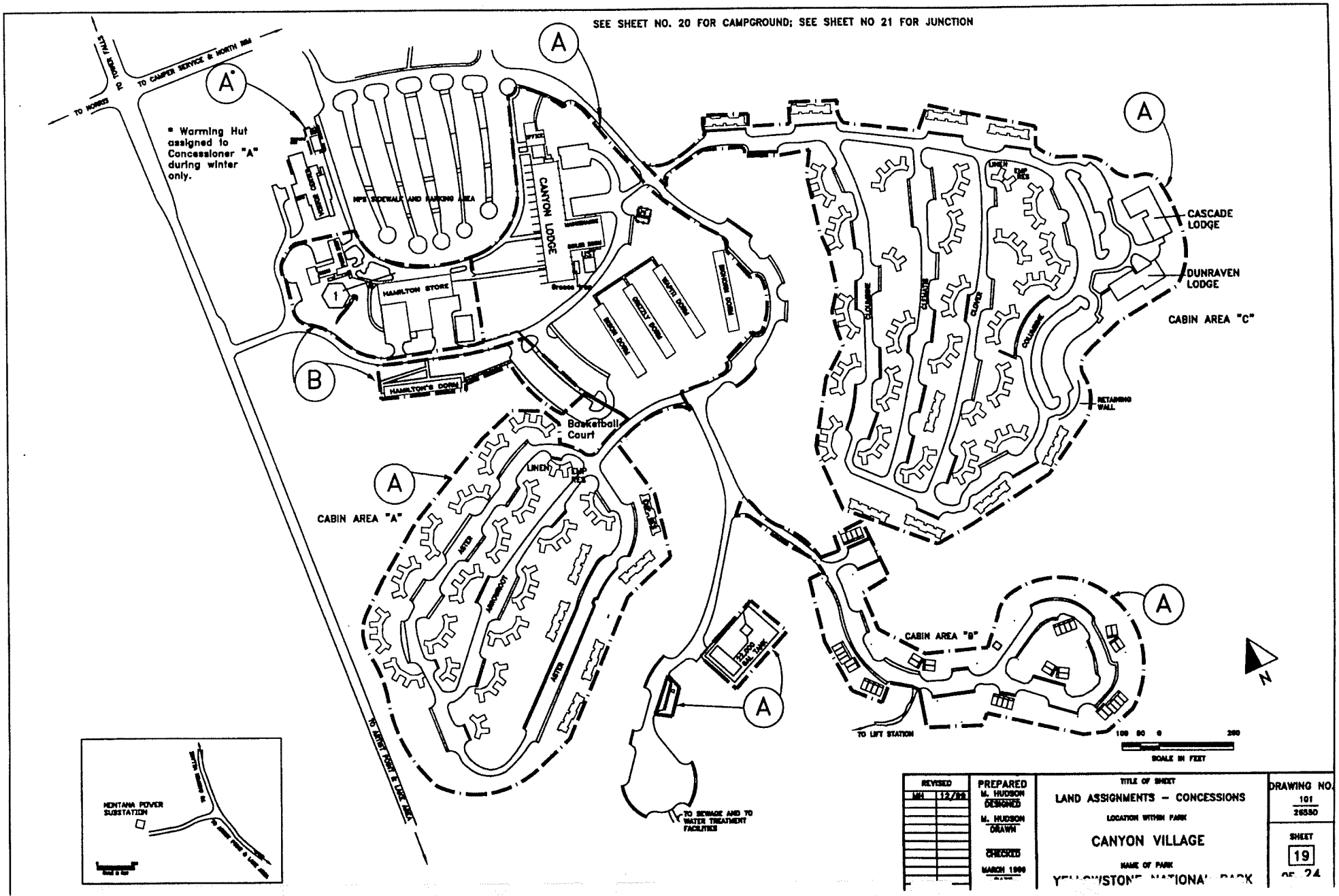
REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/88	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 26560
	M. HUDSON DRAWN	LOCATION WITHIN PARK: TOWER FALL	SHEET 22
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	OF 24
	MARCH 1988		



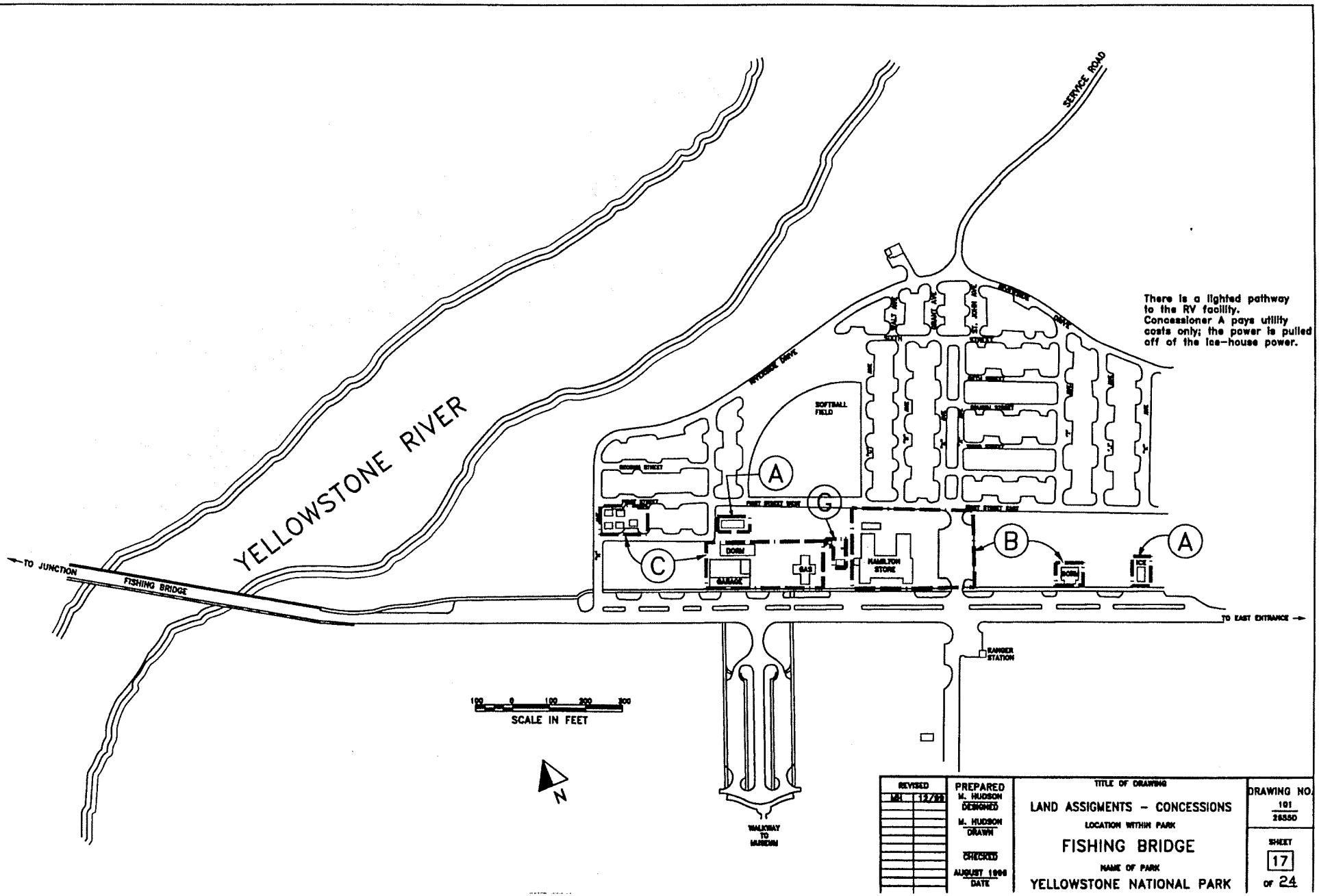
REVISED		PREPARED	TITLE OF SHEET
MM	10/98	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS
		M. HUDSON DRAWN	LOCATION WITHIN PARK
		CHECKED	ROOSEVELT LODGE
		MARCH 1998 DATE	NAME OF PARK
			YELLOWSTONE NATIONAL PARK

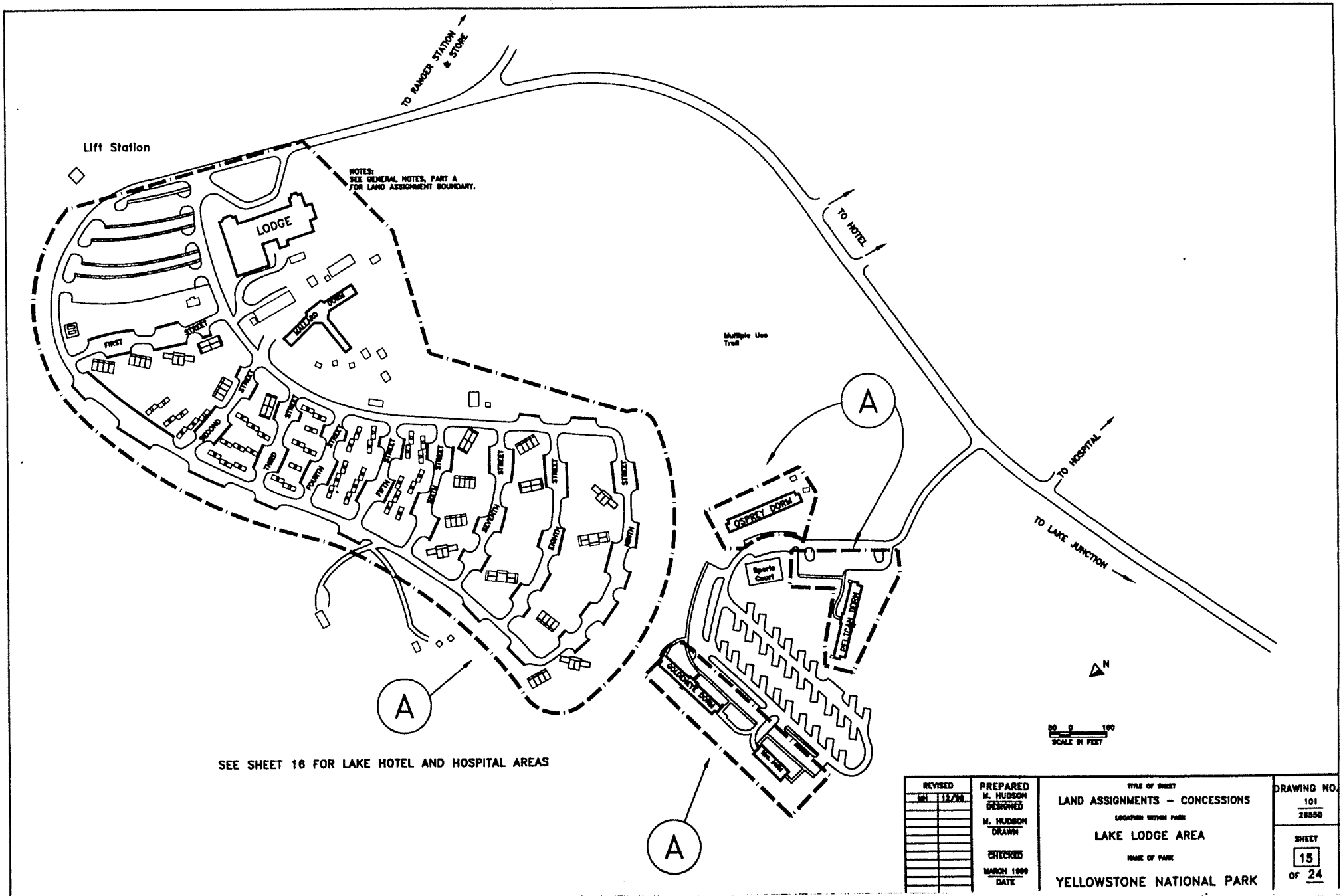
DRAWING NO. 101 / 25350

SHEET 23 OF 24

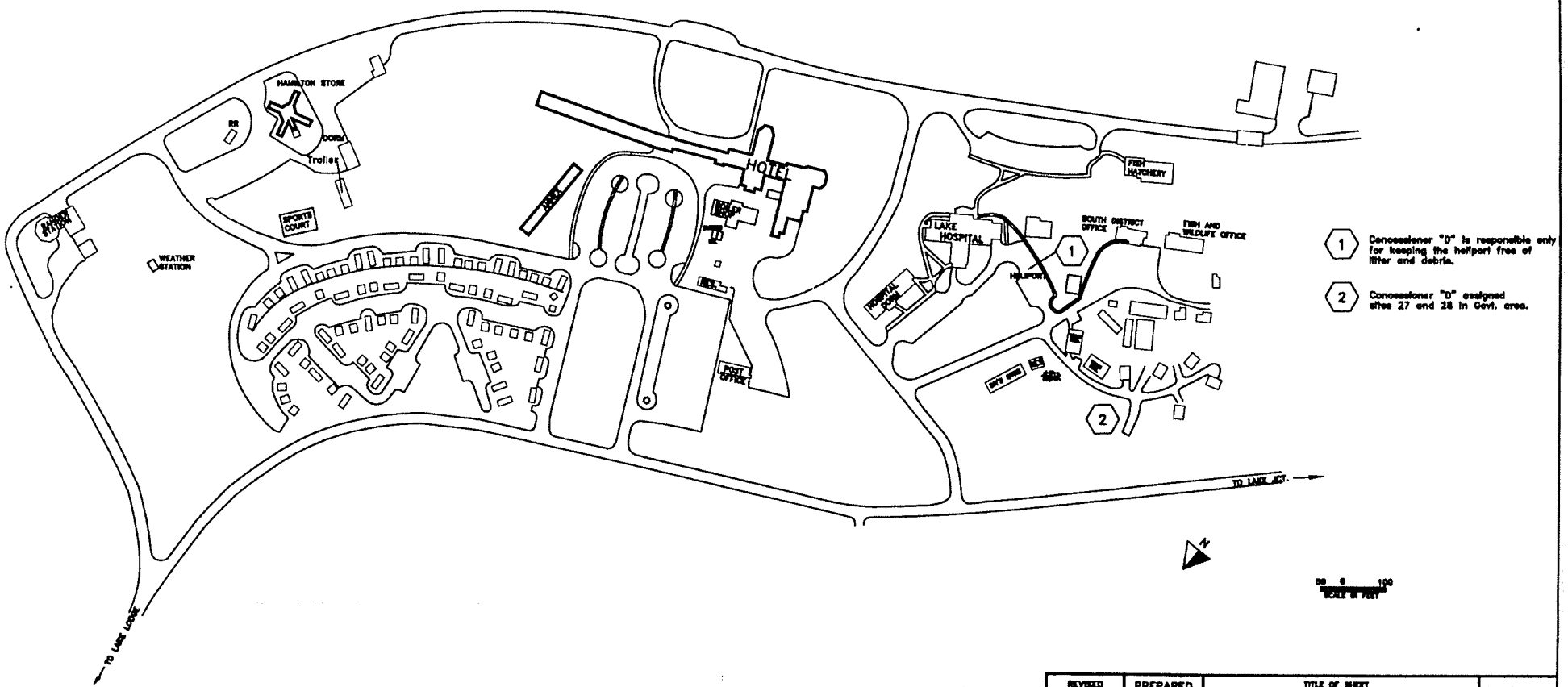


REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/88	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 26550
	M. HUDSON DRAWN	LOCATION WITHIN PARK: CANYON VILLAGE	SHEET 19
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	OF 24
	MARCH 1988		


