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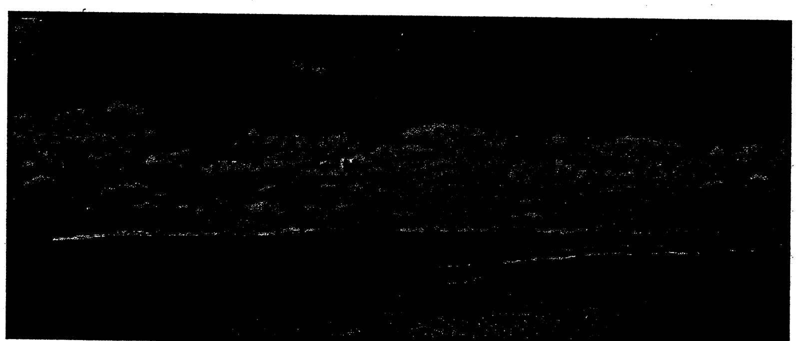
RIVERTON DOME
COAL BED NATURAL GAS AND CONVENTIONAL GAS DEVELOPMENT
DRAFT ENVIRONMENTAL IMPACT STATEMENT
VOLUME II
AIR QUALITY
TECHNICAL SUPPORT DOCUMENTS: EMISSIONS INVENTORY, NEAR-FIELD ANALYSIS, AND FAR-FIELD ANALYSIS



Prepared for:
Bureau of Indian Affairs
Wind River Agency
Fort Washakie, Wyoming

Prepared by:
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September 2007

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EMISSIONS INVENTORY
AIR QUALITY TECHNICAL SUPPORT DOCUMENT
FOR THE
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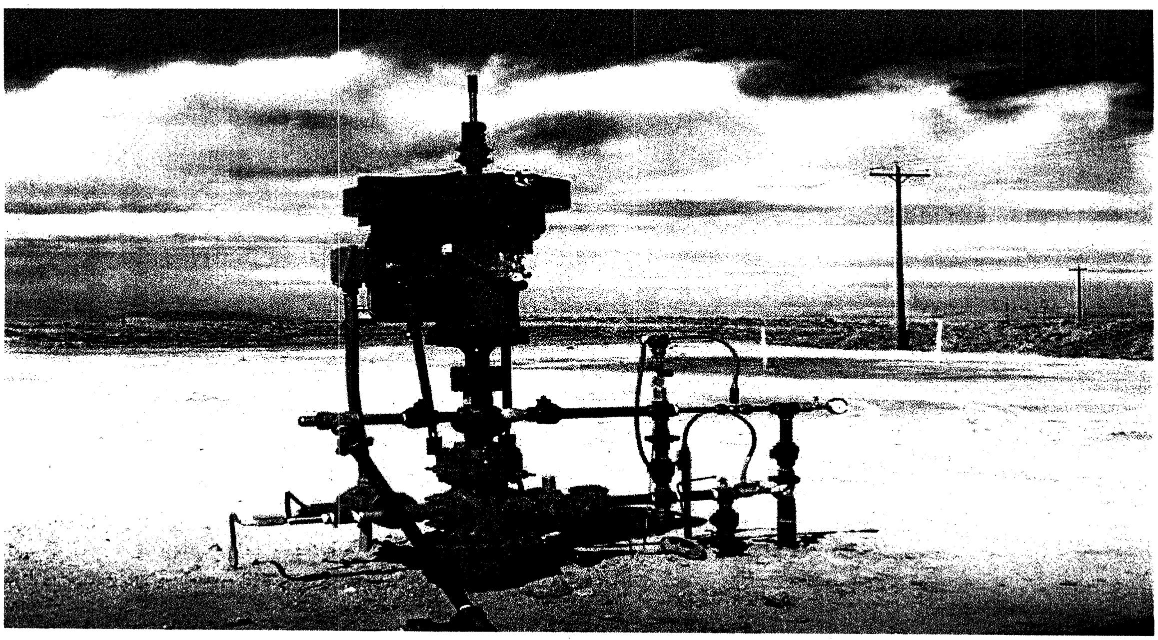

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Environmental Consultants

Project: Devon Energy Riverton Dome EIS

Proposed Action 40 Acre Spacing - 10 year Duration

Development Summary

Existing					
	1 existing well pads		MAX SCENARIO		
	55 existing wells		306 total CBNG Wells	306 new CBNG pads	
			20 total conventional wells	20 new conventional pads	
Drilling				326 total new pads	
New Well pad/road construction	5 days				
Drilling (10 years, 336 wells)	33 pads				
	2 new CBNG wells per year		297 wells last year of project		
	35 new Conventional Wells per year		18 wells last year of project		
Maximum Development	35 new well pads per year		315 wells last year of project		
	35.00 new wells per year				
Well Pad Disturbance	2.80 acres per pad	1400.65 acres	121778.57 sq ft	348.97 LINER FT	
ROW Disturbance	88.80 miles total 89	155.63 acres			
	0.27 miles per pad (50ft wide)	1556.28 acres			
	1.65 acres per pad				
well pad/road disturbance per pad	4.45	17994.41 METERS			
Average Round Trip Distance for Drilling/Construction Traffic =			12.00 miles (estimated from project area road system).		
10 year drilling program (Maximum Development Scenario = assume				35 wells/year for	10 years
Avg of days to drill, log and case one gas well		11.14 days			
	24/hrs/day	267.43 hours			
Time to complete each well		7.37 days			
Dust supression will be utilized					
Assume 1460 hp drill rigs (4 Cat 3406 @365 hp each - Proponent)					
Completion					
6 hours frac time per well	6.00				
4-1000 hp frac pump engines	4000.00				
assume avg of 75% load					
2-30 hp generator engines					
No completion flaring or venting is anticipated					
Production					
	297.00 active CBNG wells Year 10				
	18.00 active conventional wells Year 10				
COMPRESSION	9000.00 HP TOTAL				
FLARES	0.10 DAYS	0.00 MMSCF			
Pumper Vehicle Traffic:	3.00 Assume 3 new pumpers (Proponent)				
Central Dehydratation at the Existing TV Riverton Dome Plant, inlet pressure = 80 psig					
0.5 MMScf/day gas volume per well (Proponent)					
Assume 90 bopd average condensate production for conventional wells					
Each production well pad will occupy 1.5 acre		65340 sq ft		255.6169	77.91203138
Each completed well pad will have well head, 500Mbtu/hr production separator (per well)					
Downhole pumps for dewatering of CBNG wells will be 40 hp electric driven					
COMP w/building dimensions = 11m x 8m x 4m high					

1. Well Pad and Road Construction Emissions (Dozer and Backhoe)

Assumptions:

Well Pad and Road Area	4.45 acres (Proposed Action)
Hours of Construction	5 days per well pad (Assumption) 12 hours/day 60 hours per well pad
Watering Control Efficiency	50 percent (Assumption)
Soil Moisture Content	7.9 percent (AP-42 Table 11.9-3, 10/98)
Soil Silt Content	6.9 percent (AP-42 Table 11.9-3, 10/98)
PM10 Multiplier	0.75 * PM15 (AP-42 Table 11.9-1, 10/98)
PM2.5 Multiplier	0.105 * TSP (AP-42 Table 11.9-1, 10/98)

Equations: From AP-42 tables 11.9-1 and 11.9-3 for
Bulldozing Overburden Emissions, Western Surface Coal Mining, 10/98

Emissions (TSP lbs/hr) = 5.7 * (soil silt content %)^1.2 * (soil moisture content %)^-1.3* Control Efficiency

Emissions (PM15 lbs/hr) = 1.0 * (soil silt content %)^1.5 * (soil moisture content %)^-1.4 * Control Efficiency

Emissions = 1.97 lbs TSP/hour/piece of equipment

Emissions = 0.50 lbs PM15/hour/piece of equipment

	Dozer and Backhoe Emissions [a]		
	lbs/hr	tons/well	tons/yr [b]
TSP	3.94	0.1182	4.14
PM15	1.00	0.0301	1.05
PM10	0.75	0.0226	0.79
PM2.5	0.41	0.0124	0.43

a Assumes one dozer and one backhoe. Backhoe emissions are conservatively estimated as equivalent to Dozer emissions.

b Last Year of Development and Production Rates

2. Well Pad and Road Construction Emissions (Grader)

Assumptions:

Grading Length	1.57 0.31 miles/road plus 1.3 miles on 256ft^2 pad (10 ft swath for 256 ft * 26 lengths) = 6,656 ft = 1.3 miles
Hours of Construction	1 day grading per well pad and road (Estimate) 8 hours/day 8 hours per well pad
Watering Control Efficiency	50 percent (Assumption)
Average Grader Speed	10 mph (Typical value)
Distance Graded	1.57 miles
PM10 Multiplier	0.6 * PM15 (AP-42 Table 11.9-1, 10/98)
PM2.5 Multiplier	0.031 * TSP (AP-42 Table 11.9-1, 10/98)

Equations: From AP-42 tables 11.9-1 and 11.9-3 for
Bulldozing Overburden Emissions, Western Surface Coal Mining, 10/98

Emissions (TSP lbs) = 0.040 * (Mean Vehicle Speed)$^{2.5}$ * Distance Graded * Control Efficiency

Emissions (PM15 lbs) = 0.051 * (Mean Vehicle Speed)$^{2.0}$ * Distance Graded * Control Efficiency

Emissions = 9.94 lbs TSP/well

Emissions = 4.01 lbs PM15/well

	Grader Construction Emissions			
	lbs/well	lbs/hr/well	tons/well	tons/yr [a]
TSP	9.94	1.24	0.0050	0.17
PM15	4.01	0.50	0.0020	0.07
PM10	2.41	0.30	0.0012	0.04
PM2.5	0.31	0.04	0.0002	0.01

a Last Year of Development and Production Rates

3. Construction Traffic Fugitive Dust Emissions

Calculation AP-42, Chapter 13.2.2		E (PM10) / VMT = 1.5 * (S/12)^0.9 * (W/3)^0.45 * (365-p)/365)	
December 2003		E (PM2.5) / VMT = 0.23 * (S/12)^0.9 + (W/3)^0.45 * (365-p)/365)	
CBNG WELLS	33.00	Silt Content (S)	12 (Average value of composit samples)
CONVENTIONAL WELLS	2.00	Round Trip Miles	12
TOTAL	35.00	Precipitation Days (P)	71 days per year (NCDC data for Lander, WY - 2004)

	Vehicle Type	Average Weight (lbs)	CBNG Round Trips per Well	Convent Round Trips per Well	PM10 (lb/VMT)	PM10/Pad (lbs)	PM10/Pad (lb/day)	PM2.5/Pad (lbs)	PM2.5/Pad (lb/day)
Construction (days/pad and road)	5								
	Semi: Hvy Equip Hauler	74,000	4	4					
	Haul Truck:Gravel	48,000	2	2					
	Pickup Truck: Crew	7,000	13	13					
	Mean Vehicle Weight	25,421	19	19	2.313741	527.5	105.5	80.9	16.2
						PM10/30 Pads (tons)		**PM2.5/30 Pads (tons)**	
						9.2		1.4	

	Vehicle Type	Average Weight (lbs)	CBNG Round Trips per Well	Convent Round Trips per Well	PM10 (lb/VMT)	PM10/Well (lbs)	PM10/Well (lb/day)	PM2.5/Well (lbs)	PM2.5/Well (lb/day)
Drilling (days/well)	11.14285714								
	Semi: Rig Transport	60,000	45	52					
	Logging/Casing Trucks	48,000	45	52					
	Semi: Hvy Equip Hauler	74,000	17	52					
	Pickup: Bit/Tool Delivery	7,000	99	302	2.307934	12684.4		1944.9	
	Mean Vehicle Weight	33,063	206	25,279	2.604248	6437.7	577.7	987.1	88.6
						PM10/36 Wells (tons)		**PM2.5/36 Wells (tons)**	
						118.9		18.2	

	Vehicle Type	Average Weight (lbs)	CBNG Round Trips per Well	Convent Round Trips per Well	PM10 (lb/VMT)	PM10/Well (lbs)	PM10/Well (lb/day)	PM2.5/Well (lbs)	PM2.5/Well (lb/day)
Completion (days/well)	7.371428571								
	Semi: Casing	74,000	20	46					
	Completion Rig Equip Truck	48,000	20	46					
	Frac Trucks	80,000	10	46					
	Haul: Frac Sand	44,000	30	46					
	Pickup: Comp.Foreman	7,000	54	168	2.688548	11356.4		1741.3	
	Mean Vehicle Weight	36,851	134	35,489	2.734504	4397.1	596.5	674.2	91.5
						PM10/36 Wells (tons)		**PM2.5/36 Wells (tons)**	
						83.9		12.9	

	Vehicle Type	Average Weight (lbs)	CBNG Round Trips per Well	Convent Round Trips per Well	PM10 (lb/VMT)	PM10/Day (lbs)	PM10/Day (lb/day)	PM2.5/Day (lbs)	PM2.5/Day (lb/day)
Field Development (days/well)	2								
	Gathering Sys. Const. Crew	8,000	4	4					
	Haul Truck: Trencher	48,000	1	1					
	Haul Truck: Pipe	48,000	6	6					
	Surveyor	7,000	1	1					
	Welder	8,000	4	4					
	Reclamation Crew	8,000	1	1					
	Mean Vehicle Weight	24,412	17	17	2.271942	463.5	231.7	71.1	35.5
						PM10/36 Wells (tons)		**PM2.5/36 Wells (tons)**	
						8.1		1.2	
Annual Traffic Fugitive Dust Emissions (tons/year)						**220.16**		**33.76**	

4. Wind Erosion Fugitive Dust Emissions

Assumptions

Threshold Friction Velocity U_t^* — 1.02 m/s (2.28 mph) for well pads (AP-42 Table 13.2.5-2 Overburden - Western Surface Coal Mine
1.33 m/s (2.97 mph) for roads (AP-42 Table 13.2.5-2 Roadbed material)

Initial Disturbance Area — 1556.3 acres total initial disturbance for roads and pipelines (Proposed Action)
6,298,034 square meters total initial disturbance for roads

1,401 acres total initial disturbance for well pads and pipelines (Proposed Action)
5,668,230 square meters total initial disturbance for well pads

2,957 acres total disturbance

Exposed Surface Type — Flat

Meteorological Data — 2002 Lander, WY (obtained from NCDC website)

Fastest Mile Wind Speed U_{10}^+ — 23.2 meters/sec (52 mph) reported as fastest 2-minute wind speed for Lander, WY (2002)

Number soil of disturbances — 2 for well pads (Assumption, disturbance at construction and reclamation)
Constant for dirt roads

Development Period — 10 years (Proposed Action)

Equations

Friction Velocity $U^* = 0.053\ U_{10}^+$

Erosion Potential P (g/m²/period) $= 58*(U^*-U_t^*)^2 + 25*(U^*-U_t^*)$ for $U^*>U_t^*$, P = 0 for $U^* < U_t^*$