YELLOWSTONE RIVER
SERVICE ROAD
There is a lighted pathway to the RV facility. Concessioner A pays utility costs only; the power is pulled off of the ice-house power.
TO JUNCTION
FISHING BRIDGE
TO EAST ENTRANCE
SOFTBALL FIELD
DORM
GARAGE
GAS
HAMILTON STORE
ICE
RANGER STATION
WALKWAY TO MUSEUM
A
B
C
G
SCALE IN FEET
N
REVISED
PREPARED
M. HUDSON
DESIGNED
M. HUDSON
DRAWN
CHECKED
AUGUST 1998
DATE
TITLE OF DRAWING
LAND ASSIGMENTS - CONCESSIONS
LOCATION WITHIN PARK
FISHING BRIDGE
NAME OF PARK
YELLOWSTONE NATIONAL PARK
DRAWING NO.
101
26550
SHEET
17
OF 24



REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/88	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 26550
	M. HUDSON DRAWN	LOCATION WITHIN PARK: LAKE LODGE AREA	SHEET 15 OF 24
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	
	MARCH 1988 DATE		

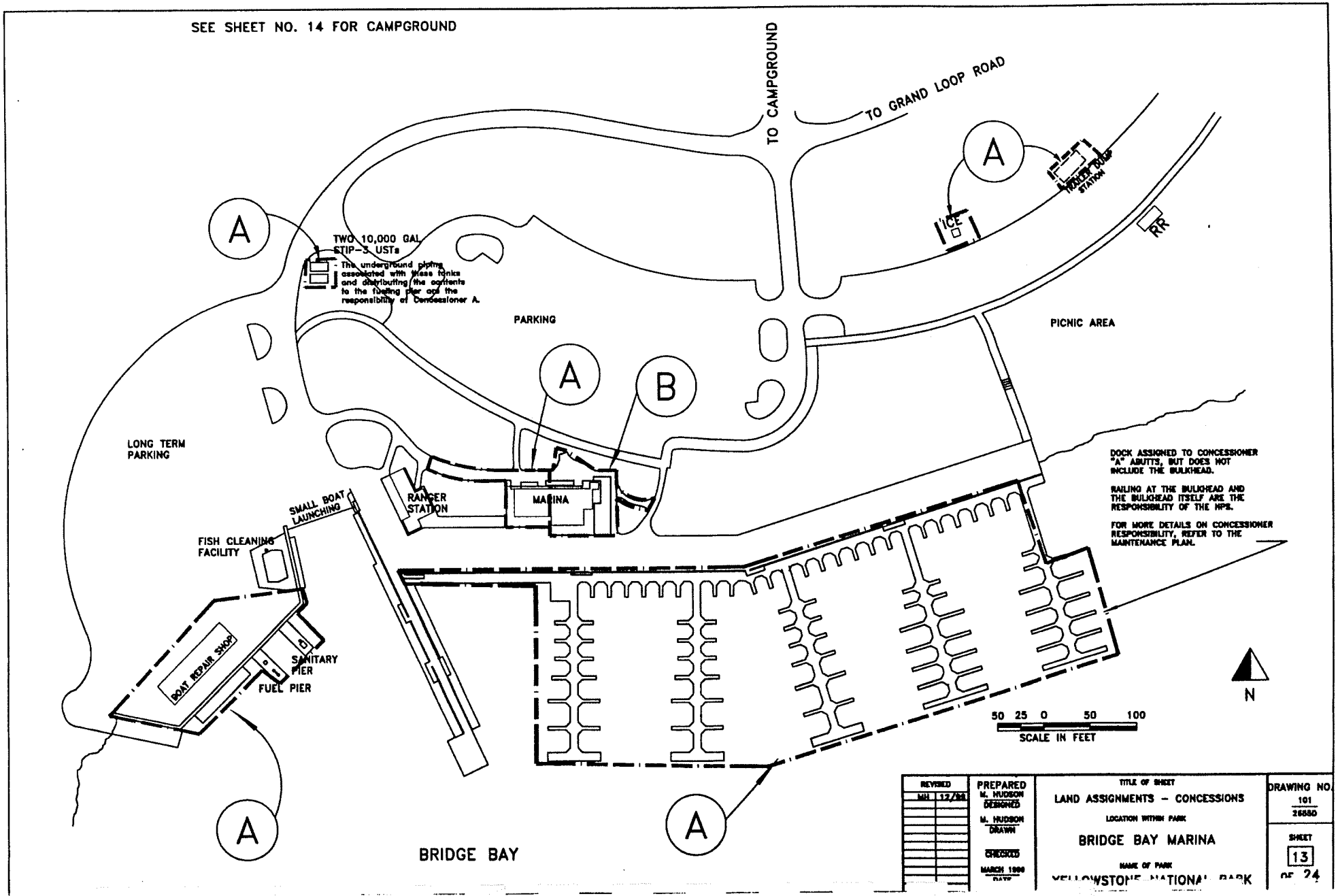


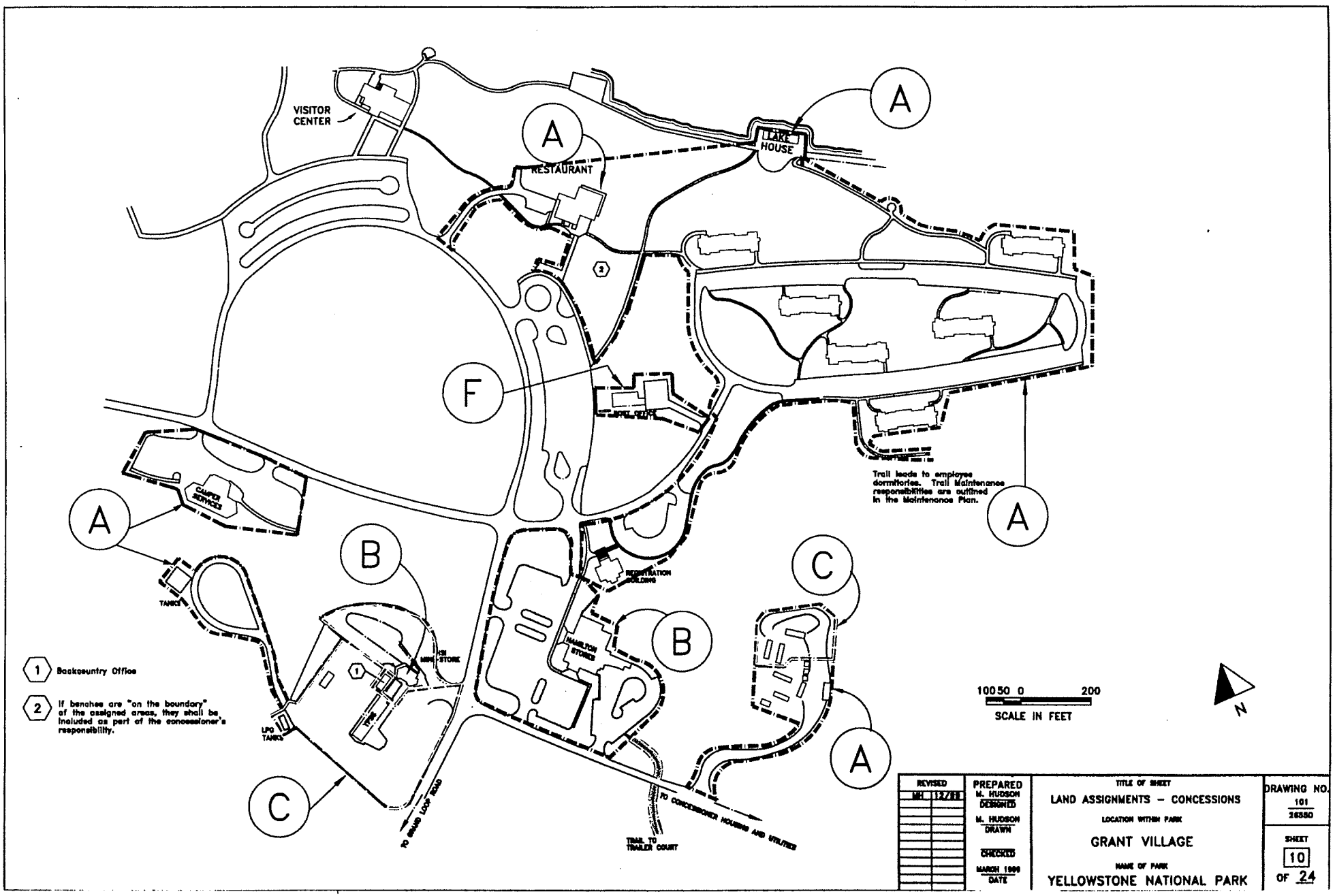
1 Concessioner "D" is responsible only for keeping the heliport free of litter and debris.

2 Concessioner "D" assigned sites 27 and 28 in Govt. area.

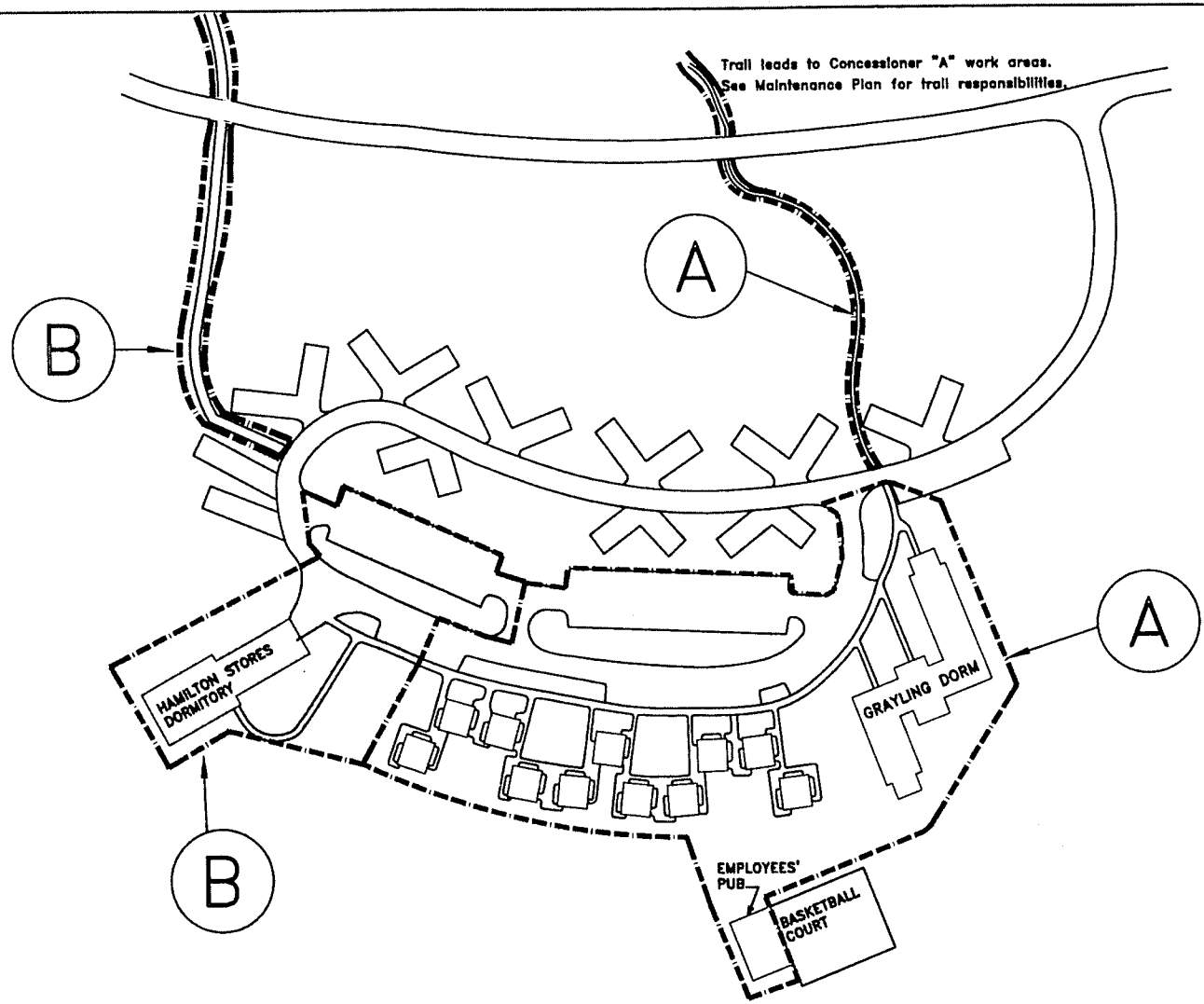
SEE SHEET 15 FOR LAKE LODGE AREA

REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/88	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 25560
	M. HUDSON DRAWN	LOCATION WITHIN PARK: LAKE HOTEL AND HOSPITAL AREA	SHEET 16 OF 24
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	
	MARCH 1988 DATE		