Emissions (tons/year) = Erosion Potential(g/m²/period)*Disturbed Area(m²)*Disturbances/year*(k)/(453.6 g/lb)/2000 lbs/ton/Develop Period

Particle Size Multiplier (k)		
30 um	<10 um	<2.5 um
1.0	0.5	0.2

Maximum U_{10}^+ Wind Speed (m/s)	Maximum U^* Friction Velocity m/s	Well U_t^* Threshold Velocity[a] m/s	Well Pad Erosion Potential g/m²	Road U_t^* Threshold Velocity[a] m/s	Road Erosion Potential g/m²
23.20	1.23	1.02	7.79	1.33	0.00

Wind Erosion Emissions

Particulate Species	Wells (tons/year)	Roads/Pipelines (tons/year)
TSP	9.73	0.00
PM10	4.87	0.00
PM2.5	1.95	0.00

5. Construction Tailpipe Emissions

Assumptions:

Average Round Trip Distance	12.0 miles (Estimated from project area and existing road system)
Hours of Construction	60 hours per site (Proponent)
Number of Heavy Diesel Truck Trips	6 (Assumption)
Number of Pickup Trips	13 (Assumption)
Diesel Fuel sulfur content	0.05 % (Typical value)
Diesel Fuel density	7.08 lbs/gallon (Typical value)
Heavy Haul Diesel Fuel Efficiency	10 miles/gallon (Typical value)
Heavy Duty Pickup Fuel Efficiency	15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{\# Trips} * \text{Trip Distance (miles)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ \text{(g/lb)} * \text{Fuel Sulfur Content} * 2\ \text{(S / SO2)}}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Construction Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
NOx	8.13	0.022	0.001	3.03	0.017	0.001	0.039	0.041
CO	17.09	0.045	0.001	33.64	0.193	0.006	0.238	0.250
VOC [c]	4.83	0.013	0.000	1.84	0.011	0.000	0.023	0.024
SO2	0.32	0.001	0.000	0.21	0.001	0.000	0.002	0.002

a AP-42 Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95)
b AP-42 Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)
c Emission factor is for total Hydrocarbons.
d Assumes average construction rate over two years

6. Drilling Tailpipe Emissions

Assumptions:

Average Round Trip Distance 12.0 miles (Estimated from project area and existing road system)

Hours of Operation 267.4286 hours per site (13.5 days @ 24 hrs/day - Proposed Action)

Number of Heavy Diesel Truck Trips 107 (Assumption)

Number of Pickup Trips 99 (Assumption)

Diesel Fuel sulfur content 0.05 % (Typical value)

Diesel Fuel density 7.08 lbs/gallon (Typical value)

Heavy Haul Diesel Fuel Efficiency 10 miles/gallon (Typical value)

Heavy Duty Pickup Fuel Efficiency 15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{\# Trips} * \text{Trip Distance (miles)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ \text{(g/lb)} * \text{Fuel Sulfur Content} * 2\ (S / SO2)}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Drilling Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
NOx	8.13	0.086	0.012	3.03	0.030	0.004	0.116	0.542
CO	17.09	0.181	0.024	33.64	0.329	0.044	0.510	2.388
VOC [c]	4.83	0.051	0.007	1.84	0.018	0.002	0.069	0.324
SO2	0.32	0.003	0.000	0.21	0.002	0.000	0.005	0.026

a AP-42 Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95)
b AP-42 Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)
c Emission factor is for total Hydrocarbons.
d Last Year of Development and Production Rates

7. Completion Tailpipe Emissions

Assumptions:

Average Round Trip Distance 12.0 miles (Estimated from project area and existing road system)

Hours of Operation 73.71429 hours per site (Proponent)

Number of Heavy Diesel Truck Trips 80 (Assumption)

Number of Pickup Trips 54 (Assumption)

Diesel Fuel sulfur content 0.05 % (Typical value)

Diesel Fuel density 7.08 lbs/gallon (Typical value)

Heavy Haul Diesel Fuel Efficiency 10 miles/gallon (Typical value)

Heavy Duty Pickup Fuel Efficiency 15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{\# Trips} * \text{Trip Distance (miles)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ \text{(g/lb)} * \text{Fuel Sulfur Content} * 2\ \text{(S / SO2)}}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Completion Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
NOx	8.13	0.233	0.009	3.03	0.059	0.002	0.292	0.377
CO	17.09	0.491	0.018	33.64	0.652	0.024	1.143	1.474
VOC [c]	4.83	0.139	0.005	1.84	0.036	0.001	0.174	0.225
SO2	0.32	0.009	0.000	0.21	0.004	0.000	0.013	0.017

a AP-42 Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95)
b AP-42 Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)
c Emission factor is for total Hydrocarbons.
d Last Year of Development and Production Rates

8. Development Tailpipe Emissions

Assumptions:

Average Round Trip Distance 12.0 miles (Estimated from project area and existing road system)

Hours of Operation 16 hours per site (2 days @ 8 hrs/day - Assumption)

Number of Heavy Diesel Truck Trips 7 (Assumption)

Number of Pickup Trips 10 (Assumption)

Diesel Fuel sulfur content 0.05 % (Typical value)

Diesel Fuel density 7.08 lbs/gallon (Typical value)

Heavy Haul Diesel Fuel Efficiency 10 miles/gallon (Typical value)

Heavy Duty Pickup Fuel Efficiency 15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{\# Trips} * \text{Trip Distance (miles)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ \text{(g/lb)} * \text{Fuel Sulfur Content} * 2\ (S / SO2)}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Development Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
NOx	8.13	0.094	0.001	3.03	0.050	0.000	0.144	0.040
CO	17.09	0.198	0.002	33.64	0.556	0.004	0.754	0.211
VOC [c]	4.83	0.056	0.000	1.84	0.030	0.000	0.086	0.024
SO2	0.32	0.004	0.000	0.21	0.004	0.000	0.007	0.002

a AP-42 Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95)
b AP-42 Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)
c Emission factor is for total Hydrocarbons.
d Last Year of Development and Production Rates

9. Construction Heavy Equipment Tailpipe Emissions

Assumptions:

Hours of Operation	60 hours/site (Proponent)
Development Rate	35 new pads per year (Proposed Action)
Load Factor	0.4 (Assumed typical value)
Backhoe Size	100 hp (Assumed Typical value)
Dozer Size	150 hp (Assumed Typical value)
Motor Grader Size	135 hp (Assumed Typical value)

Equations:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/hp-hr)} * \text{Rated Horsepower (hp)} * \text{Operating Hours (hrs)} * \text{Load Factor (Dimensionless)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

Heavy Const. Vehicles	Backhoe			Dozer			Grader		
	E. Factor [a] (g/hp-hr)	Emissions (lb/hr)	Emissions[e] (tons/yr)	E. Factor [a] (g/hp-hr)	Emissions (lb/hr)	Emissions[e] (tons/yr)	E. Factor [b] (g/hp-hr)	Emissions (lb/hr)	Emissions[e] (tons/yr)
NOx	8.15	0.719	0.755	8.15	1.078	1.132	7.14	0.850	0.893
CO	2.28	0.201	0.211	2.28	0.302	0.317	1.54	0.183	0.193
VOC [c]	0.37	0.033	0.034	0.37	0.049	0.051	0.36	0.043	0.045
PM10 [d]	0.5	0.044	0.046	0.5	0.066	0.069	0.63	0.075	0.079
PM2.5 [d]	0.5	0.044	0.046	0.5	0.066	0.069	0.63	0.075	0.079
SO2	0.22	0.019	0.020	0.22	0.029	0.031	0.22	0.026	0.028
Formaldehyde	0.22	0.019	0.020	0.22	0.029	0.031	0.12	0.014	0.015

Heavy Const. Vehicles	Total	
	Emissions (lb/hr)	Emissions[e] (tons/yr)
NOx	2.647	2.779
CO	0.686	0.720
VOC [c]	0.124	0.131
PM10 [d]	0.185	0.194
PM2.5 [d]	0.185	0.194
SO2	0.075	0.078
Formaldehyde	0.063	0.066

a AP-42 Volume II, Mobile Sources, Nonroad Vehicles, Table 11-7.1 Off-highway truck
b AP-42 Volume II, Mobile Sources, Nonroad Vehicles, Table 11-7.1 Motor Grader
c Emission Factor represents total Hydrocarbon Emissions
d All emitted particulate matter assumed to be PM2.5
e Last Year of Development and Production Rates

10. Pumper Tailpipe Emissions

Assumptions:

Number of New Pumpers:	3.00 (Proponent)
Pumper Mileage:	1,000 miles/pumper/month (Assumption)
Total Annual New Pumper Mileage:	36,000 miles/year
Hours of Pumper Operation:	12 hours per day (Assumption)
Hours of Pumper Operation:	3120 hours per year
Fuel sulfur content	0.05 % (Typical value)
Fuel density	7.08 lbs/gallon (Typical value)
Heavy Duty Pickup Fuel Efficiency	15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{Vehicle Miles Traveled (miles/yr)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ \text{(g/lb)} * \text{Fuel Sulfur Content} * 2\ \text{(S / SO2)}}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Pumper Vehicles	Heavy Duty Pickups		
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr)
NOx	3.03	0.077	0.120
CO	33.64	0.856	1.335
VOC [b]	1.84	0.047	0.073
SO2	0.21	0.005	0.008

a AP-42 Append H Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)
b Emission factor is for total Hydrocarbons.

11. Operations Traffic Fugitive Dust Emissions

E (PM10) / VMT = 1.5 * (S/12)^0.9 * (W/3)^0.45 * (365-p)/365)	
E (PM2.5) / VMT = 0.23 * (S/12)^0.9 + (W/3)^0.45 * (365-p)/365)	
Silt Content (S)	11
Round Trip Miles	15 Within Project Per Lease Operator*
Precipitation Days (P)	71 days per year (NCDC data for Lander, WY - 2004)

365 days (Estimate)

Vehicle Type	Ave. Weight (lbs)	Round Trips per Day	PM10 (lb/VMT)	Total PM10 (lbs)	PM10 (lb/day)	Total PM2.5 (lbs)	PM2.5 (lb/day)
Pickup Truck: Crew	7,000	3					
Mean Weight	7,000	3	1.197463	19668.3	53.9	3015.8	8.3

Annual Traffic Fugitive Dust Emissions (tons/year)		**9.83**		**1.51**	

*Assumes total average round trip distance on unpaved roads = 45 miles/day
Up to three new lease operators are planned at full-production (Proponent Estimate)

12. Drill Rig Engine Emissions

Assumptions:

Hours of Operation 267.4286 hours/well (Proponent)

Development Rate 35 wells, Year 10 (Proposed Action)

Load Factor 0.4 (Assumed typical value)

Rig Size 1460 hp (Proponent)

Diesel Fuel Sulfur Content 0.05 % (typical value)

Equations:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (lb/hp-hr)} * \text{Rated Horsepower (hp)} * \text{Operating Hours (hrs)} * \text{Load Factor (Dimensionless)}}{\text{2000 (lb/tons)}}$$

SO2 E. Factor (lb/hp-hr) = Fuel sulfur content * 0.00809

Species	Drill Rig Emissions		
	E. Factor [a] (lb/hp-hr)	Emissions (lb/hr)	Emissions [e] (tons/yr)
NOx	0.024	14.016	65.595
CO	0.0055	3.212	15.032
VOC [b]	0.000705	0.412	1.927
PM10 [c]	0.000573	0.335	1.566
PM2.5 [d]	0.000479	0.280	1.309
SO2	0.0004045	0.236	1.106

a AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-1, 10/96
b Emission Factor represents total Hydrocarbon Emissions
c Total particulate emission factor is 0.0007, PM10 fraction determined from Table 3.4-2
d Total particulate emission factor is 0.0007, PM2.5 fraction determined from Table 3.4-2
e Last Year of Development and Production Rates

Buys & Associates, Inc. Project: Devon Energy Riverton Dome EIS
Environmental Consultants
Proposed Action 40 Acre Spacing - 10 year Duration

13. Well Fracturing Pump and Generator Engines

Assumptions:

Average Hours of Operation	6.00 Hours/Well (Proponents)
Development Rate	35 wells, Year 10 (Proposed Action)
Load Factor	0.75 (Proponents)
Frac Pump Engine Horsepower	4,000 Horsepower (Proponents)
Temporary Generator Horsepower	60 Horsepower (Proponents)
Diesel Fuel Sulfur Content	0.05 % (typical value)

Equations:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (lb/hp-hr) * Rated Horsepower (hp)* Operating Hours (hrs) * Load Factor (Dimensionless)}}{\text{2000 (lb/tons)}}$$

SO2 E. Factor (lb/hp-hr) = Fuel sulfur content * 0.00809

Species	Frac Pump Engine Emissions		
	E. Factor [a] (lb/hp-hr)	Emissions (lb/hr)	Emissions [e] (tons/yr)
NOx	0.024	72.000	7.560
CO	0.0055	16.500	1.733
VOC [b]	0.000705	2.115	0.222
PM10 [c]	0.000573	1.719	0.180
PM2.5 [d]	0.000479	1.437	0.151
SO2	0.0004045	1.214	0.127

Species	Generator Engine Emissions		
	E. Factor [f] (lb/hp-hr)	Emissions (lb/hr)	Emissions [e] (tons/yr)
NOx	0.031	1.395	0.146
CO	0.006680	0.301	0.032
VOC [b]	0.002470	0.111	0.012
PM10	0.002200	0.099	0.010
PM2.5 [g]	0.002200	0.099	0.010
SO2	0.0004045	0.018	0.002

a AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-1, 10/96
b Emission Factor represents total Hydrocarbon Emissions
c Total particulate emission factor is 0.0007, PM10 fraction determined from Table 3.4-2
d Total particulate emission factor is 0.0007, PM2.5 fraction determined from Table 3.4-2
e Last Year of Development and Production Rates
f AP-42 Table 3.3-1, Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines, 10/96
g All particulates are PM10

14. Average Produced Gas Characteristics
(Riverton Dome 502 Compositional Analysis Dated 9/26/05)

Gas Heat Value (wet): 971.8 Btu/scf

C1-C2 Wt. Fraction:	0.9012
VOC Wt. Fraction:	0.0043
Non-HC Wt. Fraction:	0.0946
Total:	1.0000

COMPONENT	MOLE PERCENT	COMPONENT MOLE WEIGHT (lb/lb-mole)	NET MOLE WEIGHT (lb/lb-mole)	WEIGHT FRACTION	GROSS HEATING VALUE (BTU/scf)	NET DRY HEATING VALUE (BTU/scf)	LOWER HEATING VALUE (BTU/scf)	NET LOW HEATING VALUE (BTU/scf)
Methane	94.1067	16.043	15.098	0.868	1010.000	950.478	910.000	856.371
Ethane	1.8921	30.070	0.569	0.033	1769.800	33.486	1618.000	30.614
Propane	0.0630	44.097	0.028	0.002	2516.200	1.585	2316.000	1.459
i-Butane	0.0208	58.123	0.012	0.001	3252.100	0.676	3005.000	0.625
n-Butane	0.0110	58.123	0.006	0.000	3262.400	0.359	3013.000	0.331
i-Pentane	0.0068	72.150	0.005	0.000	4000.900	0.272	3698.000	0.251
n-Pentane	0.0033	72.150	0.002	0.000	4008.800	0.132	3708.000	0.122
Hexanes	0.0073	86.177	0.006	0.000	4756.200	0.347	4404.000	0.321
Heptanes	0.0032	100.204	0.003	0.000	5502.500	0.176	5100.000	0.163
Octanes	0.0036	114.231	0.004	0.000	6249.100	0.225		0.000
Nonanes	0.0000	128.258	0.000	0.000	6996.400	0.000		0.000
Decanes	0.0000	142.285	0.000	0.000	7743.200	0.000		0.000
Benzene	0.0003	78.120	0.000	0.000	3715.500	0.011		0.000
Toluene	0.0006	92.130	0.001	0.000	4444.600	0.027		0.000
Ethylbenzene	0.0006	106.160	0.001	0.000	5191.500	0.031		0.000
Xylenes	0.0038	106.160	0.004	0.000	5183.500	0.197		0.000
n-Hexane	0.0016	86.177	0.001	0.000	4756.200	0.076		0.000
Helium	0.0000	4.003	0.000	0.000	0.000	0.000	0.000	0.000
Nitrogen	0.3830	28.013	0.107	0.006	0.000	0.000	0.000	0.000
Carbon Dioxide	3.4923	44.010	1.537	0.088	0.000	0.000	0.000	0.000
Oxygen	0.0000	32.000	0.000	0.000	0.000	0.000	0.000	0.000
Hydrogen Sulfide	0.0000	34.080	0.000	0.000	637.100	0.000	588.000	0.000
TOTAL	100.0000		17.385	1.000		988.079		890.259

Relative Mole Weight (lb/lb-mole) = [Mole Percent * Molecular weight (lb/lb-mole)] / 100

Weight Fraction = Net Mole Weight / Total Mole Weight

15. Average Produced Gas Characteristics
(Average of T-2 Phosphoria and Frontier/Dakota 43 Samples Dated 9/26/05)

Gas Heat Value (wet): 1097.1 Btu/scf

C1-C2 Wt. Fraction:	0.8296
VOC Wt. Fraction:	0.1167
Non-HC Wt. Fraction:	0.0537
Total:	1.0000

COMPONENT	MOLE PERCENT	COMPONENT MOLE WEIGHT (lb/lb-mole)	NET MOLE WEIGHT (lb/lb-mole)	WEIGHT FRACTION	GROSS HEATING VALUE (BTU/scf)	NET DRY HEATING VALUE (BTU/scf)	LOWER HEATING VALUE (BTU/scf)	NET LOW HEATING VALUE (BTU/scf)
Methane	87.6531	16.043	14.062	0.741	1010.000	885.296	910.000	797.643
Ethane	5.5886	30.070	1.680	0.089	1769.800	98.907	1618.000	90.424
Propane	1.9602	44.097	0.864	0.046	2516.200	49.323	2316.000	45.398
i-Butane	0.3652	58.123	0.212	0.011	3252.100	11.877	3005.000	10.974
n-Butane	0.6996	58.123	0.407	0.021	3262.400	22.824	3013.000	21.079
i-Pentane	0.2318	72.150	0.167	0.009	4000.900	9.274	3698.000	8.572
n-Pentane	0.1996	72.150	0.144	0.008	4008.800	8.000	3708.000	7.399
Hexanes	0.0855	86.177	0.074	0.004	4756.200	4.067	4404.000	3.765
Heptanes	0.2119	100.204	0.212	0.011	5502.500	11.657	5100.000	10.804
Octanes	0.0241	114.231	0.027	0.001	6249.100	1.503		0.000
Nonanes	0.0089	128.258	0.011	0.001	6996.400	0.619		0.000
Decanes	0.0000	142.285	0.000	0.000	7743.200	0.000		0.000
Benzene	0.0114	78.120	0.009	0.000	3715.500	0.424		0.000
Toluene	0.0228	92.130	0.021	0.001	4444.600	1.013		0.000
Ethylbenzene	0.0009	106.160	0.001	0.000	5191.500	0.047		0.000
Xylenes	0.0065	106.160	0.007	0.000	5183.500	0.334		0.000
n-Hexane	0.0679	86.177	0.059	0.003	4756.200	3.229		0.000
Helium	0.0000	4.003	0.000	0.000	0.000	0.000	0.000	0.000
Nitrogen	0.8003	28.013	0.224	0.012	0.000	0.000	0.000	0.000
Carbon Dioxide	0.9210	44.010	0.405	0.021	0.000	0.000	0.000	0.000
Oxygen	0.0000	32.000	0.000	0.000	0.000	0.000	0.000	0.000
Hydrogen Sulfide	1.1411	34.080	0.389	0.020	637.100	7.270	588.000	6.710
TOTAL	100.00		18.98	1.00		1115.66		1002.77

Relative Mole Weight (lb/lb-mole) = [Mole Percent * Molecular weight (lb/lb-mole)] / 100

Weight Fraction = Net Mole Weight / Total Mole Weight

16. Gas Compression

Assumptions:

Required Additional Compression: for field compression — 9,000 Horsepower (Estimated by Project Proponents)

Equations:

$$\text{Emissions (lbs/hr)} = \frac{\text{Emission Factor (g/hp-hr)} * \text{Power (hp)}}{453.6 \text{ g/lb}}$$

Pollutant	Emission Factor [4] (lb/MMBtu)	Emission Factor (g/hp-hr)	Emissions (lb/hr)	Emissions (tons/yr)
NOx [1]		1.5	29.76	130.357
CO [1]		0.5	9.92	43.452
VOC [1]		0.8	14.88	65.179
PM10 [2,5]	0.0100	0.036	0.72	3.152
PM2.5 [2,5]	0.0100	0.036	0.72	3.152
SO2 [3]	0.0	0.0	0.00	0.000
Benzene [2]	0.000440	0.00160	0.03	0.139
Toluene [2]	0.000408	0.00148	0.03	0.129
Ethylbenzene [2]	0.000040	0.00014	0.00	0.013
Xylenes [2]	0.000184	0.00067	0.01	0.058
Formaldehyde [2]		0.07	1.39	6.083

1 - Average Manufacturer Specified Emission Rate for Caterpillar G3412 LE Compressor Engine (Project Proponent)
2 - AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines, 7/00
3 - Fuel gas is assumed to be free from sulfur compounds
4 - Conversion from lb/MMBtu to g/hp-hr assumes an average heat rate of 8,000 Btu/hp-hr (*3.632)
5 - PM = sum of PM filterable and PM condensable

17. Completion Flare Emissions

Assumptions

Hours of Operation	0.10 days (Typical)
Amount of Gas Flared	0.00 MMscf/well (Assumption)
Average Gas Heat Content	972 Btu/scf (Inlet Gas Analyses)
Average Gas VOC Content	0 weight % (Inlet Gas Analyses)
Average Mole Weight	17.4 lb/lb-mole (Inlet Gas analyses)
Development rate	35 wells, Year 10

Equations

NOx/CO Emissions (lb/well) = Emission Factor (lb/MM Btu) * Gas Amount (MMscf/well) * Heat Content (Btu/scf)

PM/HAP Emissions (lb/well) = Emission Factor (lb/MMscf) * Gas Amount (MMscf/well)

$$\text{Flare Gas Wt. (lb/well)} = \frac{\text{Flare Gas Volume (MMscf/well)} * 10^6 \text{ (scf/MMscf)} * \text{Mole Weight (lb/lb-mole)}}{379.49 \text{ (scf/mole)}}$$

VOC Emissions (lb/well) = Flare Gas Wt. (lb/well) * VOC wt. % * 0.02 (Assumes 98% destruction Efficiency)

	Emission Factor (lb/MMBtu)	Well Emissions (lb/well)	Well Emissions (lb/hr/well)	Total Emissions [e] (tons/yr)
NOx [a]	0.068	0.0	0.00	0.00
CO [a]	0.37	0.0	0.00	0.00
VOC	N.A.	0.0	0.00	0.00
SOx [b]	0.00	0.0	0.00	0.00

	Emission Factor (lb/MMscf)	Well Emissions (lb/well)	Well Emissions (lb/hr/well)	Total Emissions [e] (tons/yr)
TSP [c]	7.6	0	0.000	0.000
PM10 [c]	7.6	0	0.000	0.000
PM2.5 [c]	7.6	0	0.000	0.000
Benzene [d]	0.0021	0	0.000	0.000
Toluene [d]	0.0034	0	0.000	0.000
Hexane [d]	1.8	0	0.000	0.000
Formaldehyde [d]	0.075	0	0.000	0.000

a AP-42 Table 13.5-1, Emission Factors for Flare Operations, 9/91
b Assumes produced gas contains no sulfur
c AP-42 Table 1.4-2, Emission Factors for Natural Gas Combustion, 3/98 (All Particulates are PM1.0)
d AP-42 Table 1.4-3, Emission Factors for Organic Compounds from Natural Gas Combustion, 3/98
e Assumes the maximum development rate

18. Central Facility TEG Dehydrator Emissions

Assumptions

Production Rate:
0.5 MMscf/day per CBNG well
2.1 MMscf/day average for conventional wells
297 Producing CBNG wells, Year 10
18 Producing Conventional wells, Year 10
148.5 MMscfd CBNG Gas Production
37.8 MMscfd Conventional Gas Production

Gas Composition: Riverton Dome 502 Sample Dated 9/26/05

Inlet Gas Conditions: Inlet gas saturated at 80 psi and 75 F

Glycol Circulation Rate: 3 gallons/ lb of water
(Typical operating rate)

Calculations

Dehydrator emissions were simulated using GRI GlyCalc version 4.0
Destruction Efficiency of 95% assumed to meet MACT

Emissions

Species	CBNG Emissions (lb/hr)	Conventional Emissions (lb/hr)	Central Dehydrator Emissions (lb/hr)	Total Project Emissions (tons/year)
VOC	1.3279	1.9221	3.25	14.24
Benzene	0.0135	0.1293	0.14	0.63
Toluene	0.0564	0.5386	0.60	2.61
Ethylbenzene	0.1145	0.0409	0.16	0.68
Xylenes	0.9327	0.3981	1.33	5.83
n-Hexane	0.0021	0.0225	0.02	0.11
Hydrogen Sulfide	0	0.2371	0.24	1.04
Total HAPs	1.1197	1.1329	2.25	9.87

19. Production Heater Emissions

Assumptions

Wellsite Separator Size	500 (Proponent)
Firing Rate	60 minutes/hour on average for entire year (Typical value) 8760 hours/year
Fuel Gas Heat Value	1097 Btu/scf (Gas Analyses from Existing Wells)
Fuel Gas VOC Content	0.117 by weight (Gas Analyses from Existing Wells)
Development size	18 new conventional wells in production, Year 10

Equations

Fuel Consumption (MMscf/yr) = $\frac{\text{Heater Size (MBtu/hr) * 1,000 (Btu/MBtu) * Hours of Operation (hrs/yr)}}{\text{Fuel Heat Value (Btu/scf) * 1,000,000 (scf/MMscf)}}$

NOx/CO/TOC Emissions (tons/yr) = $\frac{\text{AP-42 E.Factor (lbs/MMscf) * Fuel Consumption (MMscf/yr) * Fuel heating Value (Btu/scf)}}{\text{2,000 (lbs/ton) * 1,000 (Btu/scf - Standard Fuel Heating Value)}}$

VOC Emissions (tons/yr) = TOC Emissions (tons/yr) * VOC wt. fraction

	Wellpad Heater Emissions			Total Heater	
	Emission Factor (lb/MMscf)	Well Emissions (lb/hr/pad)	Total Emissions [e] (tons/yr)	Well Emissions (lb/hr/pad)	Total Emissions [e] (tons/yr)
NOx [a]	100	0.050	3.942	0.050	3.942
CO [a]	84	0.042	3.311	0.042	3.311
TOC [c]	11	0.006	0.434	0.006	0.434
VOC	N.A.	0.001	0.051	0.001	0.051
SOx [b]	0.00	0.000	0.000	0.000	0.000
TSP [c]	7.6	0.004	0.300	0.004	0.300
PM10 [c]	7.6	0.004	0.300	0.004	0.300
PM2.5 [c]	7.6	0.004	0.300	0.004	0.300
Benzene [d]	0.0021	0.000	0.000	0.000	0.000
Toluene [d]	0.0034	0.000	0.000	0.000	0.000
Hexane [d]	1.8	0.001	0.071	0.001	0.071
Formaldehyde [d]	0.075	0.000	0.003	0.000	0.003

a AP-42 Table 1.4-1, Emission Factors for Natural Gas Combustion, 7/98
b Assumes produced gas contains no sulfur
c AP-42 Table 1.4-2, Emission Factors for Natural Gas Combustion, 7/98 (All Particulates are PM1.0)
d AP-42 Table 1.4-3, Emission Factors for Organic Compounds from Natural Gas Combustion, 7/98
e Last Year of Development and Production Rates

20. Conventional Wellsite Condensate Storage Tank Flash/Working/Standing Emissions

Assumptions:

Average Condensate Production Rate : 35.0 bbls per day per conventional well
(Average reported by proponents)

Size of Development: 18 conventional wells, Year 10

Calculations:

E&P Tanks v2.0 used to calculate working/standing/breathing losses
Extended hydrocarbon sample dated 9/26/05
Riverton Dome Field - Frontier/Dakota Formation wells
No controls required

Emissions:

Component	Well Emissions (tons/yr/pad)	Project Emissions [a] (tons/yr)
Total VOC	0.322	5.796
Benzene	0.002	0.036
Toluene	0.003	0.054
Ethylbenzene	0.000	0.000
Xylene	0.002	0.036
n-Hexane	0.010	0.180
Total HAPS	0.020	0.360

a Last Year of Development and Production Rates

Buys & Associates, Inc.
Environmental Consultants

Project: Devon Energy Riverton Dome EIS

Proposed Action 40 Acre Spacing - 10 year Duration

21. Long-Term Construction Emissions Sumary

Acres 3450.5

AREA SOURCE

Pollutant	Long-Term Construction Emissions (tons/year)[a] Construction	Drilling	Completion	Development	Wind Erosion	Total (tons/yr)	**Total Area**	**Area/4**	Ton/yr-acre
NO_X	2.82	0.54	0.38	0.04		3.8	**3.9**	**1.0**	2.82E-04
CO	0.97	2.39	1.47	0.21		5.0	**6.4**	**1.6**	4.62E-04
VOC	0.16	0.32	0.22	0.02		0.7	**0.8**	**0.2**	5.80E-05
SO_2	0.08	0.03	0.02	0.00		0.1	**0.1**	**0.0**	9.72E-06
PM_{10}	9.43	118.91	83.91	8.11	4.87	225.2	**235.1**	**58.8**	1.70E-02
Pmcourse							**197.6**	**49.4**	1.43E-02
$PM_{2.5}$	1.61	18.23	12.87	1.24	1.95	35.9	**37.4**	**9.4**	2.71E-03
Benzene						0.0	**0.0**	**0.0**	0.00E+00
Toluene						0.0	**0.0**	**0.0**	0.00E+00
Ethylbenzene						0.0	**0.0**	**0.0**	0.00E+00
Xylene						0.0	**0.0**	**0.0**	0.00E+00
n-Hexane						0.0	**0.0**	**0.0**	0.00E+00
Formaldehy	0.07					0.1	**0.1**	**0.0**	4.78E-06
Hydrogen Sulfide						0.0	**0.0**	**0.0**	0.00E+00

POINT SOURCE

Pollutant	Long-Term Construction Emissions (tons/year)[a] Constructior	Drilling		Completion		Heater	Compressor	Tons/yr **Point/4**
NO_X		65.59	16.40	7.71	1.93	3.94	130.36	**0**
CO		15.03	3.76	1.76	0.44	3.31	43.45	**0**
VOC		1.93	0.48	0.23	0.06	0.05	65.18	**0**
SO_2		1.11	0.28	0.13	0.03	0.00	0.00	**0**
PM_{10}		1.57	0.39	0.19	0.05	0.30	0.00	**0**
$PM_{2.5}$		1.31	0.33	0.16	0.04	0.00	3.15	**0**
Benzene						0.00	0.13	**0**
Toluene						0.00	0.01	**0**
Ethylbenzene						0.00	0.06	**0**
Xylene						0.07	0.00	**0**
n-Hexane						0.00	0.00	**0**
Formaldehyde						0.00	6.08	**0**
Hydrogen Sulfide								**0**

a - Last Year Development and Production Rates

Pollutant	Total Project Production Related Emissions (tons/year)[a] Production Heaters	Condensate Tank Flash	Central Dehydrators	Operations Vehicle	Gas Compressio	Total (tons/year)
NO_X				0.1		0.1
CO				1.3		1.3
VOC				0.1		0.1
SO_2				0.0		0.0
PM_{10}				9.8		9.8
$PM_{2.5}$				1.5		1.5
Benzene						0.0
Toluene						0.0
Ethylbenzene						0.0
Xylene						0.0
n-Hexane						0.0
Hydrogen Sulfide						0.0
Formaldehyde						0.0

Pollutant	Total Project Production Related Emissions (tons/year)[a] Production Heaters	Condensate Tank Flash	Central Dehydrators	Operations Vehicle	Gas Compression	Total (tons/year)	Gas Compression
NO_X	3.9	0.0	0.0			3.9	130.3571
CO	3.3	0.0	0.0			3.3	43.45238
VOC	0.1	5.8	14.2			20.1	65.17857
SO_2	0.0	0.0	0.0			0.0	0
PM_{10}	0.3	0.0	0.0			0.3	3.152309
$PM_{2.5}$	0.3	0.0	0.0			0.3	3.152309
Benzene	0.0	0.0	0.6			0.7	0.138881
Toluene	0.0	0.0	2.6			2.6	0.12878
Ethylbenzei	0.0	0.0	0.7			0.7	0.012531
Xylene	0.0	0.0	5.8			5.8	0.058077
n-Hexane	0.1	0.2	0.1			0.4	0
Hydrogen S	0.0	0.0	1.0			1.0	0
Formaldehy	0.0	0.0	0.0			0.0	6.083333

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Project: Devon Energy Riverton Dome EIS

Proposed Action 40 Acre Spacing - 10 year Duration

22. Total Project Production Related Emissions Summary

Pollutant	Total Project Production Related Emissions (tons/year) [a]					Total
	Production Heaters	Condensate Tank Flash	Central Dehydrators	Operations Vehicle	Gas Compression	(tons/year)
NO_X	3.9			0.1	130.4	134.4
CO	3.3			1.3	43.5	48.1
VOC	0.1	5.8	14.2	0.1	65.2	85.3
SO_2	0.0			0.0	0.0	0.0
PM_{10}	0.3			9.8	3.2	13.3
$PM_{2.5}$	0.3			1.5	3.2	5.0
Benzene	0.0	0.0	0.6		0.1	0.8
Toluene	0.0		2.6		0.1	2.7
Ethylbenzene			0.7		0.0	0.7
Xylene			5.8		0.1	5.9
n-Hexane	0.1	0.2	0.1			0.4
Hydrogen Sulfide			1.0			1.0
Formaldehyde	0.0				6.1	6.1

a - Last Year of Development and Production Rates

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Project: Devon Energy Riverton Dome EIS

Proposed Action 40 Acre Spacing - 10 year Duration

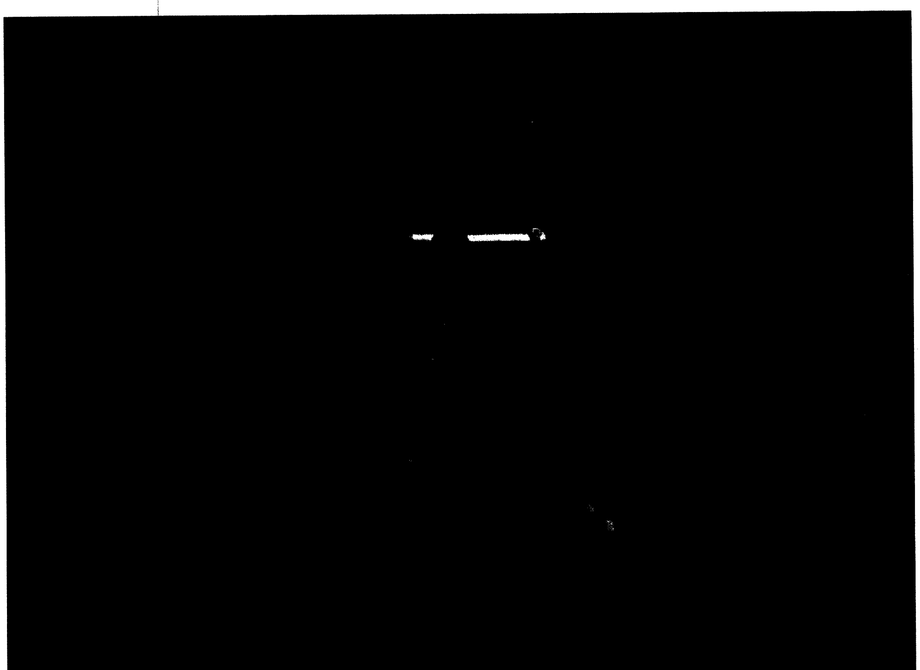
23. Total Project Emissions Summary

Pollutant	Project Emissions (tons/year)			Total Emissions (tons/year)
	Well Development	Well Production	Gas Compression	
NO_X	69.4	4.1	130.4	203.8
CO	5.0	4.6	43.5	53.1
VOC	0.7	20.2	65.2	86.1
SO_2	0.1	0.0	0.0	0.1
PM_{10}	225.2	10.1	3.2	238.5
$PM_{2.5}$	35.9	1.8	3.2	40.9
Benzene	0.0	0.7	0.1	0.8
Toluene	0.0	2.6	0.1	2.7
Ethylbenzene	0.0	0.7	0.0	0.7
Xylene	0.0	5.8	0.1	5.9
n-Hexane	0.0	0.4	0.0	0.4
Hydrogen Sulfide	0.0	1.0	0.0	1.0
Formaldehyde	0.1	0.0	6.1	6.2

NEAR-FIELD
AIR QUALITY TECHNICAL SUPPORT DOCUMENT

RIVERTON DOME COAL BED NATURAL GAS AND CONVENTIONAL GAS DEVELOPMENT PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT



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1.0 INTRODUCTION

This report describes the process used to develop the Near-Field Air Quality Impact Assessment for the Draft Environmental Impact Statement (DEIS) for Riverton Dome Coalbed and Conventional Natural Gas Project (RD) proposed by Devon Energy Production Company, L.P. (Devon). The RD project area (RDPA) is located approximately five miles southeast of Riverton, Wyoming, and covers approximately 13,787 acres (see **Figure 1-1**). This document provides a detailed description of the procedures applied for the EIS analysis to quantify potential ambient air quality and air quality related values (AQRV) impacts that may result from the implementation of the RD Project alone and in conjunction with other cumulative sources of air pollutant emissions.

This Near-Field air quality assessment report is one of three documents that support the air quality analysis presented in the EIS. The other supporting documents are:

- Emissions Inventory for the RD project (Buys and Associates 2007a)
- Far-Field Air Quality Technical Support Document for the RD Project (Buys and Associates 2007b)

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Figure 1-1. Riverton Dome Project Location

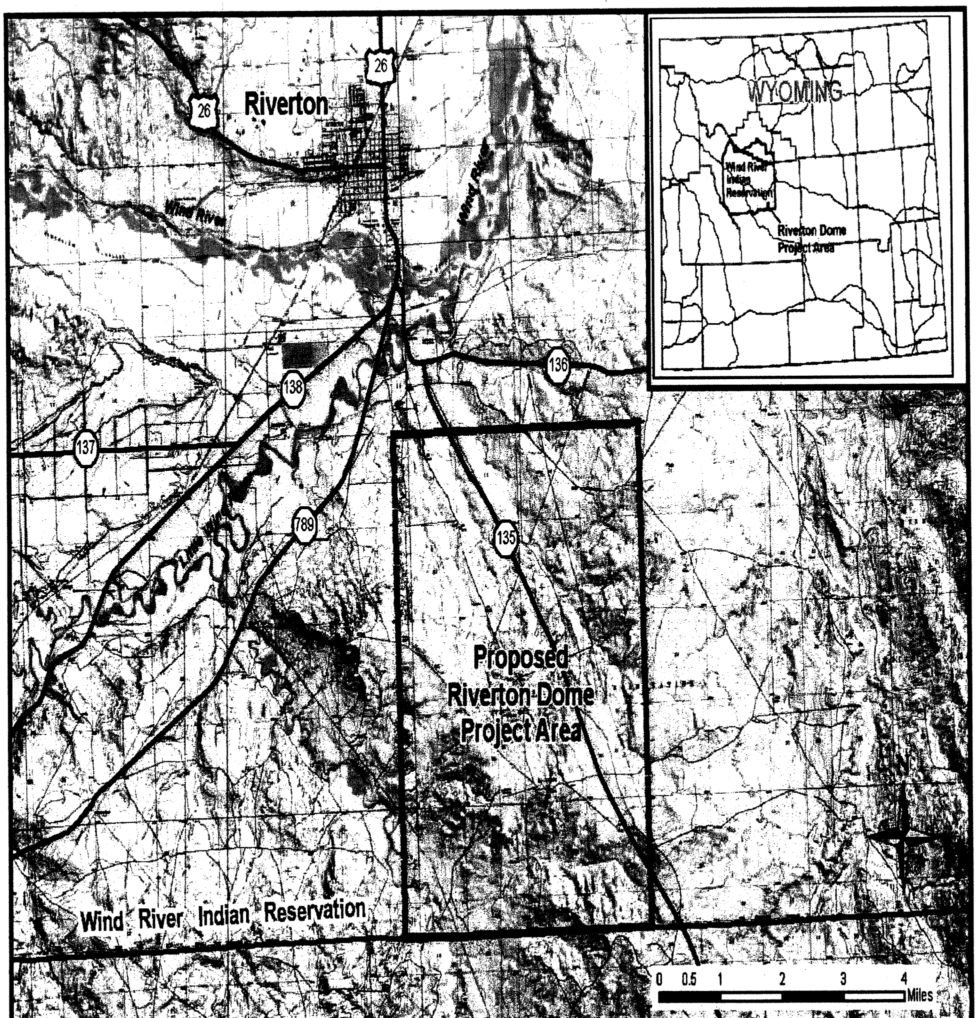

Figure 1-1. Location of Riverton Dome Project Area, Wind River Indian Reservation, Freemont County, Wyoming

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2.0 PROJECT DESCRIPTION

The existing wells in the RD Field include 30 producing conventional gas wells, 6 producing oil wells, 13 existing CBNG wells, and a road network of 53 miles. Existing compression is 4,243 horsepower gas-fired engines at the Riverton Dome Gas Plant.

A pilot well program was approved in 2005 to evaluate the commercial quantities of CBNG, the amount and decline rate of produced water, and whether 80-acre spacing would be adequate. Currently, 10 of the 20 pilot CBNG wells have been drilled and are producing CBNG.

Devon proposes that a maximum of 326 CBNG and 20 conventional wells could be developed over a 10-year period at an average rate of 33 CBNG wells and two conventional wells annually. Ancillary facilities would include 79 miles of new pipeline co-located with proposed roads and 9.8 miles of pipelines parallel to existing roads. Gas and water pipelines from the wells to gathering system lines would average 1,320 feet in length. Compressor engines would be added at the existing Riverton Dome Gas Plant such that compression would increase by 9,000 hp. No gas-fired field compression would be installed.

In addition to the Proposed Action, the following action alternative is proposed. Devon proposes that 151 CBNG and 20 conventional wells could be developed over a 6-year period at the same development rate as the Proposed Action. Additionally, 53 miles of new pipeline co-located with proposed roads and 9.8 miles of pipelines parallel to existing roads would be constructed within the RDPA. Gas flowlines from the wells to gathering system lines would average 1,320 feet in length. Compressor engines would be added at the existing Riverton Dome Gas Plant such that compression would increase by 7,000 hp.

Since the majority of development/operation near-field impacts under Alternative B were equivalent to the Proposed Action impacts, no additional modeling beyond the Proposed Action was necessary.

Emissions from the Riverton Dome project would consist of the criteria pollutants nitrogen oxides (NO_x), carbon monoxide (CO), particulates (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and volatile organic compounds (VOC), and various hazardous air pollutants (HAP). These pollutants would be emitted from the following activities and sources:

- Well pad and road construction: equipment producing fugitive dust while moving and leveling earth;
- Drilling: drill rig engine exhaust and vehicles generating fugitive dust on access roads;
- Completion: vehicles generating fugitive dust on access roads, frac pump engine and generator emissions;
- Vehicle tailpipe emissions associated with all development phases;
- Conventional well production operations: three-phase separator emissions, and flashing and breathing emissions from a condensate tank; and
- Central production facility: compressor engine emissions.

The derivation of the emission rates applied for this analysis is detailed separately in the emissions inventory report (Buys and Associates 2007a).