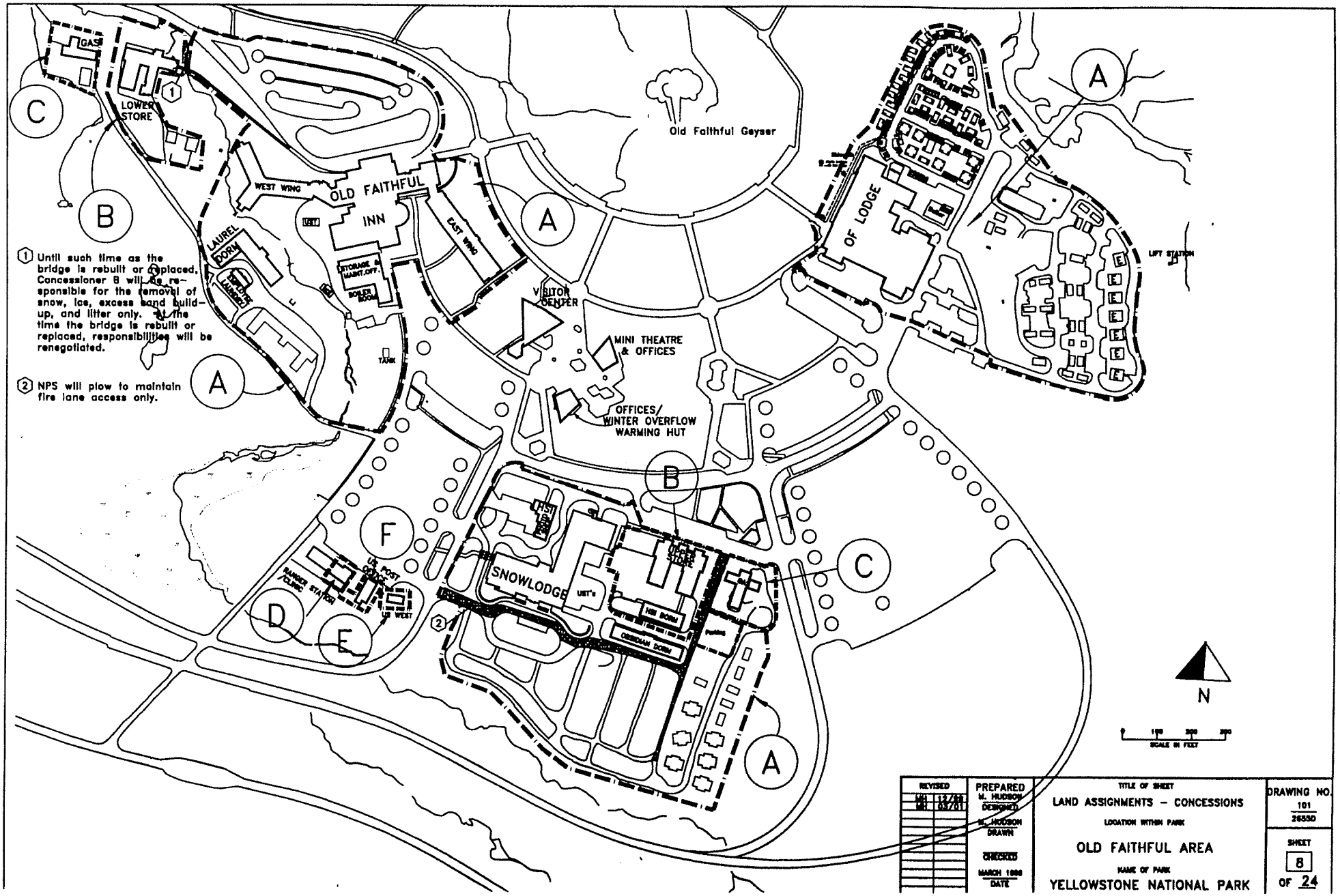

SEE SHEET NO. 14 FOR CAMPGROUND
TO CAMPGROUND
TO GRAND LOOP ROAD
A
TWO 10,000 GAL STIP-3 USTs
The underground piping associated with these tanks and distributing the contents to the fueling pier are the responsibility of Concessioner A.
ICE
RR
PARKING
PICNIC AREA
A
B
LONG TERM PARKING
RANGER STATION
MARINA
DOCK ASSIGNED TO CONCESSIONER "A" ABUTTS, BUT DOES NOT INCLUDE THE BULKHEAD.
RAILING AT THE BULKHEAD AND THE BULKHEAD ITSELF ARE THE RESPONSIBILITY OF THE NPS.
FOR MORE DETAILS ON CONCESSIONER RESPONSIBILITY, REFER TO THE MAINTENANCE PLAN.
SMALL BOAT LAUNCHING
FISH CLEANING FACILITY
BOAT REPAIR SHOP
SANITARY PIER
FUEL PIER
N
50 25 0 50 100
SCALE IN FEET
BRIDGE BAY
REVISED
MH 12/88
PREPARED
M. HUDSON
DESIGNED
M. HUDSON
DRAWN
CHECKED
MARCH 1988
TITLE OF SHEET
LAND ASSIGNMENTS – CONCESSIONS
LOCATION WITHIN PARK
BRIDGE BAY MARINA
NAME OF PARK
YELLOWSTONE NATIONAL PARK
DRAWING NO.
101
26550
SHEET
13
OF 24



REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/88	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 26550
	M. HUDSON DRAWN	LOCATION WITHIN PARK: GRANT VILLAGE	SHEET 10 OF 24
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	
	MARCH 1989 DATE		



REVISED		PREPARED	TITLE OF SHEET	DRAWING NO.
MM	12/98	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 26550
		M. HUDSON DRAWN	LOCATION WITHIN PARK	SHEET
		CHECKED	GRANT VILLAGE CONCESSIONER TRAILER COURT	11 OF 24
		MARCH 1999 DATE	NAME OF PARK YELLOWSTONE NATIONAL PARK	



1. Until such time as the bridge is rebuilt or replaced, Concessioner B will be responsible for the removal of snow, ice, excess sand build-up, and litter only. At the time the bridge is rebuilt or replaced, responsibilities will be renegotiated.

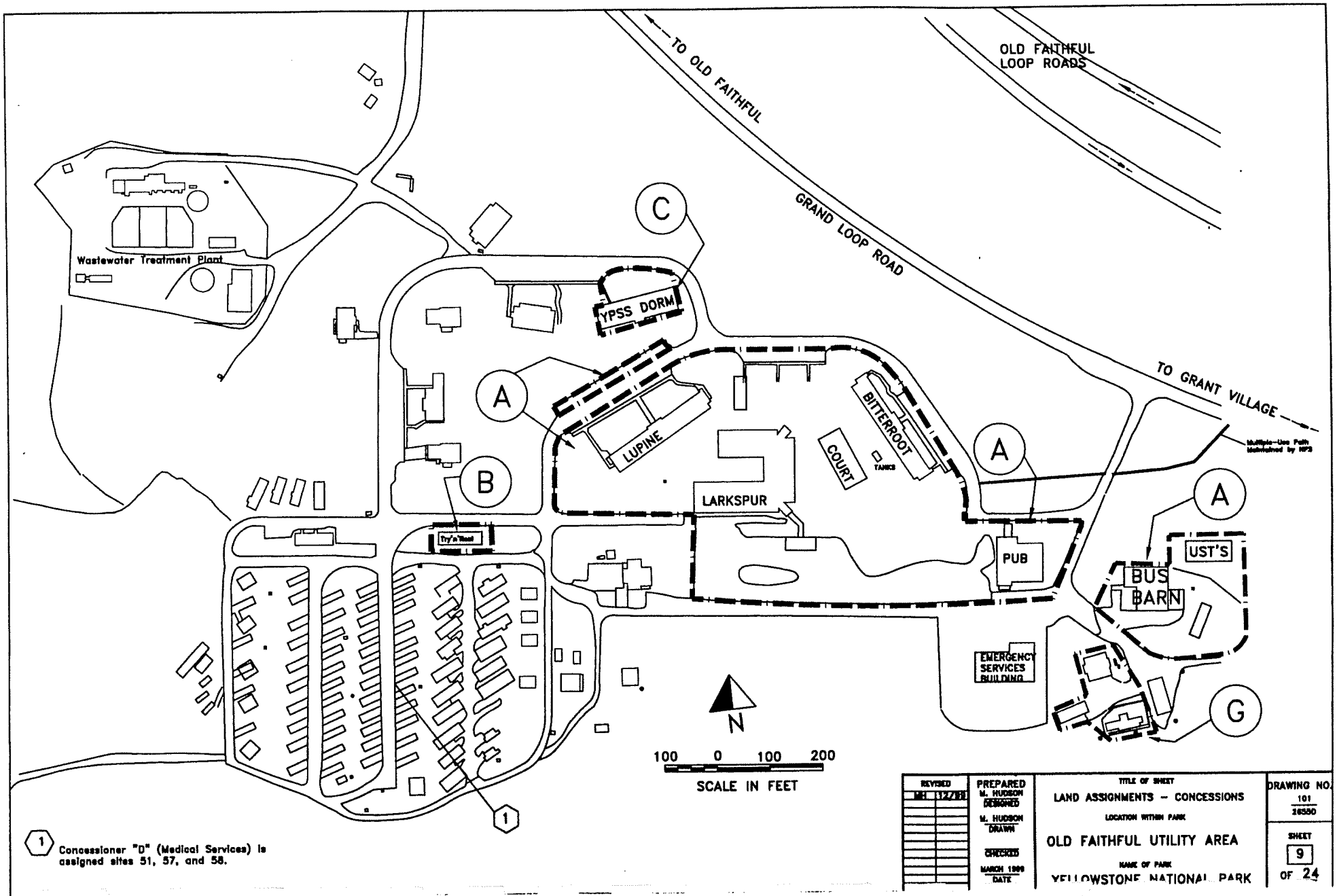
2. NPS will plow to maintain fire lane access only.

REVISED	PREPARED
MH 12/00	M. HUDSON
MH 03/01	DESIGNED
	M. HUDSON
	DRAWN
	CHECKED
	MARCH 1999
	DATE

TITLE OF SHEET
LAND ASSIGNMENTS – CONCESSIONS
LOCATION WITHIN PARK
OLD FAITHFUL AREA
NAME OF PARK
YELLOWSTONE NATIONAL PARK

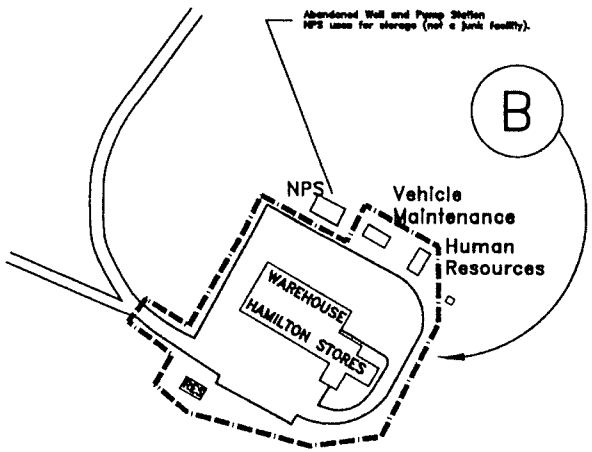
DRAWING NO. 101 26550

SHEET 8 OF 24

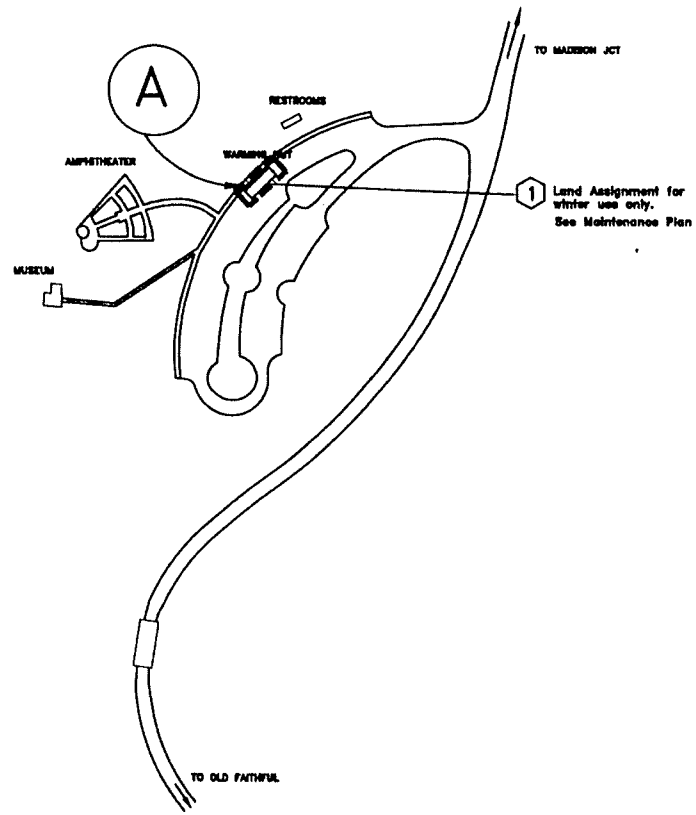


1 Concessioner "D" (Medical Services) is assigned sites 51, 57, and 58.

REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/98	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 28550
	M. HUDSON DRAWN	LOCATION WITHIN PARK: OLD FAITHFUL UTILITY AREA	SHEET 9 OF 24
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	
	MARCH 1998 DATE		

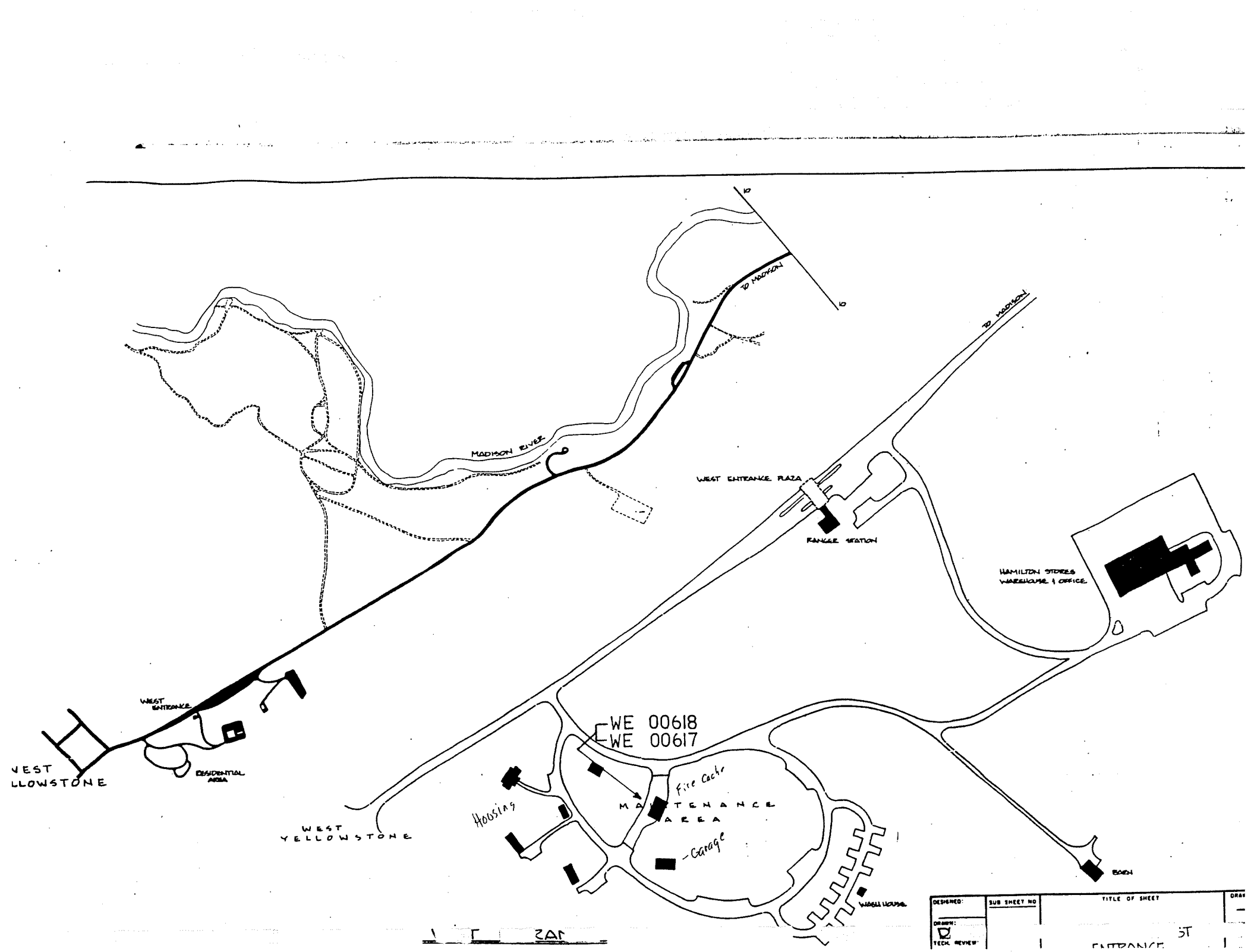


WEST ENTRANCE -- HAMILTON STORE'S WAREHOUSE ETC



MADISON AREA WARMING HUT

REVISED	PREPARED	TITLE OF SHEET	DRAWING NO.
MH 12/98	M. HUDSON DESIGNED	LAND ASSIGNMENTS – CONCESSIONS	101 / 28550
	M. HUDSON DRAWN	LOCATION WITHIN PARK: WEST YELLOWSTONE / MADISON WARMING HUT	SHEET 7 OF 24
	CHECKED	NAME OF PARK: YELLOWSTONE NATIONAL PARK	
	MARCH 1999 DATE		