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3.0 NEAR-FIELD DISPERSION MODEL AND METEOROLOGY

The AERMOD-Prime model (Version 04300) has been promulgated in the EPA Guideline on Air Quality Models to replace ISCST3 as the primary dispersion model for assessing near-field impacts, and was therefore applied in this analysis. The AERMOD system contains three primary components: AERMOD-Prime (dispersion model with prime building downwash algorithms), AERMAP (terrain preprocessor), and AERMET (meteorological preprocessor). A special feature of AERMOD-Prime includes the capability to more accurately represent boundary layer meteorology and dynamics, and is therefore an improvement over the ISC dispersion model.

The AERMET system utilizes both surface and upper air measurements in order to estimate profiles of wind, turbulence, and temperature in the Planetary Boundary Layer (PBL). Minimum meteorological data requirements to run AERMET generally include horizontal wind speed, horizontal wind direction, ambient temperature, surface characteristics (Albedo, Bowen Ratio, Surface Roughness), cloud cover, and a morning upper air sounding. The recent version of the model, however, has incorporated the Bulk Richardson Number scheme which removes the model dependence on cloud cover if Solar Radiation and Temperature Change with Height (SRDT) data are available. This is especially important in areas where cloud cover data are unavailable or considered to be non-representative.

Another requirement for successful model performance is that the meteorological data be representative of the conditions affecting the transport and dispersion of pollutants within the modeling domain. Generally, this means that the surface characteristics surrounding the meteorological monitoring site should be similar to those within the modeling domain. While degree of similarity may correlate with proximity of the monitoring site to the project site, meteorological data measured at more distant sites may be considered representative as long as it adequately represents the meteorology and surface characteristics of the modeling domain.

In evaluating the meteorological data available to drive AERMOD, the surface data from Lander and upper air data from Riverton were selected. Evaluation of the surface characteristics surrounding the data collection site indicate that the data is likely to be representative of the meteorological conditions encountered within the modeling domain.

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4.0 SIGNIFICANCE CRITERIA

Scales of measurement, or significance criteria, must be defined to evaluate potential air quality impacts. Potential impacts to near-field air quality that would result from the implementation of the RD project were compared to the significance criteria listed below.

4.1 WYOMING AND NATIONAL AIR QUALITY STANDARDS

National and Wyoming Ambient Air Quality Standards (NAAQS and WAAQS) have been promulgated for the purpose of protecting human health and welfare with an adequate margin of safety. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Pollutants for which standards have been set include sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and particulate matter less than 10 microns in diameter (PM_{10}) and less than 2.5 microns in diameter ($PM_{2.5}$).

Comprehensive air quality monitoring has not been conducted within the RDPA. However, air quality in and surrounding the area is expected to be relatively good due to the limited number of large industrial emission sources and predominately favorable atmospheric dispersion conditions. Background values, provided by the Wyoming Department of Environmental Quality, are below the NAAQS and WAAQS. Measured regional background concentrations are presented in **Table 4-1** with the applicable ambient air quality standards.

Under the Prevention of Significant Deterioration (PSD) provisions, incremental increases of specific pollutant concentrations are limited above a legally defined baseline level. Congress designated 158 areas as Class I areas, including national parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres, in existence on August 7, 1977. The PSD program protects air quality within Class I areas by allowing only slight incremental increases in pollutant concentrations. Areas of the state not designated as PSD Class I are classified as Class II. For Class II areas, greater incremental increases in ambient pollutant concentrations are allowed. The PSD increments for both Class I and II areas are presented in **Table 4-1**.

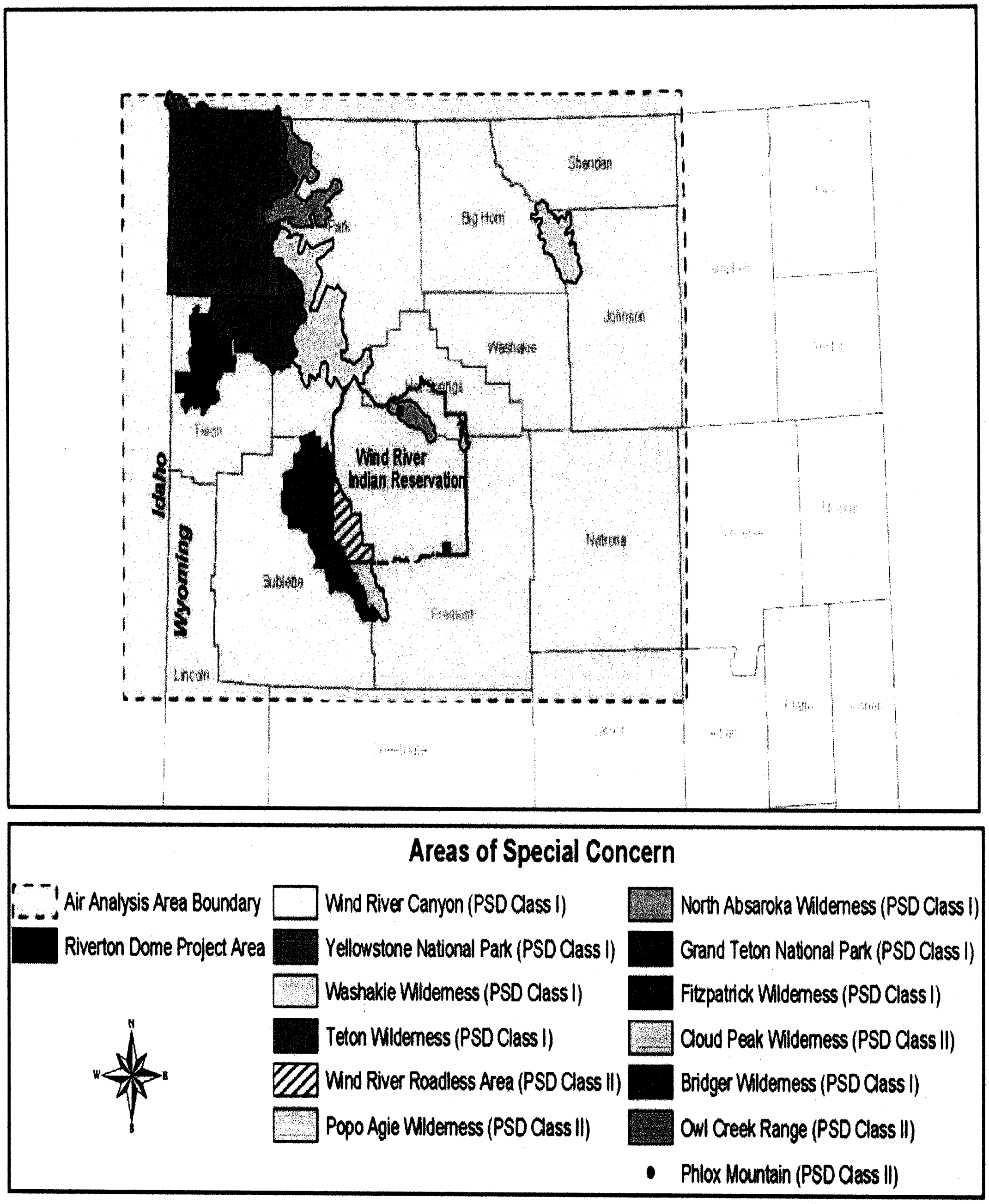
The RDPA and surrounding region is federally designated as a PSD Class II. The two nearest PSD Class I areas are Bridger and Fitzpatrick Wilderness Areas located directly west of the RDPA in the Wind River Mountain Range. Contiguous with Bridger Wilderness are Popo Agie Wilderness and the Wind River Roadless Area, both designated as PSD Class II. Nearby tribal areas of special concern include Wind River Canyon (PSD Class II) located northeast of the RDPA, and Phlox Mountain, located in the Owl Creek range (PSD Class II) north of the RDPA. The Wind River Canyon and the Owl Creek Range are both located within the Wind River Indian Reservation boundary. More distant Class I areas include Grand Teton and Yellowstone National Parks, and Washakie, Teton, and North Absaroka Wilderness areas. Cloud Peak Wilderness is designated as PSD Class II. **Figure 4-1** presents a regional map indicating the location of the RDPA and the areas of special concern.

Table 4-1. Air Pollutant Background Concentrations, National and State Ambient Air Quality Standards, and PSD Increments

Pollutant and Averaging Time	Measured Background Concentration (µg/m3)	National and Wyoming Ambient Air Quality Standard (µg/m3)	PSD Class I Increment (µg/m3)	PSD Class II Increment (µg/m3)
Carbon Monoxide (CO)				
1-hour	3,336 a	40,000	n/a	n/a
8-hour	1,381 a	10,000	n/a	n/a
Nitrogen Dioxide (NO_2)				
Annual	3.4 b	100	2.5	25
Ozone (O_3)				
1-hour	169 c	235	n/a	n/a
8-hour	147 c	157	n/a	n/a
Particulate Matter (PM_{10})				
24-hour	33 d	150	8	30
Annual	16 d	50	4	17
Particulate Matter ($PM_{2.5}$)				
24-hour	13 d	65	n/a	n/a
Annual	5 d	15	n/a	n/a
Sulfur Dioxide (SO_2)				
3-hour	132 e	1,300	25	512
3-hour (1st highest)	34 f			
3-hour (2nd highest)	31 f			
24-hour	43 e	365 (260)	5	91
24-hour (1st highest)	11 f			
24-hour (2nd highest)	8 f			
Annual	9 e	80 (60)	2	20
Annual	3 f			

Note: Measured background ozone concentration value represents the top tenth percentile maximum 1-hour value. Other short-term background concentrations are second-maximum values unless specified. Annual data represent averages.
n/a: Not Applicable.
Wyoming Ambient Air Quality Standards from: Wyoming Air Quality Standards and Regulations, Chapter 2 - Ambient Standards. For SO_2, number in parenthesis indicates more stringent Wyoming Standard.
National Ambient Air Quality Standards from: 40 CFR part 50 National Primary and Secondary Air Quality Standards.
PSD Increments from: 40 CFR part 51.166 Prevention of Significant Deterioration of Air Quality.
Sources of Measured Background Concentrations
[a] Data collected by Amoco at Ryckman Creek for an 8 month period during 1978-1979, summarized in the Riley Ridge EIS (BLM 1983).
[b] Data collected at Green River Basin Visibility Study site, Green River, Wyoming during the period January-December 2001. (ARS 2002)
[c] Data collected at Green River Basin Visibility Study site, Green River, Wyoming during the period June 10, 1998 through December 31, 2001 (ARS 2001).
[d] Data collected by WDEQ-AQD at Emerson Building, Cheyenne, Wyoming, Year 2001, second highest 24-hour concentrations. These data were determined by WDEQ-AQD to be the most representative co-located PM_{10} and $PM_{2.5}$ data available.
[e] Data collected at LaBarge Study Area at the Northwest Pipeline Craven Creek site, 1982-1983 (WDEQ).
[f] Data collected by Tribal Monitors of the Eastern Shoshone and Northern Arapaho Tribes, Wind River Reservation, located at Sand Draw Sulfur Oxides #1 Site, Riverton, WY, between October 2004 and March 2005 (4,335 total hourly observations).

Figure 4-1. Riverton Dome Far-Field Air Quality Analysis Area



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4.2 ACUTE AND CHRONIC HAP EXPOSURE THRESHOLDS

Hazardous Air Pollutants (HAPs) associated with the RD Project and cumulative sources include BTEX (benzene, toluene, ethylbenzene, and xylene), and formaldehyde. Since there are no applicable federal ambient air quality standards for the above pollutants, Reference Concentrations (RfC) for chronic inhalation exposure, and Reference Exposure Levels (REL) for acute inhalation exposures are applied as significance criteria. **Table 4-2** provides the RfCs and RELs. The RfCs represent an estimate of the continuous (i.e. annual average) inhalation exposure rate to the human population (including sensitive subgroups such as children and the elderly) without an appreciable risk of harmful effects. The RELs represent the acute (i.e. one-hour average) concentration at or below which no adverse health effects are expected. Both the RfC and REL guideline values are for non-cancer effects.

Table 4-2. HAP Reference Exposure Levels and Reference Concentrations

Hazardous Air Pollutant (HAP)	Reference Exposure Level [REL 1-hr Average] ($\mu g/m^3$)	Reference Concentration [1] [RfC Annual Average] ($\mu g/m^3$)
Benzene	1,300 [2]	30
Toluene	37,000 [2]	400
Ethylbenzene	350,000 [3]	1,000
Xylenes	22,000 [2]	100
n-Hexane	390,000 [3]	200
Formaldehyde	94[2]	9.8

[1] EPA Air Toxics Database, Table 1 (EPA 2002a)
[2] EPA Air Toxics Database, Table 2 (EPA 2002a)
[3] Immediately Dangerous to Life or Health (IDLH)/10, EPA Air Toxics Database, Table 2 (EPA 2002a) since no available REL

Diesel emissions have the potential to cause adverse health effects. The EPA has recognized that diesel exhaust has the potential to cause long-term (chronic) respiratory damage and short-term (acute) irritation (eye, throat, bronchial) and respiratory symptoms. Evidence also suggests that diesel exhaust is a likely human carcinogen with potential to cause lung cancer from long-term inhalation exposure. However, the carcinogenic effect of diesel exhaust on humans has not been definitively proven due to a lack of conclusive exposure data (EPA 2002b).

4.3 INCREMENTAL CANCER RISK

To assess long-term exposure from carcinogenic HAP emissions, traditional risk assessment methods are applied and the risk for the maximally exposed individual (MEI) and most likely exposure (MLE) are compared to the significance criterion of one additional cancer per one million exposed persons (1×10^{-6}). Benzene and formaldehyde, the project HAP carcinogens, are evaluated. For the MEI risk, it is assumed that a person is exposed continuously (24 hours per day, 365 days per year) for the life of project (LOP). For the MLE risk, an adjustment was made for the amount of time a family stays at a residence (nine years) and for the portion of time spent away from the home (64 percent of the day) (EPA 1997). It is further assumed that households are exposed to one-quarter of the maximum concentration the remaining (36 percent) of the time. Exposure adjustment factors of 0.4 for the MEI (28/70) and 0.095 for the MLE [(9/70)*((0.64*1)+(0.36*0.25))] are applied to the estimated cancer risk to account for the actual time that an individual could be exposed during a 70-year lifetime. The chronic inhalation cancer risk factors for benzene and formaldehyde are presented in **Table 4-3.**

Table 4-3. Carcinogenic Unit Risk Factors

Hazardous Air Pollutant	Carcinogenic Unit Risk Factor [Annual Inhalation Exposure] ($1/\mu g/m^3$)
Formaldehyde[1]	1.3×10^{-5}
Benzene[1]	2.2×10^{-6} - 7.8×10^{-6}

Source: [1] EPA Integrated Risk Information System (IRIS) database (EPA 2003). A range of risk factors is available for benzene.

5.0 SUB-GRID IMPACTS

5.1 SUB-GRID DEVELOPMENT EMISSIONS

The major pollutant associated with development activities would be PM_{10} and $PM_{2.5}$ generated by earth-moving and traffic activities. Additional pollutants would be emitted from vehicle and equipment exhaust. A well pad and access road complex was characterized by the emissions from a 2.8 acre well pad. Although a well pad could be oriented in any direction, the use of five years of meteorological data adequately characterizes the maximum short-term impacts regardless of orientation.

Receptors were spaced at 100-meter intervals with a buffer zone of 100 meters from the well pad. The buffer zone criteria were based on minimum distances that heavy equipment operators would allow public access to construction. The receptor grid extended out to 2,000 meters beyond the buffer zone. Receptor elevations were assumed to be at the base elevation of well site sources (i.e., flat terrain). The modeled source (well pad and access road) are shown on **Figure 5-1**.

Modeling for construction activities involved PM_{10} and $PM_{2.5}$ emissions from the operation of a backhoe, loader, crawler tractor, and grader. Modeling for the drilling activities involved the traffic-generated fugitive dust as well as criteria pollutant emissions from a drill rig. Modeling for completion activities involved the vehicle-generated fugitive dust and well fracturing emissions. The fugitive dust generated from vehicles traveling to and from the site was scaled to the section of road near the pad. All of the PM_{10} and $PM_{2.5}$ emissions were then assumed to emanate from the well pad and short section of access road.

Based on the proposed project schedule, a well pad and associated access road would be constructed in about 5-10 days. The time to drill a well would range from 7 to 10 days. A well would then be completed in about 10 to 15 days. Well drilling was assumed to occur 24 hours per day, while construction and completion activities were assumed to occur 10 hours per day.

Criteria pollutant emissions were predicted for comparison to applicable short-term ambient air quality standards. Comparison to annual thresholds is not applicable because the location of emissions sources would move with the development schedule.

Fugitive dust emissions were modeled as area sources with the release parameters listed in **Table 5-1**. Drill rig and well fracturing pump and generator engine stacks were modeled as point sources with the release parameters listed in **Table 5-2**.

Emission rates were derived according to the averaging period being modeled. For instance, annual fugitive dust emission rates incorporated a natural control efficiency based on annual precipitation rates. However, short-term fugitive dust emission rates reflected the maximum 24-hour emissions that could be observed during a dry period. The maximum predicted short-term emissions from well development are shown in **Table 5-3,** while annual emission rates are presented in **Table 5-4**.

Table 5-1. RD Development Area Source Release Parameters

Source	Dimensions (meters)		Release Heights (meters)
	X-Dimensions	Y-Dimensions	
Pad	107	107	5

Table 5-2. RD Proposed Action Development Point Source Release Parameters

Source	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Temperature (k)
Drill Rig	7.6	0.1	50	800
Fracturing Engines	9.1	0.3048	35	811

Table 5-3. RD Proposed Action Short-Term Development Emission Rates

Activity	Duration	Maximum PM_{10} Emission Rate (lbs/hr)	Maximum $PM_{2.5}$ Emission Rate (lbs/hr)	Maximum SO_2 Emission Rate (lbs/hr)
Construction (per pad)	5-10 days			
Earth Moving		1.33	1.33	
Drilling (per well)	7 to 10 days			
Drill Rig		0.21	0.18	0.15
Vehicle Traffic		0.31	0.05	1.09E-05
Completion (per well)				
Well Fracturing	3 hours	2.12	1.79	1.44
Vehicle Traffic	29 days	0.18	0.03	4.82E-05

5.2 SUB-GRID DEVELOPMENT RESULTS

Well development impacts as compared to the NAAQS for the Proposed Action are shown in **Table 5-4**. Since well development activities are temporary and short-term in nature, comparisons to PSD increments are not appropriate. The short-term results show that there is no exceedance of the NAAQS. **Figure 5-1** illustrates the 24-hour maximum PM_{10} impacts that would occur southeast of a typical well pad.

Table 5-4. RDPA Proposed Action Development Impacts

Pollutant and Averaging Period	Averaging Period	Ambient Air Concentration (μg/m³)[a]				
		Predicted	Background[b]	Total	NAAQS	% of NAAQS (Project + Background)
SO_2	3-Hour	34.7	143	177.7	1,300	13.7%
	24-Hour	11. 8	42	53.8	365	14.7%
	Annual	NA	-	-	-	-
NO_2	Annual	NA	-	-	-	-
PM_{10}	24-Hour	28.1	33	61.1	150	40.7%
	Annual	NA	-	-	-	-
$PM_{2.5}$	24-Hour	9.3	13	22.3	65	34.3%
	Annual	NA			-	-
CO	1-Hour	253.4	3,336	3589.4	40,000	9.0%
	8-Hour	141.8	1,381	1522.8	10,000	15.2%

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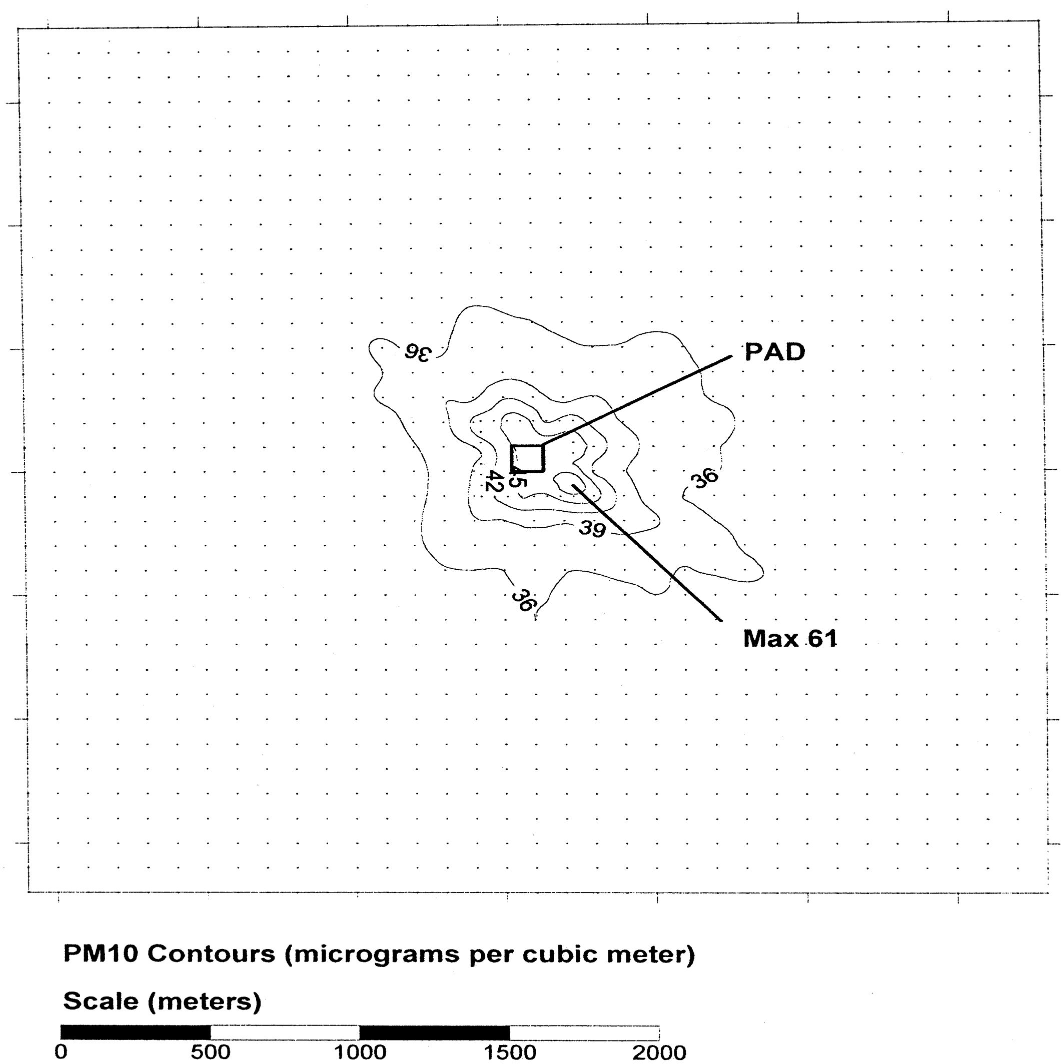
Figure 5-1. PM_{10} Predicted 24-Hour Impacts from Development Activities



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5.3 PROPOSED ACTION OPERATIONAL EMISSIONS

A "most-likely scenario" was developed to assess the criteria pollutant and HAP impacts from the largest single source of in the RDPA, the 9,000-horespower upgrade at the Riverton Dome Gas Plant. A modeling grid was developed around the fence line of the compressor station. Receptors were spaced at 25 meters along the perimeter of the well pads and compressor station. Receptor spacing of 100 meters was utilized from the facility perimeters out to 2 kilometers.

Modeled results were compared to the NAAQS for each criteria pollutant and the acute, chronic, and carcinogenic thresholds for each applicable HAP.

The compressor engine was modeled as a point source with the release parameters listed in **Table 5-5**.

Table 5-5. RD HAP Point Source Release Parameters

Source	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Temperature (k)
Compressor Engines	9.1	0.3048	25	811

Table 5-6 shows the estimated criteria pollutant and HAP emissions from the compressor engines.

Table 5-6. Compressor Engine Upgrade Annual Emissions

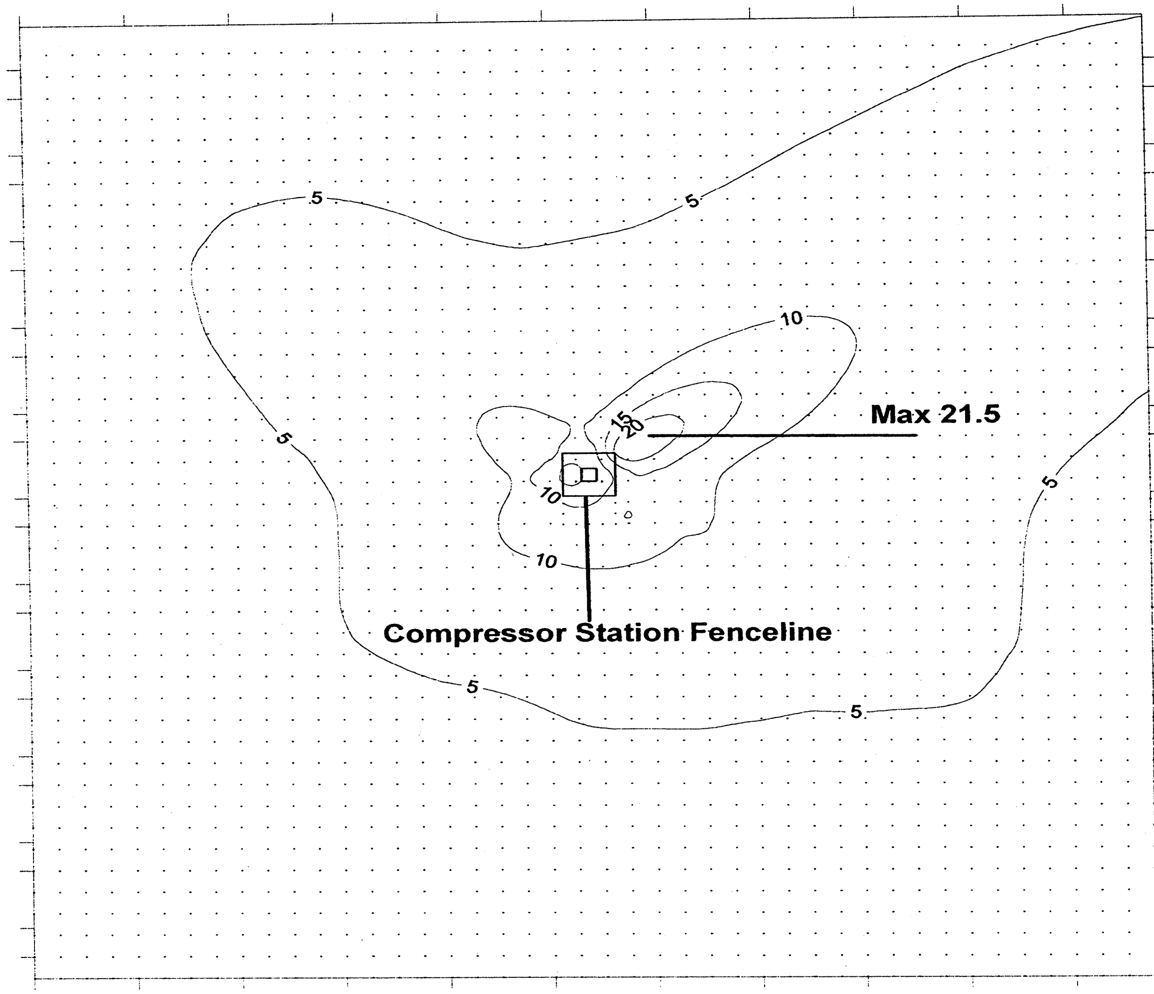
Pollutant	Emissions (tons/year)
NO_X	130.36
CO	43.45
SO_2	0.00
PM_{10}	3.15
$PM_{2.5}$	3.15
Benzene	0.14
Toluene	0.13
Ethylbenzene	0.01
Xylene	0.06
n-Hexane	0.00
H_2S	0.00
Formaldehyde	6.08

The results of the compressor station upgrade analysis is shown graphically in **Figure 5-2** and listed with the full development impact analysis in **Table 5-7.** The predicted concentrations are all well below the applicable standards.

Table 5-7. Predicted Ambient Impacts near the Upgraded Compressor Station

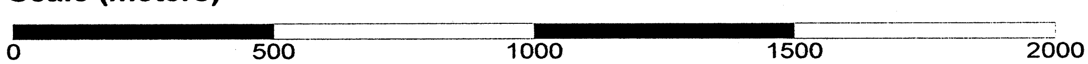
Pollutant	Pollutant Concentration (micrograms per cubic meter) and Averaging Time				
	Annual	24-hour	8-hour	3-hour	1-hour
NO_X	21.49	NA	NA	NA	NA
CO	NA	NA	87.50	NA	107.52
SO_2	0.00	0.00	NA	0.00	0.00
PM_{10}	0.52	3.38	NA	NA	NA
$PM_{2.5}$	0.52	3.38	NA	NA	NA
Benzene	0.02	0.15	NA	NA	0.34
Toluene	0.02	0.14	NA	NA	0.32
Ethylbenzene	0.00	0.01	NA	NA	0.03
Xylene	0.01	0.06	NA	NA	0.14
n-Hexane	0.00	0.00	NA	NA	0.00
H_2S	0.00	0.00	NA	NA	0.00
Formaldehyde	1.00	6.52	NA	NA	15.05

Figure 5-2. NOx Impacts near Upgraded Riverton Dome Gas Plant



Contours (micrograms per cubic meter)

Scale (meters)



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5.4 SUB-GRID HAZARDOUS AIR POLLUTANT RESULTS

Short-term impacts from HAP exposure were assessed by comparing one-hour average impacts to the HAP-specific acute REL (reference exposure level) and annual average impacts to the HAP-specific RfC (reference concentration for continuous inhalation exposure). The REL is the acute concentration at or below which no adverse health effects are expected. The RfC is the average concentration, i.e., an annual average, at or below which no long-term adverse health effects are expected. Both of these guideline values are for non-cancer effects.