10
10
TO MADISON
TO MADISON
MADISON RIVER
WEST ENTRANCE PLAZA
RANGER STATION
HAMILTON STORES
WAREHOUSE & OFFICE
WEST ENTRANCE
RESIDENTIAL AREA
VEST
LLOWSTONE
WE 00618
WE 00617
Fire Cache
Housing
MAINTENANCE AREA
Garage
WEST
YELLOWSTONE
BARN
WASH HOUSE
DESIGNED:
SUB SHEET NO
TITLE OF SHEET
DRAWN:
TECH. REVIEW:
ENTRANCE

APPENDIX C

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^3	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[c]	CO	VOC[d]
Residential Furnace[e]	0.4	142S	18	5	0.713
Boilers < 100 Million Btu/hr (Commercial/Institutional Combust.[f])	2	142S	20	5	0.34
Boilers < 100 Million Btu/hr (Industrial Boilers[g])	2	142S	20	5	0.2
Boilers > 100 Million Btu/hr (Utility Boilers[h])	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)				
	PM[j]	SO_2	NO_x[c]	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_x burners	7.6	0.6	50	84	5.5
-Controlled-Low NO_x 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_x 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 gal fuel burned)				
	PM[a]	SO_2[b]	NO_x[c]	CO	VOC[d]
Commercial Boilers[f]	0.4	0.10S	14	1.9	0.3
Industrial Boilers[g]	0.6	0.10S	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):

Fuel Type	Emission Factor (lb/hp-hr)				
	PM	SO_x	NO_x	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_x	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[j]	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[(j)]	SO_x	NO_x[(c)]	CO	VOC
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 NO_2.
(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 ∃300,000 Btu/hr, but <10,000,000 Btu/hr.
(g) Unit Rating ∃10,000,000 Btu/hr, but <100,000,000 Btu/hr.
(h) Unit Rating ∃100,000,000 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 D

EMISSION CALCULATIONS

2000 ACTUAL CRITERIA EMISSIONS FROM HEATING UNITS AT YELLOWSTONE NATIONAL PARK

Emission Source	Location	Facilities	Fuel	Number of Sources	Capacity (Btu/hr)		Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service													
Boiler	Mammoth	Administration/Canteen	No. 2 Fuel Oil	2	1,900,000	3,800,000	12,600	25	895	252	63	270,897	4
Boiler	Mammoth	Visitor Center/Residences 2 & 3/Clinic	No. 2 Fuel Oil	2	1,900,000	3,800,000	12,600	25	895	252	63	270,897	4
Boiler	Mammoth	YCR Supplies/Officers Row Residences	No. 2 Fuel Oil	2	1,900,000	3,800,000	12,600	25	895	252	63	270,897	4
Boiler	Mammoth	Fire Cache/Grounds Shop/Paint Shop	No. 2 Fuel Oil	1	1,900,000	1,900,000	6,300	13	447	126	31	135,449	2
Boiler	Mammoth	Supply Center/Radio Shop/4 Residences	No. 2 Fuel Oil	2	1,900,000	3,800,000	12,600	25	895	252	63	270,897	4
Boiler	Mammoth	11 Residences/Jail	No. 2 Fuel Oil	2	1,900,000	3,800,000	12,600	25	895	252	63	270,897	4
Boiler	Mammoth	Apartment Bldg/Plumbing Shop	No. 2 Fuel Oil	2	1,900,000	3,800,000	12,600	25	895	252	63	270,897	4
Boiler	Mammoth	Elementary School	No. 2 Fuel Oil	1	1,670,000	1,670,000	5,537	11	393	111	28	119,052	2
Boiler	Lake	Hospital	No. 2 Fuel Oil	2	1,900,000	3,800,000	12,600	25	895	252	63	270,897	4
Boiler	Canyon	Visitor Center	No. 2 Fuel Oil	2	651,000	1,302,000	4,317	9	307	86	22	92,818	1
Boiler	Old Faithful	Visitor Center	No. 2 Fuel Oil	2	994,000	1,988,000	6,592	13	468	132	33	141,722	2
Boiler	Parkwide	Residences	No. 2 Fuel Oil	90	100,000	9,000,000	29,842	12	2,119	537	149	641,599	21
			Totals	110	18,615,000		140,787	234	9,996	2,756	704	3,026,921	59
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for residential furnaces (<300,000 Btu/hr) S = 0.5 percent								0.4	142S	18.0	5.0	21,500	0.7
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for furnaces (>300,000 Btu/hr) S = 0.5 percent								2.0	142S	20.0	5.0	21,500	0.3
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
	Mammoth	New Garage	Propane	2	1,900,000	3,800,000	13,120	5	0	184	26	164,000	4
	Canyon	Garage	Propane	1	1,900,000	1,900,000	6,560	3	0	92	13	82,000	2
	Lake	Garage	Propane	1	1,900,000	1,900,000	6,560	3	0	92	13	82,000	2
	Madison	Garage	Propane	1	1,900,000	1,900,000	6,560	3	0	92	13	82,000	2
	Old Faithful	Emergency Services	Propane	1	1,900,000	1,900,000	6,560	3	0	92	13	82,000	2
	Parkwide	Residences	Propane	380	100,000	38,000,000	131,200	52	2	1,837	262	1,640,000	39
			Totals	386		49,400,000	170,560	68	3	2,388	341	2,132,000	51
Emission Factors from AP-42, Tables 1.5-1 for commercial boilers, S = 0.18 grains/100 cu ft								0.4	0.1*S	14.00	1.90	12,500	0.30
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
	West Yellowstone	Fire Cache/ranger Station	Natural Gas	1	100,000	100,000	86,208	1	0	9	4	1,078	1
	West Yellowstone	Employee Housing	Natural Gas	1	100,000	100,000	86,208	1	0	9	4	1,078	1
	West Yellowstone	Garage	Natural Gas	1	100,000	100,000	86,208	1	0	9	4	1,078	1
	West Yellowstone	Employee Housing	Natural Gas	1	100,000	100,000	86,208	1	0	9	4	1,078	1
	West Yellowstone	4-Plex Housing	Natural Gas	4	100,000	400,000	344,833	3	0	38	16	4,310	3
	West Yellowstone	4-Plex Housing	Natural Gas	4	100,000	400,000	344,833	3	0	38	16	4,310	3
			Totals	12		1,200,000	1,034,500	9	1	113	48	12,931	9
		Emission Factors from AP-42, Tables 1.4-1 and 1.4-2 for residential furnaces						7.6	0.6	94.0	40.0	120,000	5.5
		Formula = Consumption (cf/yr) * Emission Factor (lb/1,000,000 cf)											
			Total National Park Service Heating Units	508				311	10,000	5,257	1,093	5,171,852	119

Emission Source	Location	Facilities	Fuel	Number of Sources	Capacity (Btu/hr)		Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Xanterra Parks & Resorts													
Boiler	Gardiner	Laundry	No. 2 Fuel Oil	3	8,000,000	24,000,000	114,066	228	8,099	2,281	570	2,452,419	39
Boiler	Gardiner	Residence 5	No. 2 Fuel Oil	1	140,000	140,000	1,195	2	85	24	6	25,693	0
Boiler	Mammoth	Mammoth	No. 2 Fuel Oil	3	4,184,000	12,552,000	133,012	266	9,444	2,660	665	2,859,758	45
Furnace	Mammoth	Residence 3	No. 2 Fuel Oil	1	140,000	140,000	1,796	4	128	36	9	38,614	1
Furnace	Mammoth	Residence 24	No. 2 Fuel Oil	1	140,000	140,000	557	1	40	11	3	11,976	0
Furnace	Mammoth	Residence 89	No. 2 Fuel Oil	1	120,000	120,000	784	2	56	16	4	16,856	0
Boiler	Mammoth	Spruce Dorm	No. 2 Fuel Oil	1	1,900,000	1,900,000	13,182	26	936	264	66	283,413	4
Boiler	Lake Village	Lake Hotel	No. 2 Fuel Oil	3	5,230,000	15,690,000	43,152	86	3,064	863	216	927,768	15
Boiler	Lake Village	Lake Hotel Kitchen	No. 2 Fuel Oil	1	839,000	839,000	2,308	5	164	46	12	49,622	1
Boiler	Lake Village	Lake Lodge	No. 2 Fuel Oil	3	2,092,000	6,276,000	23,146	46	1,643	463	116	497,639	8
Boiler	Lake Village	Lake Lodge Kitchen	No. 2 Fuel Oil	1	837,000	837,000	3,087	6	219	62	15	66,371	1
Boiler	Old Faithful	Old Faithful Inn	No. 2 Fuel Oil	3	6,277,000	18,831,000	71,670	143	5,089	1,433	358	1,540,905	24
Boiler	Old Faithful	Old Faithful Inn Kitchen	No. 2 Fuel Oil	1	8,370,000	8,370,000	30,716	61	2,181	614	154	660,394	10
Boiler	Old Faithful	Old Faithful Lodge	No. 2 Fuel Oil	3	4,184,000	12,552,000	41,820	84	2,969	836	209	899,130	14
Boiler	Old Faithful	Old Faithful Snow Lodge	No. 2 Fuel Oil	3	2,930,000	8,790,000	53,661	107	3,810	1,073	268	1,153,712	18
Boiler	Canyon Village	Canyon Village Lodge	No. 2 Fuel Oil	2	3,350,000	6,700,000	27,700	55	1,967	554	139	595,550	9
Boiler	Canyon Village	Canyon Village Lodge Kitchen	No. 2 Fuel Oil	1	2,510,000	2,510,000	10,255	21	728	205	51	220,483	3
			Totals	32	51,243,000		572,107	1,144	40,620	11,442	2,861	12,300,301	195
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for residential furnaces (<300,000 Btu/hr) S = 0.5 percent								0.4	142S	18.0	5.0	21,500	0.7
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for furnaces (>300,000 Btu/hr) S = 0.5 percent								2.0	142S	20.0	5.0	21,500	0.3
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
Boiler	Gardiner	Personnel/Service Center	Propane	1	126,000	126,000	9,660	4	0	135	19	120,750	3
Furnace	Gardiner	Residence 1 & 2	Propane	2	118,000	236,000	18,095	7	0	253	36	226,188	5
Furnace	Gardiner	Support Services/Warehouse/Residence	Propane	2	100,000	200,000	10,132	4	0	142	20	126,650	3
Boiler	Mammoth	Residence 1 & 2	Propane	1	715,000	715,000	8,930	4	0	125	18	111,625	3
Heater	Mammoth	Residence 3	Propane	1	100,000	100,000	418	0	0	6	1	5,225	0
Furnace	Mammoth	Residence Duplex	Propane	2	113,000	226,000	3,963	2	0	55	8	49,538	1
Equipment	Mammoth	Roosevelt Kitchen	Propane	1	250,000	250,000	16,897	7	0	237	34	211,213	5
Equipment	Mammoth	Roosevelt Cookout	Propane	1	50,000	50,000	1,509	1	0	21	3	18,863	0
Equipment	Lake	Lake Hotel Kitchen/Residence	Propane	1	150,000	150,000	8,612	3	0	121	17	107,650	3
Equipment	Lake	Lake Lodge Kitchen/Residence	Propane	2	150,000	300,000	18,868	8	0	264	38	235,850	6
Furnace	Lake	Fishing Bridge RV Park	Propane	1	100,000	100,000	8,576	3	0	120	17	107,200	3
Furnace	Lake	Bay Bridge Store/Office/Repair Shop	Propane	2	45,000	90,000	946	0	0	13	2	11,825	0
Equipment	Old Faithful	Old Faithful Inn Kitchen/Residence	Propane	2	150,000	300,000	13,754	6	0	193	28	171,925	4
Equipment	Old Faithful	Old Faithful Lodge Kitchen/Residence	Propane	2	150,000	300,000	4,610	2	0	65	9	57,625	1
Boiler	Old Faithful	Old Faithful Snow Lodge	Propane	1	150,000	150,000	13,671	5	0	191	27	170,888	4
Equipment	Canyon Village	Canyon Village Lodge Kitchen	Propane	1	150,000	150,000	13,908	6	0	195	28	173,850	4
Furnace	Canyon Village	Residences	Propane	3	50,000	150,000	954	0	0	13	2	11,925	0
Furnace	Canyon Village	Lodge Cabins	Propane	550	50,000	27,500,000	67,587	27	1	946	135	844,838	20
Furnace	Grant Village	Lake House	Propane	2	140,000	280,000	4,920	2	0	69	10	61,500	1
			Totals	578		31,373,000	226,010	90	4	3,164	452	2,825,125	68
Emission Factors from AP-42, Tables 1.5-1 for commercial boilers, S = 0.18 grains/100 cu ft								0.4	0.1*S	14.00	1.90	12,500	0.30
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
			Total Xanterra Resorts & Parks Heating Units	610			lbs/yr	1,235	40,624	14,606	3,313	15,125,426	262
			Park Totals	1,118			lbs/yr	1,546	50,623	19,863	4,406	20,297,277	382
							tons/yr	0.77	25.31	9.93	2.20	10,149	0.19