Table 5-8 presents the acute RELs and RfCs for non-cancer effects for the Proposed Action. The predicted maximum concentrations of all HAPs are compared against the REL and RfC for each pollutant.

Table 5-8. RDPA Proposed Action Non-Carcinogenic Acute REL and RfC Impacts

HAP	REL ($\mu g/m^3$)	Predicted Maximum 1-Hour Impact ($\mu g/m^3$)	% of REL	RfC[c] ($\mu g/m^3$)	Predicted Maximum Annual Impact ($\mu g/m^3$)	% of RfC
Benzene	1,300 [a]	0.35	< 1%	30	0.02	< 1%
Toluene	37,000 [a]	0.32	<1 %	400	0.02	<1 %
Ethylbenzene	350,000 [b]	0.03	<1 %	1,000	0.002	<1 %
Xylenes	22,000 [a]	0.15	<1 %	100	0.01	<1 %
n-Hexane	390,000 [b]	0.0	<1 %	200	0.00	<1 %
Formaldehyde	94 [a]	15.05	16%	9.8	1.01	11 %

[a] EPA Air Toxics Database, Table 2 (EPA 2002a)
[b] Immediately Dangerous to Life or Health (IDLH)/10, EPA Air Toxics Database, Table 2 (EPA 2002a) since no available REL
[c] EPA Air Toxics Database, Table 1 (EPA 2002a)

Since benzene and formaldehyde are carcinogenic, annual average concentrations of these two HAPs were modeled and expressed as a long-term cancer risk (based on 70- year exposure). Cancer risk was estimated for two exposure scenarios: 1) most likely exposure (MLE) for residents and 2) a maximally exposed individual (MEI) corresponding to an individual that could be exposed for the entire life of the project (assumed as 28 years), such as compressor station workers. Resultant exposure adjustment factors for the MLE and MEI scenarios of 0.095 and 0.4, respectively, were applied to the estimated cancer risk to account for the actual time that an individual would be exposed during a 70-year lifetime.

Table 5-9 presents the unit risk factor, exposure adjustment factor, and the estimated cancer risk for the MLE and MEI exposure scenarios for benzene and formaldehyde. The unit risk factor is a slope factor that when multiplied by the ambient air concentration provides an estimate of the probability of one additional person contracting cancer based on continuous exposure over a 70-year lifetime. A range of unit risk factors is available for benzene. The significant cancer risk criterion of 1×10^{-6} is at the low end of the range of cancer risks typically considered as acceptable when evaluating the health effects of a particular action. The range of acceptable cancer risks when evaluating the health effects of an action varies from 1 in a million to 1 in 10,000 (EPA 1999).

Table 5-9. RDPA Proposed Action Carcinogenic HAP Risk

HAP	Exposure Scenario	Unit Risk Factor (1/μg/m^3)	Exposure Adjustment Factor	Modeled Annual Impact (μg/m^3)	Cancer Risk
Benzene	MLE	2.2×10^{-6} to 7.8×10^{-6}	0.095	0.023	<1 in a million
Formaldehyde	MLE	1.3×10^{-5}	0.095	1.003	1.3 in a million
Benzene	MEI	2.2×10^{-6} to 7.8×10^{-6}	0.4	0.023	<1 in a million
Formaldehyde	MEI	1.3×10^{-5}	0.4	1.003	5 in a million

6.0 NEAR-FIELD IMPACTS

The near-field impact assessment considered NO_X, CO, PM_{10}, and $PM_{2.5}$ emissions during the operational phase of the RD after full-field development. Since SO_2 emissions from vehicle exhaust would be less than one ton per year, these emissions were not included in the near-field modeling. All facilities were assumed to operate continuously throughout the year. The Proposed Action was the only scenario modeled since emissions would be the highest from the Proposed Action. Impacts from additional alternatives would be less than the Proposed Action.

6.1 MODELING SETUP

The near-field impact analysis evaluated the emissions from all sources related to construction, drilling, completion and operational activities. The analysis considers the tenth year of development when all wells would come on line and the last 10 percent of the wells would be drilled and placed into operation. Ambient air concentrations were also predicted using the EPA-approved AERMOD dispersion model to distances of 10 kilometers from the RDPA and compared to applicable ambient air quality standards and applicable PSD Class II increments. All comparisons with PSD Class II increments are intended only to evaluate potential significance, and do not represent a regulatory PSD increment consumption analysis. PSD increment consumption analyses are typically applied to large industrial sources during permitting, and are solely the responsibility of the EPA on Tribal lands.

6.2 EMISSIONS

The total emissions are listed in **Table 6-1**.

Table 6-1. Riverton Dome Proposed Action Annual Emissions

Pollutant	Project Emissions (tons/year)			
	Well Development	Well Production	Gas Compression	Total
NO_X	69.4	4.1	130.4	203.8
CO	20.1	4.6	43.5	68.2
VOC	2.7	20.2	65.2	88.0
SO_2	1.7	0.0	0.0	1.7
PM_{10}	226.5	10.1	3.2	239.8
$PM_{2.5}$	37.0	1.8	3.2	42.0

For the AERMOD emission input data, the following method was applied:

- Compressor engine emissions were placed at the Riverton Dome Gas Plant.
- Drill rig engines emissions were placed at the center of four equal area quadrants of the RDPA. Twenty-five percent of the annual emissions were placed at each location.
- Completion rig engines emissions and heater separator emissions were apportioned in the same manner as the drill rig engine emissions.
- All fugitive emissions were equally apportioned to the four quadrants of the RDPA.

Table 6-2. Riverton Dome Proposed Action Point Sources

Source	UTM easting	UTM northing	Elevation (m)	Stack Height (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)	Stack Diameter (m)	NO_x (tons/ year)	CO (tons/ year)	PM_{10} (tons/ year)	PM_{25} (tons/ year)	SO_2 (tons/year)
9000 hp upgrade Riverton Dome Plant	716460	4757448	1617.37	9.1	811	25	0.3038	130.357	43.453	0	3.153	0
Simulate 8.3 Drill Rigs/Year	715463	4760289	1557.91	7.6	800	35	0.1	16.399	3.758	0.392	0.327	0.276
Simulate 8.3 Drill Rigs/Year	718693	4760289	1579.96	7.6	800	35	0.1	17.384	3.758	0.392	0.327	0.276
Simulate 8.3 Drill Rigs/Year	718693	4755881	1642.17	7.6	800	35	0.1	17.384	3.758	0.392	0.327	0.276
Simulate 8.3 Drill Rigs/Year	715463	4755881	1623.5	7.6	800	35	0.1	17.384	3.758	0.392	0.327	0.276
Simulate Comp Rigs	715463	4760289	1557.91	9.1	811	25	0.3048	1.927	0.441	0.048	0.04	0.032
Simulate Comp Rigs	718693	4760289	1579.96	9.1	811	25	0.3048	1.927	0.441	0.048	0.04	0.032
Simulate Comp Rigs	718693	4755881	1642.17	9.1	811	25	0.3048	1.927	0.441	0.048	0.04	0.032
Simulate Comp Rigs	715463	4755881	1623.5	9.1	811	25	0.3048	1.927	0.441	0.048	0.04	0.032
Simulates Oil Well Heaters	715463	4760289	1557.91	9.1	811	25	0.3048	0.986	0.828	0	0.3285	0
Simulates Oil Well Heaters	718693	4760289	1579.96	7.6	800	35	0.3048	0.986	0.828	0	0.3285	0
Simulates Oil Well Heaters	718693	4755881	1642.17	7.6	800	35	0.3048	0.986	0.828	0	0.3285	0
Simulates Oil Well Heaters	715463	4755881	1623.5	7.6	800	35	0.3048	0.986	0.828	0	0.3285	0
Pollutant Totals								210.56	63.561	1.76	5.935	1.232

Table 6-3. Riverton Dome Area Sources

Source	UTM e	UTM n	Elevation (m)	Release Height (m)	x length (m)	y length (m)	NOx (tons/ year)	CO (tons/ year)	PM10 (tons/ year)	Pm2.5 (tons/ year)	SO2 (tons/ year)
1/4 of Fugitives	714348	4758585	1612	3	2230	3408	0.975	1.595	58.763	9.352	0.034
1/4 of Fugitives	717578	4758585	1587	3	2230	3408	0.975	1.595	58.763	9.352	0.034
1/4 of Fugitives	717578	4754177	1636	3	2230	3408	0.975	1.595	58.763	9.352	0.034
1/4 of Fugitives	714348	4754177	1554	3	2230	3408	0.975	1.595	58.763	9.352	0.034
Pollutant Totals							3.9	6.38	235.052	37.408	0.136

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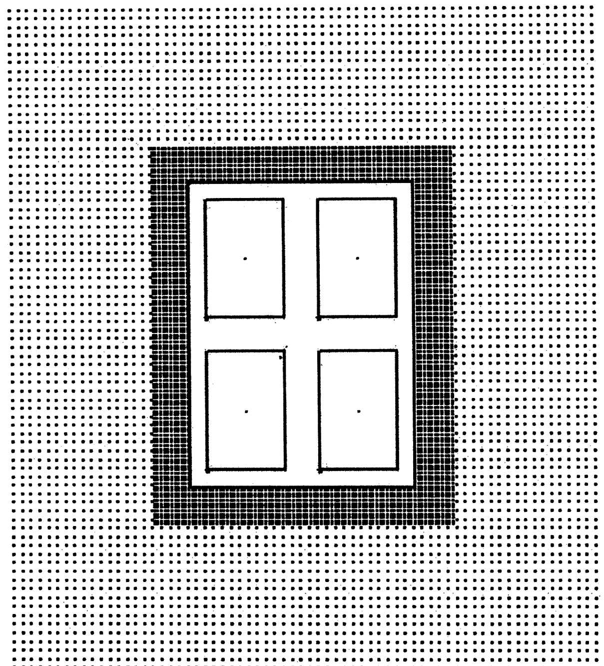
Figure 6-1. Near Field Modeling Grid



Red rectangles are area sources.

Red dots are point sources.

Black dots are receptors.

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6.3 NEAR-FIELD RESULTS

Impacts from the RD Proposed Action within the near-field analysis area were estimated using dispersion modeling. Results of the near-field modeling for each of the highest value of the five years of meteorological data, with the added background concentrations, are presented in **Table 6-4**. The predicted impacts are compared to applicable federal and Wyoming NAAQS standards and applicable PSD Class II increments. All comparisons with PSD Class II increments are intended only to evaluate potential significance, and do not represent a regulatory PSD increment consumption analysis. PSD increment consumption analyses are typically applied to large industrial sources during permitting, and are solely the responsibility of the State of Wyoming and the Environmental Protection Agency.

Table 6-4. RDPA Proposed Action Near-Field Predicted Impacts

Pollutant	Period	Predicted Concentration (µg/m³)	PSD Class II Increment	% of PSD Class II Increment	Project + Background [a] (µg/m³)	% of NAAQS (Project + Background)
Vicinity Riverton Dome Gas Plant						
NO_2	Annual	21.5	25	86%	24.9	24.9%
PM_{10}	Annual	1.1	17	6.5%	17.1	34.2%
	24-hour	6.7	30	22.3%	39.7	26.5%
$PM_{2.5}$	Annual	0.5	NA	NA	5.5	36.7%
	24-hour	3.4	NA	NA	16.4	25.2%
CO	1-hour	107.5	NA	NA	3,443.5	8.6%
	8-hour	87.5	NA	NA	1,468.5	14.7%
SO_2	3-hour	0	512	NA	NA	NA
	24-hour	0	91	NA	NA	NA
	Annual	0	20	NA	NA	NA
RDPA Boundary and Beyond						
NO_2	Annual	1.14	25	4.8%	4.8	4.8%
PM_{10}	Annual	2.2	17	13.5%	18.3	36.3%
	24-hour	10.1	30	32.7%	42.8	28.5%
$PM_{2.5}$	Annual	0.4	NA	NA	5.4	36.0%
	24-hour [b]	1.5	NA	NA	14.6	22.5%
CO	1-hour	22.2	NA	NA	1358.3	3.4%
	8-hour	6.5	NA	NA	1387.8	13.9%
SO_2	3-hour	0.34	512	2.2%	132.3	10.2%
	24-hour	0.11	91	2.7%	43.1	11.8%
	Annual	0.008	20	2.0%	9.01	11.2%

[a] with NO_2 annual background 3.4 µg/m³
[a] with PM_{10} 24-hour background 33 µg/m³
[a] with PM_{10} Annual background 16 µg/m³
[a] with $PM_{2.5}$ 24-hour background 13 µg/m³
[a] with $PM_{2.5}$ annual background 5 µg/m³
[a] with CO 1-hour background 3,336 µg/m³
[a] with CO 8-hour background 1,381 µg/m³
[a] with SO_2 3-hour background 132 µg/m³
[a] with SO_2 24-hour background 43 µg/m³
[a] with SO_2 Annual background 9 µg/m³

Ozone impacts were determined using the results of the impact analysis performed for the Pinedale EIS. Therefore, the following document is incorporated in its entirety by reference:

> *Air Quality Impact Analysis Technical Support Document for the Draft Supplemental Pinedale Anticline Oil and Gas Exploration and Development Environmental Impact Statement, Ozone Modeling Analysis, prepared for Bureau of Land Management, Pinedale Field Office, Pinedale, Wyoming, February, 2007.*

BLM performed the ozone modeling analysis to predict ozone impacts using the Western Regional Air Partnership (WRAP) projected emissions for the year 2018. WRAP is a collaborative effort of Tribal governments, state governments, and various federal agencies to develop the technical and policy tools needed by western states to comply with EPA's regional haze regulations. The inventory includes an estimate of emissions in Fremont County, which are greater than the Proposed Action or alternative emissions. The modeling was performed with the CALGRID photochemical modeling system in combination with one year of meteorological fields determined using the CALMET meteorological model.

Emissions determined from the 2002 baseline and the 2018 projections are presented in **Table 6-5** below. As can be seen, the Riverton Dome project emissions are much less than the predicted oil and gas increases. Therefore, the WRAP 2018 emissions were used as the basis to determine maximum ozone impacts. The CALGRID model uses the emissions contained within 36 X 36-km grid cells and predicts the ozone concentrations as a result of ozone formation and horizontal translation from adjacent cells.