2000 POTENTIAL CRITERIA EMISSIONS FROM HEATING UNITS AT YELLOWSTONE NATIONAL PARK

Emission Source	Location	Facilities	Fuel	Number of Sources	Capacity (Btu/hr)		Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service													
Boiler	Mammoth	Administration/Canteen	No. 2 Fuel Oil	2	1,900,000	3,800,000	237,771	476	16,882	4,755	1,189	5,112,086	81
Boiler	Mammoth	Visitor Center/Residences 2 & 3/Clinic	No. 2 Fuel Oil	2	1,900,000	3,800,000	237,771	476	16,882	4,755	1,189	5,112,086	81
Boiler	Mammoth	YCR Supplies/Officers Row Residences	No. 2 Fuel Oil	2	1,900,000	3,800,000	237,771	476	16,882	4,755	1,189	5,112,086	81
Boiler	Mammoth	Fire Cache/Grounds Shop/Paint Shop	No. 2 Fuel Oil	1	1,900,000	1,900,000	118,886	238	8,441	2,378	594	2,556,043	40
Boiler	Mammoth	Supply Center/Radio Shop/4 Residences	No. 2 Fuel Oil	2	1,900,000	3,800,000	237,771	476	16,882	4,755	1,189	5,112,086	81
Boiler	Mammoth	11 Residences/Jail	No. 2 Fuel Oil	2	1,900,000	3,800,000	237,771	476	16,882	4,755	1,189	5,112,086	81
Boiler	Mammoth	Apartment Bldg/Plumbing Shop	No. 2 Fuel Oil	2	1,900,000	3,800,000	237,771	476	16,882	4,755	1,189	5,112,086	81
Boiler	Mammoth	Elementary School	No. 2 Fuel Oil	1	1,670,000	1,670,000	104,494	209	7,419	2,090	522	2,246,627	36
Boiler	Lake	Hospital	No. 2 Fuel Oil	2	1,900,000	3,800,000	237,771	476	16,882	4,755	1,189	5,112,086	81
Boiler	Canyon	Visitor Center	No. 2 Fuel Oil	2	651,000	1,302,000	81,468	163	5,784	1,629	407	1,751,562	28
Boiler	Old Faithful	Visitor Center	No. 2 Fuel Oil	2	994,000	1,988,000	124,392	249	8,832	2,488	622	2,674,428	42
Boiler	Parkwide	Residences	No. 2 Fuel Oil	90	100,000	9,000,000	563,143	225	39,983	10,137	2,816	12,107,571	402
			Totals	110	18,615,000		2,656,783	4,413	188,632	52,009	13,284	57,120,831	1,113
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for residential furnaces (<300,000 Btu/hr) S = 0.5 percent								0.4	142S	18.0	5.0	21,500	0.7
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for furnaces (>300,000 Btu/hr) S = 0.5 percent								2.0	142S	20.0	5.0	21,500	0.3
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
	Mammoth	New Garage	Propane	2	1,900,000	3,800,000	363,803	146	7	5,093	728	4,547,541	109
	Canyon	Garage	Propane	1	1,900,000	1,900,000	181,902	73	3	2,547	364	2,273,770	55
	Lake	Garage	Propane	1	1,900,000	1,900,000	181,902	73	3	2,547	364	2,273,770	55
	Madison	Garage	Propane	1	1,900,000	1,900,000	181,902	73	3	2,547	364	2,273,770	55
	Old Faithful	Emergency Services	Propane	1	1,900,000	1,900,000	181,902	73	3	2,547	364	2,273,770	55
	Parkwide	Residences	Propane	380	100,000	38,000,000	3,638,033	1,455	65	50,932	7,276	45,475,410	1,091
			Totals	386		49,400,000	4,729,443	1,892	85	66,212	9,459	59,118,033	1,419
Emission Factors from AP-42, Tables 1.5-1 for commercial boilers, S = 0.18 grains/100 cu ft								0.4	0.1*S	14.00	1.90	12,500	0.30
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
	West Yellowstone	Fire Cache/ranger Station	Natural Gas	1	100,000	100,000	834,286	6	1	78	33	100,114	6
	West Yellowstone	Employee Housing	Natural Gas	1	100,000	100,000	834,286	6	1	78	33	100,114	6
	West Yellowstone	Garage	Natural Gas	1	100,000	100,000	834,286	6	1	78	33	100,114	6
	West Yellowstone	Employee Housing	Natural Gas	1	100,000	100,000	834,286	6	1	78	33	100,114	6
	West Yellowstone	4-Plex Housing	Natural Gas	4	100,000	400,000	3,337,143	25	2	314	133	400,457	25
	West Yellowstone	4-Plex Housing	Natural Gas	4	100,000	400,000	3,337,143	25	2	314	133	400,457	25
			Totals	12		1,200,000	10,011,429	76	6	941	400	1,201,371	76
		Emission Factors from AP-42, Tables 1.4-1 and 1.4-2 for residential furnaces						7.6	0.6	94.0	40.0	120,000	5.5
		Formula = Consumption (cf/yr) * Emission Factor (lb/1,000,000 cf)											
		Total National Park Service Heating Units		508				6,380	188,723	119,163	23,143	117,440,236	2,608

Emission Source	Location	Facilities	Fuel	Number of Sources	Capacity (Btu/hr)		Consumption (gal/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Amfac Parks & Resorts													
Boiler	Gardiner	Laundry	No. 2 Fuel Oil	3	8,000,000	24,000,000	1,501,714	3,003	106,622	30,034	7,509	32,286,857	511
Boiler	Gardiner	Residence 5	No. 2 Fuel Oil	1	140,000	140,000	8,760	18	622	175	44	188,340	3
Boiler	Mammoth	Mammoth	No. 2 Fuel Oil	3	4,184,000	12,552,000	785,397	1,571	55,763	15,708	3,927	16,886,026	267
Furnace	Mammoth	Residence 3	No. 2 Fuel Oil	1	140,000	140,000	8,760	18	622	175	44	188,340	3
Furnace	Mammoth	Residence 24	No. 2 Fuel Oil	1	140,000	140,000	8,760	18	622	175	44	188,340	3
Furnace	Mammoth	Residence 89	No. 2 Fuel Oil	1	120,000	120,000	7,509	15	533	150	38	161,434	3
Boiler	Mammoth	Spruce Dorm	No. 2 Fuel Oil	1	1,900,000	1,900,000	118,886	238	8,441	2,378	594	2,556,043	40
Boiler	Lake Village	Lake Hotel	No. 2 Fuel Oil	3	5,230,000	15,690,000	981,746	1,963	69,704	19,635	4,909	21,107,533	334
Boiler	Lake Village	Lake Hotel Kitchen	No. 2 Fuel Oil	1	839,000	839,000	52,497	105	3,727	1,050	262	1,128,695	18
Boiler	Lake Village	Lake Lodge	No. 2 Fuel Oil	3	2,092,000	6,276,000	392,698	785	27,882	7,854	1,963	8,443,013	134
Boiler	Lake Village	Lake Lodge Kitchen	No. 2 Fuel Oil	1	837,000	837,000	52,372	105	3,718	1,047	262	1,126,004	18
Boiler	Old Faithful	Old Faithful Inn	No. 2 Fuel Oil	3	6,277,000	18,831,000	1,178,283	2,357	83,658	23,566	5,891	25,333,075	401
Boiler	Old Faithful	Old Faithful Inn Kitchen	No. 2 Fuel Oil	1	8,370,000	8,370,000	523,723	1,047	37,184	10,474	2,619	11,260,041	178
Boiler	Old Faithful	Old Faithful Lodge	No. 2 Fuel Oil	3	4,184,000	12,552,000	785,397	1,571	55,763	15,708	3,927	16,886,026	267
Boiler	Old Faithful	Old Faithful Snow Lodge	No. 2 Fuel Oil	3	2,930,000	8,790,000	550,003	1,100	39,050	11,000	2,750	11,825,061	187
Boiler	Canyon Village	Canyon Village Lodge	No. 2 Fuel Oil	2	3,350,000	6,700,000	419,229	838	29,765	8,385	2,096	9,013,414	143
Boiler	Canyon Village	Canyon Village Lodge Kitchen	No. 2 Fuel Oil	1	2,510,000	2,510,000	157,054	314	11,151	3,141	785	3,376,667	53
			Totals	32	51,243,000		7,532,787	15,066	534,828	150,656	37,664	##########	2,561
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for residential furnaces (<300,000 Btu/hr) S = 0.5 percent								0.4	142S	18.0	5.0	21,500	0.7
Emission Factors from AP-42, Tables 1.3-1 and 1.3-3 for furnaces (>300,000 Btu/hr) S = 0.5 percent								2.0	142S	20.0	5.0	21,500	0.3
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
Boiler	Gardiner	Personnel/Service Center	Propane	1	126,000	126,000	12,063	5	0	169	24	150,787	4
Furnace	Gardiner	Residence 1 & 2	Propane	2	118,000	236,000	22,594	9	0	316	45	282,426	7
Furnace	Gardiner	Support Services/Warehouse/Residence	Propane	2	100,000	200,000	19,148	8	0	268	38	239,344	6
Boiler	Mammoth	Residence 1 & 2	Propane	1	715,000	715,000	68,452	27	1	958	137	855,656	21
Heater	Mammoth	Residence 3	Propane	1	100,000	100,000	9,574	4	0	134	19	119,672	3
Furnace	Mammoth	Residence Duplex	Propane	2	113,000	226,000	21,637	9	0	303	43	270,459	6
Equipment	Mammoth	Roosevelt Kitchen	Propane	1	250,000	250,000	23,934	10	0	335	48	299,180	7
Equipment	Mammoth	Roosevelt Cookout	Propane	1	50,000	50,000	4,787	2	0	67	10	59,836	1
Equipment	Lake	Lake Hotel Kitchen/Residence	Propane	1	150,000	150,000	14,361	6	0	201	29	179,508	4
Equipment	Lake	Lake Lodge Kitchen/Residence	Propane	2	150,000	300,000	28,721	11	1	402	57	359,016	9
Furnace	Lake	Fishing Bridge RV Park	Propane	1	100,000	100,000	9,574	4	0	134	19	119,672	3
Furnace	Lake	Bay Bridge Store/Office/Repair Shop	Propane	2	45,000	90,000	8,616	3	0	121	17	107,705	3
Equipment	Old Faithful	Old Faithful Inn Kitchen/Residence	Propane	2	150,000	300,000	28,721	11	1	402	57	359,016	9
Equipment	Old Faithful	Old Faithful Lodge Kitchen/Residence	Propane	2	150,000	300,000	28,721	11	1	402	57	359,016	9
Boiler	Old Faithful	Old Faithful Snow Lodge	Propane	1	150,000	150,000	14,361	6	0	201	29	179,508	4
Equipment	Canyon Village	Canyon Village Lodge Kitchen	Propane	1	150,000	150,000	14,361	6	0	201	29	179,508	4
Furnace	Canyon Village	Residences	Propane	3	50,000	150,000	14,361	6	0	201	29	179,508	4
Furnace	Canyon Village	Lodge Cabins	Propane	550	50,000	27,500,000	2,632,787	1,053	47	36,859	5,266	32,909,836	790
Furnace	Grant Village	Lake House	Propane	2	140,000	280,000	26,807	11	0	375	54	335,082	8
			Totals	578		31,373,000	3,003,579	1,201	54	42,050	6,007	37,544,738	901
Emission Factors from AP-42, Tables 1.5-1 for commercial boilers, S = 0.18 grains/100 cu ft								0.4	0.1*S	14.00	1.90	12,500	0.30
Formula = Consumption (gal/yr) * Emission Factor (lb/1,000 gal)													
		Total Amfac Resorts & Parks Heating Units		610			lbs/yr	16,267	534,882	192,706	43,671	199,499,649	3,462
			Park Totals	1,118			lbs/yr	22,647	723,605	311,868	66,814	316,939,885	6,070
							tons/yr	11.32	361.80	155.93	33.41	158.470	3.04

2000 POTENTIAL CRITERIA EMISSIONS FROM GENERATORS AT YELLOWSTONE NATIONAL PARK

Emission Source	Location	Fuel	Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_x (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service												
Generator	Bechler Ranger Station	Propane	2	12	8,760	210,240	43	381	995	242		54
Generator	Lamar Ranger Station	Propane	2	12	8,760	210,240	43	381	995	242		54
Generator	Lewis Lake Quarters	Propane	1	10	500	5,000	1	9	24	6		1
Generator	Lewis Lake Pumphouse	Propane	1	5	500	2,500	1	5	12	3		1
Generator	Madison Maintenance	Propane	1	275	500	137,500	28	249	651	159		35
	Propane Generator Totals		7	314	19,020	565,480	117	1,026	2,676	652		146
Emission Factors from AP-42, Chapter 3.1-1 for natural gas large uncontrolled gas turbines (lb/hp-hr), S=.18							1.54E-04	7.52E-03*S	3.53E-03	8.60E-04		1.92E-04
Formula = Emission Factor (lb/hp-hr) * 608 (g/kW-hr / lb/hp-hr) * Output (kW-hr/yr) / 453.6 (g/lb)												
Generator	Beartooth Road Camp	Diesel	1	30	500	15,000	44	41	623	134	23,115	50
Generator	Beartooth Road Camp	Diesel	1	45	8,760	394,200	1,162	1,083	16,375	3,529	607,462	1,326
Generator	Canyon Maintenance	Diesel	1	500	500	250,000	235	1,355	8,040	1,843	385,250	214
Generator	Canyon WWTP	Diesel	1	150	500	75,000	221	206	3,116	671	115,575	252
Generator	Fishing Bridge Lift Stn	Diesel	1	135	500	67,500	199	185	2,804	604	104,018	227
Generator	Grant Village Maint	Diesel	1	500	500	250,000	235	1,355	8,040	1,843	385,250	214
Generator	Grant Village Lift Stn	Diesel	1	100	500	50,000	147	137	2,077	448	77,050	168
Generator	Grant Village Marina	Diesel	1	75	500	37,500	111	103	1,558	336	57,788	126
Generator	Lake Maintenance	Diesel	1	500	500	250,000	235	1,355	8,040	1,843	385,250	214
Generator	Lake Hospital	Diesel	1	100	500	50,000	147	137	2,077	448	77,050	168
Generator	Mammoth Equip Repair	Diesel	1	45	500	22,500	66	62	935	201	34,673	76
Generator	South Entrance	Diesel	1	100	500	50,000	147	137	2,077	448	77,050	168
Generator	West Yellowstone	Diesel	1	125	500	62,500	184	172	2,596	559	96,313	210
Generator	West Yell Lift Station	Diesel	1	15	500	7,500	22	21	312	67	11,558	25
	Diesel Generator Totals		14		15,260	1,581,700	3,155	6,350	58,669	12,972	2,437,400	3,441
Emission Factors from AP-42, Chapter 3.3 Table 3.3-1 for generators rated < 448 kW							2.20E-03	0.00205	3.10E-02	6.68E-03	1.15E+00	2.51E-03
Emission Factors from AP-42, Chapter 3.4 Table 3.4-1 for generators rated > 448 kW S = 0.5 percent							7.00E-04	(8.09E-3)S	2.40E-02	5.50E-03	1.15E+00	6.40E-04
Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)												
Generator	Mommoth Clinic	Gasoline	1	25	500	12,500	12	10	184	7,353	18,090	369
Generator	Northeast Entrance	Gasoline	1	9	500	4,250	4	3	63	2,500	6,151	125
	Gasoline Generator Totals		2		1,000	16,750	16	13	247	9,853	24,241	494
Emission Factors from AP-42, Chapter 3.3 Table 3.3-1 for generators rated less than 448 kW							7.10E-04	5.91E-04	1.10E-02	4.39E-01	1.08E+00	2.20E-02
Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)												
						NPS Totals (lbs/yr)	3,288	7,389	61,591	23,477	2,461,640	4,080
						NPS Totals (tons/yr)	1.64	3.69	30.80	11.74	1,230.82	2.04

Emission Source	Location	Fuel	Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_x (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Amfac Resorts & Parks												
Generator	Mammoth-Roosevelt	Diesel	1	140	500	70,000	206	192	2,908	627	107,870	235
Generator	Lake Lodge	Diesel	1	175	500	87,500	258	240	3,635	783	134,838	294
Generator	Old Faithful Snow Lodge	Diesel	1	685	500	342,500	321	1,856	11,015	2,524	527,793	294
Generator	Canyon Lodge	Diesel	1	140	500	70,000	206	192	2,908	627	107,870	235
	Amfac Resorts & Parks Totals		4				992	2,481	20,465	4,561	878,370	1,059
Quest Telephone Co.												
Generator	Mount Washburn	Diesel	1	50	500	25,000	74	69	1,039	224	38,525	84
Montana Power Company												
Generator	Old Faithful Snow Lodge	Diesel	2	1,000	500	1,000,000	938	5,420	32,160	7,370	1,541,000	858
Generator	Grant Village	Diesel	2	1,600	500	1,600,000	1,501	8,672	51,456	11,792	2,465,600	1,372
Generator	Lake Yellowstone	Diesel	1	2,750	500	1,375,000	1,290	7,453	44,220	10,134	2,118,875	1,179
	Montana Power Company Totals		5				3,729	21,546	127,836	29,296	6,125,475	3,409
Emission Factors from AP-42, Chapter 3.3 Table 3.3-1 for generators rated < 448 kW							2.20E-03	0.00205	3.10E-02	6.68E-03	1.15E+00	2.51E-03
Emission Factors from AP-42, Chapter 3.4 Table 3.4-1 for generators rated > 448 kW S = 0.5 percent							7.00E-04	(8.09E-3)S	2.40E-02	5.50E-03	1.15E+00	6.40E-04
Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)												
						Park Totals (lbs/yr)	8,082	31,485	210,931	57,558	9,504,010	8,632
						Park Totals (tons/yr)	4.04	15.74	105.47	28.78	4,752	4.32

2000 ACTUAL CRITERIA EMISSIONS FROM GENERATORS AT YELLOWSTONE NATIONAL PARK

Emission Source	Location	Fuel	Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_x (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
National Park Service												
Generator	Bechler Ranger Station	Propane	2	12	2,160	51,840	11	94	245	60		13
Generator	Lamar Ranger Station	Propane	2	12	2,160	51,840	11	94	245	60		13
Generator	Lewis Lake Quarters	Propane	1	10	240	2,400	0	4	11	3		1
Generator	Lewis Lake Pumphouse	Propane	1	5	240	1,200	0	2	6	1		0
Generator	Madison Maintenance	Propane	1	275	100	27,500	6	50	130	32		7
	Propane Generator Totals		7	314	4,900	134,780	28	245	638	155		35
Emission Factors from AP-42, Chapter 3.1-1 for natural gas large uncontrolled gas turbines (lb/hp-hr), S= Formula = Emission Factor (lb/hp-hr) * 608 (g/kW-hr / lb/hp-hr) * Output (kW-hr/yr) / 453.6 (g/lb)							1.54E-04	7.52E-03*S	3.53E-03	8.60E-04		1.92E-04
Generator	Beartooth Road Camp	Diesel	1	30	24	720	2	2	30	6	1,110	2
Generator	Beartooth Road Camp	Diesel	1	45	3,600	162,000	478	445	6,729	1,450	249,642	545
Generator	Canyon Maintenance	Diesel	1	500	120	60,000	56	325	1,930	442	92,460	51
Generator	Canyon WWTP	Diesel	1	150	100	15,000	44	41	623	134	23,115	50
Generator	Fishing Bridge Lift Stn	Diesel	1	135	100	13,500	40	37	561	121	20,804	45
Generator	Grant Village Maint	Diesel	1	500	50	25,000	23	136	804	184	92,460	51
Generator	Grant Village Lift Stn	Diesel	1	100	100	10,000	29	27	415	90	15,410	34
Generator	Grant Village Marina	Diesel	1	75	100	7,500	22	21	312	67	11,558	25
Generator	Lake Maintenance	Diesel	1	500	200	100,000	94	542	3,216	737	154,100	86
Generator	Lake Hospital	Diesel	1	100	200	20,000	59	55	831	179	30,820	67
Generator	Mammoth Equip Repair	Diesel	1	45	50	2,250	7	6	93	20	3,467	8
Generator	South Entrance	Diesel	1	100	200	20,000	59	55	831	179	30,820	67
Generator	West Yellowstone	Diesel	1	125	0	0	0	0	0	0	0	0
Generator	West Yell Lift Station	Diesel	1	15	50	750	2	2	31	7	1,156	3
	Diesel Generator Totals		14		4,894	436,720	916	1,694	16,406	3,617	726,921	1,035
Emission Factors from AP-42, Chapter 3.3 Table 3.3-1 for generators rated < 448 kW							2.20E-03	0.00205	3.10E-02	6.68E-03	1.15E+00	2.51E-03
Emission Factors from AP-42, Chapter 3.4 Table 3.4-1 for generators rated > 448 kW S = 0.5 percent							7.00E-04	(8.09E-3)S	2.40E-02	5.50E-03	1.15E+00	6.40E-04
Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)												
Generator	Mammoth Clinic	Gasoline	1	25	100	2,500	2	2	37	1,471	3,618	74
Generator	Northeast Entrance	Gasoline	1	9	5	43	0	0	1	25	62	1
	Gasoline Generator Totals		2		105	2,543	2	2	37	1,496	3,680	75
Emission Factors from AP-42, Chapter 3.4-1 for generators rated less than 448 kW, S=.05 Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)							7.10E-04	5.91E-04	1.10E-02	4.39E-01	1.08E+00	2.20E-02
	Total Generators		23			NPS Totals (lbs/yr)	946	1,941	17,081	5,268	730,600	1,145
						NPS Totals (tons/yr)	0.47	0.97	8.54	2.63	365.30	0.57

Emission Source	Location	Fuel	Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO_x (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Xanterra Resorts & Parks												
Generator	Mammoth-Roosevelt	Diesel	1	140	75	10,500	31	29	436	94	16,181	35
Generator	Lake Lodge	Diesel	1	175	142	24,850	73	68	1,032	222	38,294	84
Generator	Old Faithful Snow Lodge	Diesel	1	685	45	30,825	29	167	991	227	47,501	26
Generator	Canyon Lodge	Diesel	1	140	131	18,340	54	50	762	164	28,262	62
	Amfac Resorts & Parks Totals		4				187	315	3,222	708	130,238	207
Quest Telephone Co.												
Generator	Mount Washburn	Diesel	1	50	200	10,000	29	27	415	90	15,410	34
Montana Power Company												
Generator	Old Faithful Snow Lodge	Diesel	2	1,000	52	104,000	98	564	3,345	766	160,264	89
Generator	Grant Village	Diesel	2	1,600	52	166,400	156	902	5,351	1,226	256,422	143
Generator	Lake Yellowstone	Diesel	1	2,750	52	143,000	134	775	4,599	1,054	220,363	123
	Montana Power Company Totals		5				388	2,241	13,295	3,047	637,049	355
Emission Factors from AP-42, Chapter 3.3 Table 3.3-1 for generators rated < 448 kW							2.20E-03	0.00205	3.10E-02	6.68E-03	1.15E+00	2.51E-03
Emission Factors from AP-42, Chapter 3.4 Table 3.4-1 for generators rated > 448 kW S = 0.5 percent							7.00E-04	(8.09E-3)S	2.40E-02	5.50E-03	1.15E+00	6.40E-04
Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)												
						Park Totals (lbs/yr)	1,550	4,524	34,013	9,112	1,513,297	1,740
						Park Totals (tons/yr)	0.78	2.26	17.01	4.56	756.65	0.87

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

Identification

User Identification:	Beartooth Road Camp1
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.33
Volume (gallons):	2,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	8,440.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	51.17	0.00	51.17

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

Identification

User Identification:	Bechler Ranger Station
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline AST

Tank Dimensions

Shell Length (ft):	5.50
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	4.22
Net Throughput (gal/yr):	2,110.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	52.81	46.88	58.74	50.94	3.9950	3.5384	4.4980	67.0000			92.00	Option 4: RVP=9, 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 9)	13.45	78.64	92.09

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

Identification

User Identification:	Canyon Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	16.00
Diameter (ft):	8.00
Volume (gallons):	6,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	25,320.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	153.52	0.00	153.52

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

Identification

User Identification:	East Entrance
City:	
State:	Wyoming
Company:	
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.50
Volume (gallons):	2,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	8,440.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	51.17	0.00	51.17

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

Identification

User Identification:	Grant Village Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	16.00
Diameter (ft):	8.00
Volume (gallons):	6,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	25,320.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	153.52	0.00	153.52

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

Identification

User Identification:	Grant Boat Operations
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline AST

Tank Dimensions

Shell Length (ft):	5.50
Diameter (ft):	4.00
Volume (gallons):	550.00
Turnovers:	4.22
Net Throughput (gal/yr):	2,320.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	52.81	46.88	58.74	50.94	3.9950	3.5384	4.4980	67.0000			92.00	Option 4: RVP=9, 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 9)	14.79	78.64	93.43

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

Identification

User Identification:	Lake Fuel Station-Maintenance Area
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	16.00
Diameter (ft):	8.00
Volume (gallons):	6,000.00
Turnovers:	0.00
Net Throughput (gal/yr):	25,320.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	153.52	0.00	153.52

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

Identification

User Identification:	Mammoth Clinic Generator
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	5.50
Diameter (ft):	4.00
Volume (gallons):	550.00
Turnovers:	0.00
Net Throughput (gal/yr):	2,320.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	14.07	0.00	14.07

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

Identification

User Identification:	Mammoth New Fuel Station-YCC Camp
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	19.00
Diameter (ft):	6.00
Volume (gallons):	4,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	16,880.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	102.34	0.00	102.34

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

Identification

User Identification:	Madison Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	16.00
Diameter (ft):	8.00
Volume (gallons):	6,000.00
Turnovers:	4.21
Net Throughput (gal/yr):	25,230.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	152.97	0.00	152.97

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

Identification

User Identification:	Northeast Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.33
Volume (gallons):	2,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	8,440.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	51.17	0.00	51.17

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

Identification

User Identification:	Norris Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.33
Volume (gallons):	2,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	8,440.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	51.17	0.00	51.17

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

Identification

User Identification:	Old Faithful Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline Station

Tank Dimensions

Shell Length (ft):	16.00
Diameter (ft):	8.00
Volume (gallons):	6,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	25,320.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	153.52	0.00	153.52

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

Identification

User Identification:	South Entrance Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.33
Volume (gallons):	2,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	8,440.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	51.17	0.00	51.17

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

Identification

User Identification:	Tower Falls Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.33
Volume (gallons):	2,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	8,440.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	51.17	0.00	51.17

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

Identification

User Identification:	West Entrance Fuel Station
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	NPS Gasoline UST

Tank Dimensions

Shell Length (ft):	19.00
Diameter (ft):	6.00
Volume (gallons):	4,000.00
Turnovers:	4.22
Net Throughput (gal/yr):	16,880.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	102.34	0.00	102.34

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

Identification

User Identification:	Canyon Village E101
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	46.50
Diameter (ft):	10.50
Volume (gallons):	28,500.00
Turnovers:	18.40
Net Throughput (gal/yr):	524,400.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	3,517.11	0.00	3,517.11

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

Identification

User Identification:	Canyon Village Mid-Grade
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	25.50
Diameter (ft):	10.00
Volume (gallons):	15,250.00
Turnovers:	4.30
Net Throughput (gal/yr):	65,550.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	453.07	0.00	453.07

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

Identification

User Identification:	Canyon Village Super
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	46.50
Diameter (ft):	10.50
Volume (gallons):	28,500.00
Turnovers:	2.30
Net Throughput (gal/yr):	65,550.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	439.64	0.00	439.64

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

Identification

User Identification:	Fishing Bridge E10
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	46.50
Diameter (ft):	10.50
Volume (gallons):	28,500.00
Turnovers:	10.99
Net Throughput (gal/yr):	313,150.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	1,837.74	0.00	1,837.74

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

Identification

User Identification:	Fishing Bridge Super
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	18.50
Diameter (ft):	10.00
Volume (gallons):	11,000.00
Turnovers:	7.12
Net Throughput (gal/yr):	78,300.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	525.15	0.00	525.15

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

Identification

User Identification:	Grant Village E10
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	20.00
Diameter (ft):	10.00
Volume (gallons):	11,400.00
Turnovers:	24.05
Net Throughput (gal/yr):	274,125.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	1,838.54	0.00	1,838.54

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

Identification

User Identification:	Grant Village Super
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	14.00
Diameter (ft):	10.00
Volume (gallons):	7,600.00
Turnovers:	9.02
Net Throughput (gal/yr):	68,530.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	391.47	0.00	391.47

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

Identification

User Identification:	Mammoth Hot Springs E10
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	17.00
Diameter (ft):	10.00
Volume (gallons):	9,500.00
Turnovers:	0.00
Net Throughput (gal/yr):	210,236.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	822.52	0.00	822.52

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

Identification

User Identification:	Mammoth Hot Springs Super
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	17.00
Diameter (ft):	10.00
Volume (gallons):	9,500.00
Turnovers:	0.00
Net Throughput (gal/yr):	52,560.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	205.63	0.00	205.63

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

Identification

User Identification:	Mammoth Hot Springs Snowmobiles
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Gasoline UST

Tank Dimensions

Shell Length (ft):	10.50
Diameter (ft):	8.00
Volume (gallons):	4,000.00
Turnovers:	7.64
Net Throughput (gal/yr):	30,555.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Jan	40.72	40.72	40.72	49.92	3.1090	3.1090	3.1090	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Feb	43.73	43.73	43.73	49.92	3.3132	3.3132	3.3132	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Mar	46.61	46.61	46.61	49.92	3.5184	3.5184	3.5184	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Dec	41.20	41.20	41.20	49.92	3.1411	3.1411	3.1411	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: January , February , March , December

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	53.14	0.00	53.14

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

Identification

User Identification:	Old Faithful Lower E10
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	25.50
Diameter (ft):	10.00
Volume (gallons):	15,000.00
Turnovers:	0.00
Net Throughput (gal/yr):	352,675.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	2,365.37	0.00	2,365.37

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

Identification

User Identification:	Old Faithful LowerSuper
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	13.25
Diameter (ft):	8.00
Volume (gallons):	5,000.00
Turnovers:	2.48
Net Throughput (gal/yr):	12,380.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	48.44	0.00	48.44

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

Identification

User Identification:	Old Faithful Upper E10
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	46.50
Diameter (ft):	10.50
Volume (gallons):	30,000.00
Turnovers:	0.00
Net Throughput (gal/yr):	168,800.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	1,023.44	0.00	1,023.44

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

Identification

User Identification:	Old Faithful Upper Super
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	34.00
Diameter (ft):	10.00
Volume (gallons):	20,000.00
Turnovers:	2.11
Net Throughput (gal/yr):	42,200.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	All	50.36	50.36	50.36	49.92	3.8007	3.8007	3.8007	67.0000			92.00	Option 4: RVP=9, 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 9)	255.86	0.00	255.86

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

Identification

User Identification:	Tower E10
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	17.00
Diameter (ft):	10.00
Volume (gallons):	9,500.00
Turnovers:	8.16
Net Throughput (gal/yr):	77,550.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	303.40	0.00	303.40

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

Identification

User Identification:	Tower Super
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Service Station Gasoline UST

Tank Dimensions

Shell Length (ft):	17.00
Diameter (ft):	10.00
Volume (gallons):	9,500.00
Turnovers:	2.04
Net Throughput (gal/yr):	19,390.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	75.86	0.00	75.86

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

Identification

User Identification:	AmFac Bridge Bay Marina
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Gasoline UST

Tank Dimensions

Shell Length (ft):	17.00
Diameter (ft):	10.00
Volume (gallons):	10,000.00
Turnovers:	4.58
Net Throughput (gal/yr):	45,810.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	179.23	0.00	179.23

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

Identification

User Identification:	AmFac Old Faithful Bus Barn
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Gasoline UST

Tank Dimensions

Shell Length (ft):	17.00	
Diameter (ft):	10.00	
Volume (gallons):	10,000.00	
Turnovers:	0.67	
Net Throughput (gal/yr):	6,715.00	× 2
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	45.04	0.00	45.04

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

Identification

User Identification:	Amfac Gardiner Service Center
City:	
State:	Wyoming
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	Gasoline UST

Tank Dimensions

Shell Length (ft):	17.00
Diameter (ft):	10.00
Volume (gallons):	10,000.00
Turnovers:	5.31
Net Throughput (gal/yr):	53,100.00
Is Tank Heated (y/n):	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: Boise, Idaho (Avg Atmospheric Pressure = 13.28 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 9)	Apr	49.54	49.54	49.54	49.92	3.7372	3.7372	3.7372	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	May	53.23	53.23	53.23	49.92	4.0291	4.0291	4.0291	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jun	57.22	57.22	57.22	49.92	4.3640	4.3640	4.3640	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Jul	60.49	60.49	60.49	49.92	4.6561	4.6561	4.6561	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Aug	59.83	59.83	59.83	49.92	4.5961	4.5961	4.5961	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Sep	55.50	55.50	55.50	49.92	4.2170	4.2170	4.2170	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3
Gasoline (RVP 9)	Oct	50.75	50.75	50.75	49.92	3.8308	3.8308	3.8308	67.0000			92.00	Option 4: RVP=9, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: April , May , June , July , August , September , October

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 9)	207.75	0.00	207.75

2000 ACTUAL EMISSIONS FROM WOODSTOVES AT YELLOWSTONE NATIONAL PARK

Woodstoves

Location	Number	Cords	tons/yr	PM (lbs/yr)	SO2 (lbs/yr)	NOx (lbs/yr)	CO (lbs/yr)	VOC (lbs/yr)
Emplyee Residences	250	5	2,193.75	75,904	878	5,704	554,141	502,369
				(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
				37.95	0.44	2.85	277.07	251.18

2000 ACTUAL EMISSIONS FROM CAMPFIRES AT YELLOWSTONE NATIONAL PARK

Location	Camps	Fires/Yr	Tons/Yr	PM (lbs/yr)	SO_2 (lbs/yr)	NO_x (lbs/yr)	CO (lbs/yr)	VOC (lbs/yr)
Bridge Bay	15,375	13,838	104	3,591	42	270	26,215	23,766
Canyon	14,171	12,754	96	3,310	38	249	24,162	21,905
Grant Village	12,607	11,346	85	2,944	34	221	21,496	19,487
Indian Creek	2,954	2,659	20	690	8	52	5,037	4,566
Lewis Lake	3,001	2,701	20	701	8	53	5,117	4,639
Madisdon	15,485	13,937	105	3,617	42	272	26,403	23,936
Mammoth	4,726	4,253	32	1,104	13	83	8,058	7,305
Norris	6,120	5,508	41	1,429	17	107	10,435	9,460
Pebble Creek	1,809	1,628	12	422	5	32	3,084	2,796
Slough Creek	2,501	2,251	17	584	7	44	4,264	3,866
Tower Falls	2,238	2,014	15	523	6	39	3,816	3,459
	80,987	72,888	547	18,915	219	1,421	138,087	125,186
				9.46	0.11	0.71	69.04	62.59

Assumption: Ninety percent od camp sites have either an evening or morning campfire

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Bridge Bay					436	3,321	6,394	4,648	576				15,375
Canyon						3,760	4,766	4,818	827				14,171
Grant Village						1,000	4,781	4,846	1,980				12,607
Indian Creek						474	1,169	1,064	247				2,954
Lewis Lake						309	1,231	909	351	194	7		3,001
Madisdon					1,582	3,402	4,066	3,675	2,137	623			15,485
Mammoth	10	25		168	572	664	1,136	1,110	609	387	26	19	4,726
Norris					567	1,431	1,658	1,671	793				6,120
Pebble Creek						431	628	505	245				1,809
Slough Creek					36	520	702	677	385	181			2,501
Tower Falls					198	529	524	671	316				2,238
Total	10	25	0	168	3,391	15,841	27,055	24,594	8,466	1,385	33	19	80,987

TITLE: Results of FOFEM model execution on date: 2/28/2002

FUEL CONSUMPTION CALCULATIONS

Region: Interior_West
Cover Type: SAF/SRM - SAF 218 - Lodgepole Pine
Fuel Type: Natural
Fuel Reference: FOFEM 091

FUEL CONSUMPTION TABLE

Fuel Component Name	Preburn Load (t/acre)	Consumed Load (t/acre)	Postburn Load (t/acre)	Percent Reduced (%)	Equation Reference Number	Moisture
Litter	0.60	0.60	0.00	100.0	999	
Wood (0-1/4 inch)	0.18	0.18	0.00	100.0	999	
Wood (1/4-1 inch)	0.72	0.72	0.00	100.0	999	25.0
Wood (1-3 inch)	0.60	0.59	0.01	98.4	999	
Wood (3+ inch) Sound	13.50	3.82	9.68	28.3	999	20.0
3->6	3.38	1.87	1.51	0.6		
6->9	3.38	1.07	2.30	0.3		
9->20	3.38	0.61	2.76	0.2		
20->	3.38	0.27	3.11	0.1		
Wood (3+ inch) Rotten	1.50	0.70	0.80	46.9	999	20.0
3->6	0.38	0.32	0.06	0.8		
6->9	0.38	0.21	0.17	0.5		
9->20	0.38	0.12	0.25	0.3		
20->	0.38	0.06	0.32	0.2		
Duff	15.00	6.16	8.84	41.1	2	100.0
Herbaceous	0.20	0.20	0.00	100.0	22	
Shrubs	0.25	0.15	0.10	60.0	23	
Crown foliage	6.00	0.00	6.00	0.0	37	
Crown branchwood	4.80	0.00	4.80	0.0	38	
Total Fuels	43.35	13.13	30.22	30.3		

FIRE EFFECTS ON FOREST FLOOR COMPONENTS

Forest Floor Component	Preburn Condition	Amount Consumed	Postburn Condition	Percent Reduced	Equation Number
Duff Depth (in)	1.1	0.4	0.7	36.7	6
Min Soil Exp (%)	.0	21.9	21.9	21.9	10

	Emissions -- lbs/acre flaming	smoldering	total
PM 10	6	648	654
PM 2.5	5	549	554
CH 4	2	333	335
CO	13	7312	7325
CO 2	3612	29763	33375

	Consumption tons/acre	Duration hour:min:sec
Flaming:	1.02	00:01:00
Smoldering:	12.11	01:03:00
Total:	13.13	

2001 WILDFIRE EMISSIONS AT YELLOWSTONE NATIONAL PARK

Fire Name	Acres	PM_{10} (lbs/yr)	$PM_{2.5}$ (lbs/yr)	CH_4 (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)	CH_4 (tons/yr)	CO (tons/yr)	CO_2 (tons/yr)
Arthur	2,504	1,637,616	1,387,216	838,840	18,341,800	83,571,000	819	694	419	9,171	41,786
Falco	720	470,880	398,880	241,200	5,274,000	24,030,000	235	199	121	2,637	12,015
Little Joe	110	71,940	60,940	36,850	805,750	3,671,250	36	30	18	403	1,836
Little	55	35,970	30,470	18,425	402,875	1,835,625	18	15	9	201	918
Sulphur	825	539,550	457,050	276,375	6,043,125	27,534,375	270	229	138	3,022	13,767
Stone	128	83,712	70,912	42,880	937,600	4,272,000	42	35	21	469	2,136
Totals	4,342	2,839,668	2,405,468	1,454,570	31,805,150	144,914,250	1,420	1,203	727	15,903	72,457
Emission Factors (lbs/acre)		654	554	335	7,325	33,375					

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Yellowstone NP Winter Conditions.
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  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:   9.9 (F)
```

Maximum Temperature: 29.1 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 13.5 psi
Weathered RVP: 13.5 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	1.222	1.103	1.171	0.993	0.433	0.439	0.509	2.62	0.993
Composite CO :	22.08	29.08	25.99	27.77	29.27	1.308	0.931	6.582	28.21	23.360
Composite NOX :	0.916	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 :	1.144	1.246	1.073	1.170	2.424	0.391
Composite CO :	28.33	29.31	25.86	26.28	6.522	0.795
Composite NOX :	1.051	1.424	1.406	1.891	2.555	1.180

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 :	0.993	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO :	29.27	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
-------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Yellowstone NP Summer Conditions.
* File 1, Run 1, Scenario 10.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  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:	46.8 (F)
Maximum Temperature:	79.8 (F)
Absolute Humidity:	75. grains/lb
Nominal Fuel RVP:	8.5 psi
Weathered RVP:	8.5 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 :	0.691	0.866	0.863	0.865	0.799	0.405	0.461	0.490	2.93	0.792
Composite CO :	12.04	15.22	14.70	15.00	22.33	1.277	0.945	6.500	22.57	13.000
Composite NOX :	0.735	1.023	1.294	1.138	3.631	1.170	1.239	16.586	0.99	1.145

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 :	0.823	0.879	0.844	0.905	2.512	0.418
Composite CO :	14.82	15.34	14.62	14.90	6.775	0.824
Composite NOX :	0.811	1.088	1.165	1.578	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 :	0.799	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO :	22.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Composite NOX :	3.631	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

```
* # # # # # # # # # # # # # # # # # # # # # # # # #
* Yellowstone NP Winter Conditions.
* File 1, Run 1, Scenario 9.
* # # # # # # # # # # # # # # # # # # # # # # # # #

                          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
SO4:	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
SO2:	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:	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):						
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

SO4:	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
SO2:	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:	------	------	------	------	------	------	------	------
SO4:	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
SO2:	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
SO4:	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
SO2:	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

---

* #
* Yellowstone NP Summer Conditions.
* File 1, Run 1, Scenario 10.
* #

Calendar Year: 2001
Month: July
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	0.0046	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
SO2:	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

Composite Emission Factors (g/mi):						
Lead:	0.0000	0.0000	0.0000	0.0000	------	------
GASPM:	0.0046	0.0046	0.0044	0.0044	------	------
ECARBON:	------	------	------	------	0.1498	0.0464
OCARBON:	------	------	------	------	0.2156	0.0668
SO4:	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
SO2:	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	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	0.0506	0.0506	0.0506	0.0506	0.0505	0.0000
ECARBON:	------	------	------	------	------	------	------	------
OCARBON:	------	------	------	------	------	------	------	------
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
SO2:	0.1601	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:	0.0503	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
SO4:	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
SO2:	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

Yellowstone National Park Visitor Vehicle Miles Traveled (VMT)

Road Segment	Location	Length (miles)	1992 ADT		1992 Avg Daily VMT	Summer 1992 VMT	Winter 1992 VMT	Summer 2000 VMT	Winter 2000 VMT
1	Norris-Canyon	13.1	1,460		19,126	4,666,744		5,132,747	
2	Mammoth-Norris	22.6	2,000		45,200	11,028,800		12,130,093	
3	Gardiner-Mammoth	4.8	2,300		11,040	2,693,760	1,335,840	2,962,748	1,469,232
4	Mammoth-Tower	18.5	2,800		51,800	12,639,200	6,267,800	13,901,302	6,893,678
5	Tower-NE Entrance	32.7	2,270		74,229	18,111,876		19,920,458	
6	Tower-Canyon	18.2	1,160		21,112	5,151,328		5,665,720	
Canyon North	Canyon North	2	1,290		2,580	629,520		692,381	
Canyon South	Canyon South	3	640		1,920	468,480		515,261	
7	Canyon-Lake	15.7	1,860		29,202	7,125,288		7,836,792	
8	Lake-East Entrance	25.4	1670		42,418	10,349,992		11,383,502	
9	Lake-West Thumb	20	1,700		34,000	8,296,000		9,124,407	
10	West Thumb-S. Entrance	22	2,360		51,920	12,668,480		13,933,506	
11	West Thumb-Old Faithful	17.8	2,370		42,186	10,293,384		11,321,242	
12	Old Faithful-Madison	16.6	2,190		36,354	8,870,376		9,756,138	
13	West Yell-Madison	13.7	2,130		29,181	7,120,164		7,831,156	
14	Madison-Norris	13.7	1,890		25,893	6,317,892		6,948,772	
				Totals	518,161	126,431,284	7,603,640	139,056,224	8,362,910

1992 Visitation:	3,145,405
2000 Visitation:	3,459,493

YELLOWSTONE NATIONAL PARK VISITOR VEHICLE EMISSIONS

Paved Road 2000 VMT
147,419,000

Emission Factors (g/mi) - All Vehicles

	NO_X	CO	VOC	PM_{10} (Paved) Exhaust, Brake, and Tire	PM_{10} (Paved) Fugitive	PM_{10} (Paved) Total
Summer	1.145	13.000	0.792	0.0338	0.84	0.8738
Winter	1.359	23.360	0.993	0.0341	0.84	0.8741
Average	1.252	18.180	0.893			0.874

Emissions (tons/yr) - All Vehicles

NO_X	CO	VOC	Paved PM_{10}
203.03	2,948.09	144.73	141.72

Emissions (lbs/yr) - All Vehicles

NO_X	CO	VOC	Paved PM_{10}
406,051	5,896,170	289,457	283,441

YELLOWSTONE NATIONAL PARK NPS AND GSA VEHICLES

	LDGV	LDGT	HDGV	HDDV	Total
Total Miles	2,013,600	0	197,200	147,100	2,357,900

Emission Factors (g/mi) - LDGV

	NO_X	CO	VOC	PM_{10} Exhaust, Brake, and Tire	PM_{10} Fugitive	PM_{10} Total
Summer	0.7350	12.0400	0.6910	0.0276	0.8400	0.8676
Winter	0.9160	22.0800	0.8790	0.0276	0.8400	0.8676
Average	0.8255	17.0600	0.7850			0.8676

Emissions (tons/yr) - LDGV

NO_X	CO	VOC	PM_{10}
1.83	37.79	1.74	1.92

Emissions (lbs/yr) - LDGV

NO_X	CO	VOC	PM_{10}
3,657	75,574	3,477	3,843

Emission Factors (g/mi) - HDGV

	NO_X	CO	VOC	PM_{10} Exhaust, Brake, and Tire	PM_{10} Fugitive	PM_{10} Total
Summer	3.6310	22.3300	0.7990	0.0848	0.8400	0.9248
Winter	3.9710	29.2700	0.9930	0.0846	0.8400	0.9246
Average	3.8010	25.8000	0.8960			0.9247

Emissions (tons/yr) - HDGV

NO_X	CO	VOC	PM_{10}
0.82	5.60	0.19	0.20

Emissions (lbs/yr) - HDGV

NO_X	CO	VOC	PM_{10}
1,649	11,193	389	401

Emission Factors (g/mi) - HDDV

	NO_X	CO	VOC	PM_{10} Exhaust, Brake, and Tire	PM_{10} Fugitive	PM_{10} 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 (tons/yr) - HDDV

NO_X	CO	VOC	PM_{10}
2.70	1.06	0.08	0.18

Emissions (tons/yr) - Total

NO_X	CO	VOC	PM_{10}
5.36	44.44	2.01	2.31

Emissions (lbs/yr) - Total

NO_X	CO	VOC	PM_{10}
10,714	88,884	4,028	4,612

XANTERRA PARKS & RESORTS VEHICLES

	LDGT	Buses	HDGV	HDDV	Total
Total Miles	1,560,000	128,300	80,000	60,000	1,828,300

Emission Factors (g/mi) - LDGT

	NO_X	CO	VOC	PM_{10} Exhaust, Brake, and Tire	PM_{10} Fugitive	PM_{10} Total
Summer	1.1380	15.0000	0.8650	0.0299	0.8400	0.8699
Winter	1.4310	27.7700	1.1710	0.0300	0.8400	0.8700
Average	1.2845	21.3850	1.0180			0.8700

Emissions (tons/yr) - LDGT

NO_X	CO	VOC	PM_{10}
2.20	36.70	1.75	1.49

Emission Factors (g/mi) - Buses

	NO_X	CO	VOC	PM_{10} Exhaust, Brake, and Tire	PM_{10} Fugitive	PM_{10} Total
Summer	3.631	22.330	0.799	0.085	0.840	0.925
Winter	3.971	29.270	0.993	0.085	0.840	0.925
Average	3.801	25.800	0.896			0.925

Emissions (tons/yr) - Buses

NO_X	CO	VOC	PM_{10}
0.54	3.64	0.13	0.13

Emission Factors (g/mi) - HDGV

	NO_X	CO	VOC	PM_{10} Exhaust, Brake, and Tire	PM_{10} Fugitive	PM_{10} Total
Summer	3.631	22.330	0.799	0.085	0.840	0.925
Winter	3.971	29.270	0.993	0.085	0.840	0.925
Average	3.801	25.800	0.896			0.925

Emissions (tons/yr) - HDGV

NO_X	CO	VOC	PM_{10}
0.33	2.27	0.08	0.08

Emission Factors (g/mi) - HDDV

	NO_X	CO	VOC	PM_{10} Exhaust, Brake, and Tire	PM_{10} Fugitive	PM_{10} 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 (tons/yr) - HDDV

NO_X	CO	VOC	PM_{10}
1.10	0.43	0.03	0.07

Emissions (tons/yr) - Total

NO_X	CO	VOC	PM_{10}
4.18	43.04	1.99	1.78

Emissions (lbs/yr) - Total

NO_X	CO	VOC	PM_{10}
8,356	86,080	3,970	3,559

2000 ACTUAL EMISSIONS FROM RV GENERATORS AT YELLOWSTONE NP

Emission Source	Location	Fuel	Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM (lbs/yr)	SO_2 (lbs/yr)	NO_x (lbs/yr)	CO (lbs/yr)	VOC (lbs/yr)
National Park Service											
Generator	Parkwide	Gasoline	111,820	20	2	4,472,800	4,255	3,542	65,929	2,631,169	131,858
		Gasoline Generator Totals	111,820		2	4,472,800	4,255	3,542	65,929	2,631,169	131,858
Emission Factors from AP-42, Chapter 3.4-1 for generators rated less than 448 kW, S=.05							7.10E-04	5.91E-04	1.10E-02	4.39E-01	2.20E-02
Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)											

2000 YELLOWSTONE NP 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
Tractors	1	2.04	1.03	2.31	2.19	42.35	0.68	640	83	42	94	89
Backhoe	1	2.04	1.03	2.31	2.19	77	0.55	2,155	410	0 207	0 464	440
Mule	1	2.04	1.03	2.31	2.19	15	0.55	90	3	2	4	4
Dozer	1	2.04	1.03	2.31	2.19	77	0.55	430	82	41	93	88
Grader	1	1.06	9.6	3.8	1.43	172	0.61	795	195	1,762	697	262
Sweeper	1	1.7	14	6.06	1.46	30	0.68	40	3	25	11	3
Forklift	1	1.06	9.6	3.8	1.43	172	0.61	790	193	1,751	693	261
Front End Loader	1	1.11	10.3	4.8	1.3	77	0.55	2,077	215	1,993	929	252
Roller/Compactor	1	2.04	1.03	2.31	2.19	30	0.55	280	21	10	23	22
Crane	1	1.06	9.6	3.8	1.43	172	0.61	26	6	58	23	9
Groomer	1	1	8	5	1.22	300	0.65	4,643	1,992	15,935	9,959	2,430
Miscellaneous	42							123,464	247.2	287.9	3,436.0	268.9
							Totals:	(lbs/yr)	3,449	22,113	16,425	4,127
								(tons/yr)	1.72	11.06	8.21	2.06

2/26/02

YELLOWSTONE NP MARINE VESSEL EMISSIONS

Diesel Engine Emission Factors[1]

Units	HC	CO	NO_x	PM	SO_2
(g/hp-hr)	1.26	1.91	8.92	0.563	0.352
(lb/hp-hr)	0.003	0.004	0.020	0.001	0.001

1 g = 0.0022016 lbs
BSFC = 0.367 lb/hp-hr

[1] Source: Exhaust Emission Factors for Nonroad Engine Modeling -- Compression-Ignition EPA Report No., NR-009A; Table 1

2-Stroke Gasoline Engine Emission Factors[3]

Units	HC	CO	NO_x	PM	SO_2
(g/hp-hr)	116.38	231.26	1.19	7.7	0.000
(lb/hp-hr)	0.256	0.509	0.003	0.017	0.000

4-Stroke Gasoline Engine Emission Factors[3]

Units	HC	CO	NO_x	PM	SO_2
(g/hp-hr)	14.92	339.18	7.46	0.06	0.000
(lb/hp-hr)	0.033	0.747	0.016	0.000	0.000

[3] Source: Nonroad Emission Inventory Model, Draft, June 17, 1998

National Park Service

					Criteria Pollutant Emissions[3]			
NPS 4-Stroke Engines	No. of Engines	Engine Power (hp)	Hours of Operation	Load Factor	HC (lb/yr)	CO (lb/yr)	NO_x (lb/yr)	PM (lb/yr)
32-ft Mahn	2	385	200	0.21	1,062	24,150	531	4
25-ft Bertram	2	170	200	0.21	469	10,664	235	2
20-ft Bertram	1	170	40	0.21	47	1,066	23	0
20-ft Bertram	1	170	40	0.21	47	1,066	23	0
18.5 ftGlassmaster	1	185	200	0.21	255	5,802	128	1
32-ft Gillnet Tug	1	205	300	0.21	424	9,644	212	2
32-ft Munson	2	225	200	0.21	621	14,114	310	2
					2,925	66,506	1,463	12
NPS 2-Stroke Engines						0		
22-ft Metalcraft	1	150	150	0.21	1,211	2,406	12	80
25-ft New Boston	2	225	250	0.21	6,053	12,029	62	401
32-ft Munson	2	225	250	0.21	6,053	12,029	62	401
19-ft Workskiff	1	150	150	0.21	1,211	2,406	12	80
23-ft Workskiff	1	225	150	0.21	1,816	3,609	19	120
23-ft Workskiff	1	225	150	0.21	1,816	3,609	19	120
					18,160	36,086	186	1,202
NPS Diesel Engine								
32-ft Cutthroat	1	200	150	0.21	17	26	124	8
					17	26	124	8
				Total	21,103	102,618	1,772	1,221
					(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
					10.55	51.31	0.89	0.61

[3] Emissions = Emission Factor * No. of Engines * Engine Power * Hours of Operation * Load Factor

Amfac Parks & Resorts

					Criteria Pollutant Emissions[3]			
4-Stroke Engines	No. of Engines	Engine Power (hp)	Hours of Operation	Load Factor	HC (lb/yr)	CO (lb/yr)	NO_x (lb/yr)	PM (lb/yr)
Single Engine Inboard	1	200	3,968	0.21	5,474	124,450	2,737	22
Twin Engine Inboard	2	125	600	0.21	1,035	23,523	517	4
					6,509	147,972	3,255	26
2-Stroke Engines								
Single Engine Inboard	1	125	4,145	0.21	27,879	55,398	285	1,845
					27,879	55,398	285	1,845
Diesel Engine								
Lake Queen	3	200	500	0.21	175	265	1,237	78
					175	265	1,237	78
				Total	34,563	203,636	4,777	1,949
					(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
					17.28	101.82	2.39	0.97

[3] Emissions = Emission Factor * No. of Engines * Engine Power * Hours of Operation * Load Factor

Visitors

					Criteria Pollutant Emissions[3]			
2-Stroke Engines	No. of Engines	Engine Power (hp)	Hours of Operation	Load Factor	HC (lb/yr)	CO (lb/yr)	NO_x (lb/yr)	PM (lb/yr)
Single Engine Inboard	1	125	10,000	0.21	67,259	133,651	688	4,450
					67,259	133,651	688	4,450
					(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
					33.63	66.83	0.34	2.23

[3] Emissions = Emission Factor * No. of Engines * Engine Power * Hours of Operation * Load Factor

Totals	lbs/yr	122,925	439,905	7,237	7,620
	tons/yr	61.46	219.95	3.62	3.81

APPENDIX E

PUBLIC USE DATA

Monthly Public Use Report

Printed on 02/20/2003

YELLOWSTONE NP			12/2000	1570
	December 2000			
	Recreational	Non-Recreational	Total	Calendar Year-To-Date
Visits	72,368	47,741	120,109	3,839,765
Visitor Hours	1,005,248	24,916	1,030,164	63,729,143
				Fiscal YTD
Total Fiscal YTD Visitor Days				301,977

Recreation O/N stays	Current Month	Year-To-Date	
Concessioner Lodging	5,503	572,069	NPS Campgrounds
Concessioner Campgrounds	0	422,971	Tents 61
NPS Campgrounds	118	138,358	R/V's 58
NPS Backcountry	80	39,297	Total 118
NPS Miscellaneous	0	18,663	
Non Recreation O/N stays	0	0	
Total Overnight stays	5,701	1,191,359	

	This Month	Same Month Last Year	Percent Change
Total Rec	72,368	25,286	186.20 %
Total NonRec	47,741	48,322	-1.20 %
Total Visits	120,109	73,608	63.17 %
Total YTD	3,839,765	4,123,660	-6.88 %

Special Use Data	This Month	Year-To-Date
TOTAL NORTH GATE	8,720	527,437
TOTAL NORTHEAST GATE	0	161,610
TOTAL WEST GATE	46,947	1,180,270
TOTAL REC VISITORS	72,368	2,883,295
TOTAL SOUTH GATE	13,964	691,636
HWY 191 NONREC VISITS	47,490	942,367
TOTAL EAST GATE	2,988	336,446

APPENDIX F

SELECTED WYOMING AIR QUALITY REGULATIONS

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CHAPTER 6 - PERMITTING REQUIREMENTS

WYOMING AIR QUALITY STANDARDS AND REGULATIONS

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(j) Within 30 days after achieving the maximum design production rate for which the permit is approved and at which each source will be operated, but not later than 90 days after initial start-up of such source; the owner or operator of such source shall conduct a performance test(s) in accordance with methods and under operating conditions approved by the Administrator and furnish the Administrator a written report of the results of each performance test.

(i) Such test shall be at the expense of the owner or operator.

(ii) The Administrator may monitor such test and may also conduct performance tests.

(iii) The owner or operator of a source shall provide the Administrator 15 days prior notice of the performance test to afford the Administrator the opportunity to have an observer present.

(iv) The Administrator may waive the requirement for performance tests if the owner or operator of a source has demonstrated by other means to the Administrator's satisfaction that the source is being operated in compliance with all State and Federal Regulations which are part of the applicable plan.

(v) If the maximum design production rate for which the permit is approved is not achieved within 90 days of initial start-up, testing will be conducted on a schedule to be defined by the Administrator. This schedule may require that the source be tested at the production rate achieved within 90 days of initial start-up and again when maximum design production rate is achieved.

(k) Approval to construct or modify shall not be required for:

(i) The installation or alteration of an air pollutant detector, air pollutants recorder, combustion controller, or combustion shutoff.

(ii) Air conditioning or ventilating systems not designed to remove air pollutants generated by or released from equipment.

(iii) Fuel burning equipment other than a smokehouse generator which has a heat input of not more than 25 million BTU per hour (6.25 billion gm-cal/hr) and burns only gaseous fuel containing not more than 20 grains total sulfur per 100 std. ft^3; has a heat input of not more than 10 million BTU/hr (2.5 billion gm-cal/hr) and burns any other fuel.

(iv) Mobile internal combustion engines.

(v) Laboratory equipment used exclusively for chemical or physical analyses.

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Section 2. Open burning restrictions 10-2
Section 3. Wood waste burners 10-4

Section 1. Introduction to smoke management.

(a) Chapter 10 establishes restrictions on specific burning practices. Section 1 regulates refuse burning, open burning of trade wastes, open burning for fire fighting training, and open burning of plant and forestry wastes. Section 2 specifically regulates emissions from wood waste burners.

Section 2. Open burning restrictions.

(a) Refuse burning restrictions.

(i) No person shall dispose of refuse by open burning, or cause, suffer, allow or permit open burning of refuse.

(ii) Regardless of provision of Subsections (a)(i) of this regulation, open burning on residential premises of refuse originating in dwelling units on the same premises shall not be a violation of this regulation in areas of low population density. A density of 100 dwelling units or less per square mile shall be used as an approximate definition of areas of low population density.

(b) Restrictions on open burning of trade wastes.

(i) No person shall cause or permit the disposal of trade wastes or conduct or cause or permit a salvage operation by open burning, except as provided in Subsection (b)(ii) of this regulation.

(ii) The open burning of material for fire fighting training, destruction of fire hazards if so designated by a local fire marshal or fire chief, or from a salvage operation or disposal of trade wastes may be permitted when it can be shown by a person that such open burning is absolutely necessary and in the public interest. Any person intending to engage in such open burning shall file a request to do so with the Division of Air Quality. The application shall state the following:

(A) the name, address, and telephone number of the person submitting the application;

(B) the type of business or activity involved;

(C) a description of the proposed equipment and operating practices, the type, quantity, and composition of wastes to be burned, and the expected composition and amount of air contaminants to be released into the atmosphere;

(D) the schedule of burning operations;

(E) the exact location where open burning will be used to dispose of such waste;

(F) reasons why no method other than open burning can be used for disposal;

(G) evidence that the proposed open burning has been approved by any fire department which may have jurisdiction. Upon approval of the application by the Division of Air Quality, the person may proceed with the operation without being in violation of Subsection (b)(i).

(c) Restrictions on open burning of plant and forestry wastes.

(i) The open burning of plant life grown on the premises in the course of any agricultural or forestry operation may be permitted when it can be shown that such open burning is necessary and that no fire hazard or public nuisance will occur.

Section 3. Wood waste burners.

(a) Emissions of any air contaminant from any wood waste burner discharged into the atmosphere for a period or periods aggregating more than 6 minutes in any one hour shall not exceed:

(i) An opacity of 20 percent as determined by a qualified observer.

(b) Operational requirements for all wood waste burners shall include:

(i) A thermocouple and recording pyrometer or other temperature measurement and recording device approved by the Division shall be installed and maintained;

(ii) A daily written log of the wood waste burner operation shall be maintained to determine optimum operational patterns for different fuel and atmospheric conditions. Such log shall include, but not be limited to, the time of day, draft settings, exit gas temperature, type of fuel, and atmospheric conditions. It must be shown that there is adequate time and responsibility delegated for proper burner maintenance, operation, and control; such log or a copy shall be made available to the Division within 10 days upon request;

(iii) Asphaltic materials, rubber products, or materials which cause dense smoke discharges shall not be burned or disposed in wood waste burners;

(iv) Continuous flow conveying methods shall be utilized to convey process wood waste to the combustion chamber of the wood waste burners.

(c) During startup and building of fires, in wood waste burners, the particulate, opacity, and darkness limits specified in this regulation may be exceeded for not more than 60 minutes in eight hours. Materials prohibited in Subsection (b)(iii) shall not be used for startup and building of fires in wood waste burners.

(d) The Administrator may waive the temperature monitoring and record keeping requirements of Subsections (b)(i) and (b)(ii) upon written request of the owner or operator, provided the owner or operator adequately demonstrates operational practices which satisfy the other requirements of this regulation. Any waiver granted under this paragraph may be revoked should the Administrator determine that the operational requirements of Subsections (b)(i) and (b)(ii) should be reinstated in order to achieve compliance with other provisions of this regulation.