Table 6-5. Summary of WRAP Oil and Gas Emissions and RD Emissions

Emission Source	Pollutants			
	NO_x	CO	VOCs	SO_2
WRAP 2002	2,558	201	5,853	50
WRAP 2018	4,942	364	10,319	0
Increase 2002 to 2018	2,384	163	4,466	-50
Riverton Dome Proposed Action	211	70	68	1.5

The CALGRID modeling yielded the four highest 8-hour average concentrations for all areas throughout the modeling grid. Of interest to the Riverton Dome project were the four highest concentrations predicted at the 36-km grids containing and surrounding the RDPA. The CALGRID modeling domain, as well as the model grids pertinent to the RDPA, are shown on **Figure 6-2.** An area is in compliance with the NAAQS and WAAQS for ozone of 80 parts per billion (ppb) if the fourth highest 8-hour concentration, averaged over 3 years, is less than the standard. An exceedance would not occur until the fourth highest 8-hour concentration averaged over three years is 85 ppb or greater. As shown on **Table 6-6**, the fourth highest predicted ozone concentrations range from 65 to 73 ppb, values that are below the 8-hour ozone 80 ppb standard.

Table 6-6. Summary of CALGRID Ozone Modeling Results

Grid	Ozone Predicted Ambient Concentration (ppb)			
	1st Highest	2nd Highest	3rd Highest	4th Highest
SW of RDPA	79.4	74.0	73.5	**71.3**
W of RDPA	79.7	70.6	69.0	**67.5**
NW of RDPA	69.5	68.9	66.5	**66.5**
S of RDPA	82.6	77.9	73.2	**72.6**
RDPA	78.2	72.5	70.1	**67.2**
N of RDPA	68.2	66.5	65.6	**64.7**
SE of RDPA	96.8	77.4	74.0	**73.1**
E of RDPA	85.4	72.2	70.4	**69.2**
NE of RDPA	69.0	67.9	65.8	**65.4**

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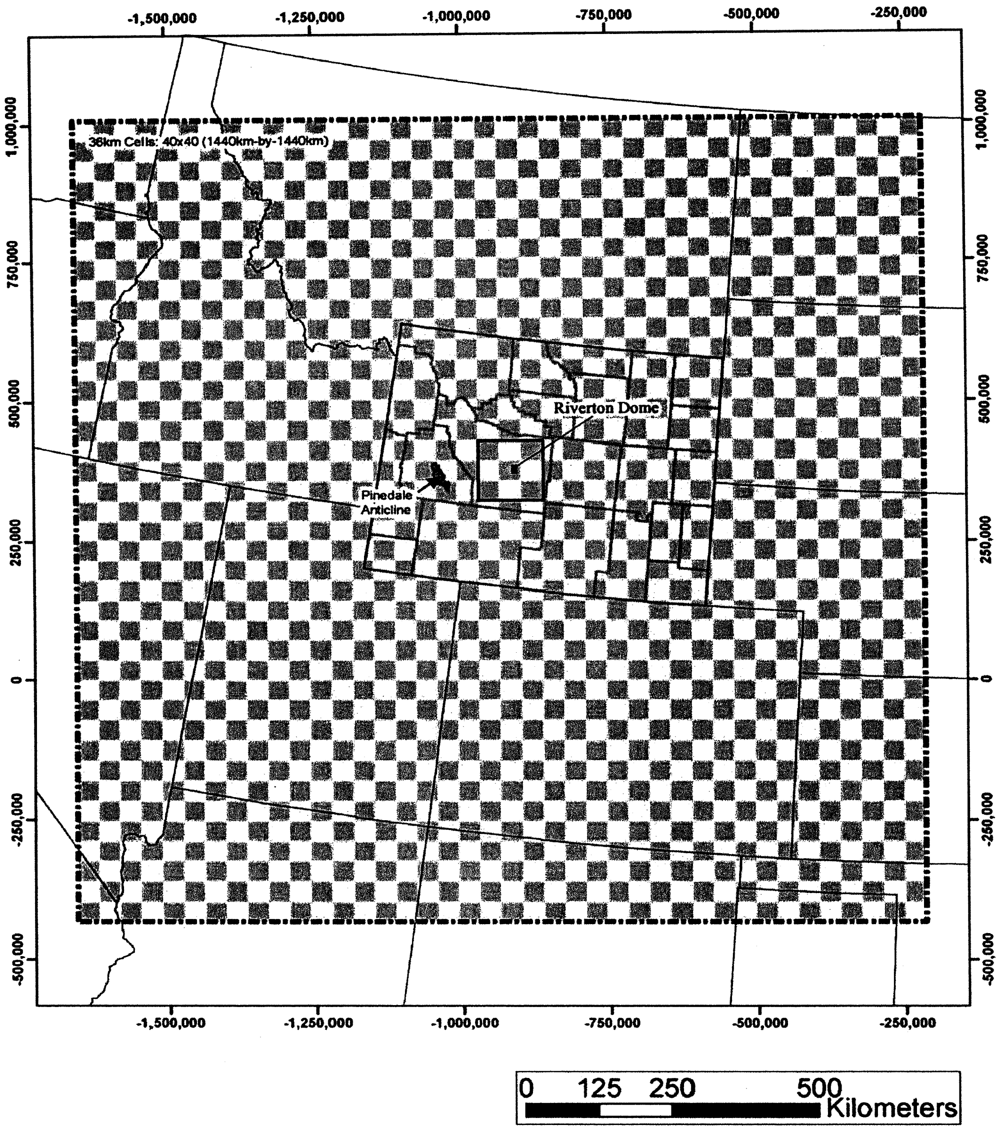
Figure 6-2. CALGRID Modeling Domain



Map Projection: LCC. Standard Parallels: 33°N, 45°N. Center: 40°N, 97°W. NWS-84 (Spherical Earth: Radius = 6370 km)

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7.0 CUMULATIVE EFFECTS

Sources within 50 kilometers of the RD Project Area were included with the RD Project emissions for the near-field air quality cumulative analysis. Sources were obtained from the State of Wyoming (Kelly Bott, WDEQ April 4, 2007 via email). The other source was the Wind River EIS (BIA 2004). The cumulative emissions are shown in **Tables 7-1 and 7-2**.

The cumulative emissions were added to the Riverton Dome Proposed Action emissions (described in Section 6). The incremental cumulative effect of the other sources in addition to the Riverton Dome sources is very small. Results are presented in **Table 7-3.**

Table 7-1. Riverton Dome Cumulative Point Sources

Source	UTM easting	UTM northing	Elevation (m)	Stack Height (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)	Stack Diameter (m)	NO_x (tons/ year)	CO (tons/ year)	PM_{10} (tons/ year)	$PM_{2.5}$ (tons/ year)	SO_2 (tons/ year)
Wind River Compressor	696600	4790560	1615	9.1	811	25	0.3038	31.87	63.73	0	2.25	0
Wind River Compressor	699450	4792200	1614	9.1	811	25	0.3038	16.42	32.83	0	1.16	0
Wind River Compressor	697950	4794950	1654	9.1	811	25	0.3038	43.45	86.9	0	3.06	0
Wind River Compressor	722050	4782150	1549	9.1	811	25	0.3038	16.42	32.83	0	1.16	0
Wind River Compressor	734850	4788000	1614	9.1	811	25	0.3038	36.69	73.39	0	2.59	0
Wind River Compressor	715975	4798000	1515	9.1	811	25	0.3038	99.46	198.92	0	7.01	0
Wind River Compressor	715125	4795469	1510	9.1	811	25	0.3038	46.35	92.7	0	3.27	0
Wind River Compressor	705976	4799569	1550	9.1	811	25	0.3038	26.07	52.14	0	1.84	0
Wind River Drill Rigs	695219	4788429	1575	7.6	800	50	0.1	43.47	9.96	0.73	0.7	
Wind River Drill Rigs	695219	4791194	1575	7.6	800	50	0.1	43.47	9.96	0.73	0.7	
Wind River Drill Rigs	709100	4791194	1575	7.6	800	50	0.1	43.47	9.96	0.73	0.7	
Wind River Drill Rigs	709100	4788429	1575	7.6	800	50	0.1	43.47	9.96	0.73	0.7	
Castle Garden 21-43	766144	4755174	1565	4.6	700	1.6	0.3048	3.5	5.3	0	0	0
Fuller Compressor Station	742857	4777110	1565	9.1	811	25	0.3038	2.7	2.7	0	0	0
Haymaker 13-22	726713	4780358	1565	4.6	700	1.6	0.3048	1.9	1.9	0	0	0
Ocla Draw 7-42	750523	4786859	1565	4.6	700	1.6	0.3048	1.7	2.6	0	0	0
Ocla Draw 8-32	751779	4786613	1565	4.6	700	1.6	0.3048	1.5	1.2	0	0	0

Source	UTM easting	UTM northing	Elevation (m)	Stack Height (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)	Stack Diameter (m)	NO_x (tons/ year)	CO (tons/ year)	PM_{10} (tons/ year)	$PM_{2.5}$ (tons/ year)	SO_2 (tons/ year)
S. Sand Draw 11-36	723067	4790603	1565	4.6	700	1.6	0.3048	1.1	1.1	0	0	0
Tribal Pavillion 23-2 Pad	693887	4792865	1565	4.6	700	1.6	0.3048	1	0.2	0	0	0
Beaver Creek Separators	718300	4751840	1858	4.6	700	1.6	0.3048	0.9	0.7	0	0	0
Pollutant Totals								504.91	688.98	2.92	25.14	0

Table 7-2. Riverton Dome Cumulative Area Sources

Source	UTM e	UTM n	Elevation (m)	Release Height (m)	x length (m)	y length (m)	NOx (tons/year)	CO (tons/year)	PM10 (tons/year)	Pm2.5 (tons/ year)	SO2 (tons/ year)
Wind River EIS	688279	4787046	1586	3	27761.5	5530	27.287	45.396	2104.377	571.833	0
Beaver Creek EA	716937	4750437	1858	3	3301	2490	0	0	4.8	0.8	0
Pollutant Totals							27.287	45.396	2109.177	572.633	0

Table 7-3. RD Proposed Action vs. Cumulative Impact Comparison

Pollutant	Averaging Time	Proposed Action Maximum Predicted Impact ($\mu g/m^3$)	Proposed Action plus Cumulative Sources Maximum Predicted Impact ($\mu g/m^3$)	Proposed Action plus Cumulative Sources Maximum Predicted Impact plus Background[a] ($\mu g/m^3$)	% of NAAQS
NO_2	Annual	1.14	1.17	4.57	4.6%
CO	1-hour	22.2	27.7	3363.7	8.4%
	8-hour	6.5	6.7	1387.7	13.9%
PM_{10}	Annual	2.2	2.5	18.5	37.0%
	24-hour	10.1	11.4	44.4	29.6%
$PM_{2.5}$	Annual	0.37	0.44	5.44	36.3%
	24-hour[b]	1.5	2.1	15.1	23.2%
SO2	Annual	0.008	.009	9.009	11.3%
	24-hour	0.11	0.11	43.11	11.8%
	3-hour	0.34	0.34	132.34	10.2%

[a] with NO_2 annual background 3.4 $\mu g/m^3$
[a] with PM_{10} 24-hour background 33 $\mu g/m^3$
[a] with PM_{10} Annual background 16 $\mu g/m^3$
[a] with $PM_{2.5}$ 24-hour background 13 $\mu g/m^3$
[a] with $PM_{2.5}$ annual background 5 $\mu g/m^3$
[a] with CO 1-hour background 3,336 $\mu g/m^3$
[a] with CO 8-hour background 1,381 $\mu g/m^3$
[a] with SO_2 3-hour background 132 $\mu g/m^3$
[a] with SO_2 24-hour background 43 $\mu g/m^3$
[a] with SO_2 Annual background 9 $\mu g/m^3$

8.0 REFERENCES

Buys & Associates. 2007a. Emissions Inventory for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Development Draft EIS. Prepared for Bureau of Indian Affairs, September 2007.

Buys & Associates. 2007c. Far-Field Air Quality Technical Support Document for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Development Draft EIS. Prepared for Bureau of Indian Affairs, September 2007.

BIA 2004. Emissions Inventory for the Wind River Natural Gas Development Project, prepared for Bureau of Indian Affairs, Wind River Agency, Fort Washakie, Wyoming, March 2004.

Kelly Bott 2007. personal communication, Kelly A. Bott, Engineer Wyoming Department of Environmental Quality/Air Quality Division, State of Wyoming. (307)777-6088, April 2007.

U.S. Environmental Protection Agency (EPA). 1997. Exposure Factors Handbook Update. EPA/600/P-95/002Fa. Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C. 1997.

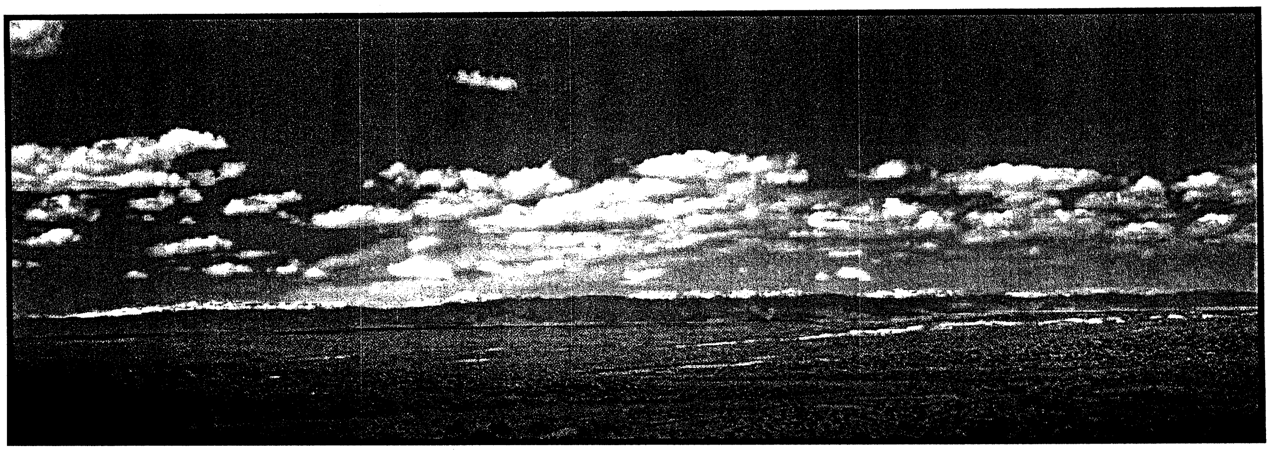
U.S. Environmental Protection Agency (EPA). 2002a. Dose-Response Assessment for Assessing Health Risks Associated with Exposure to Hazardous Air Pollutants. Tables 1 and 2. Available online at: http://www.epa.gov/ttnatw01/toxsource/

U.S. Environmental Protection Agency (EPA). 2002b. Health Assessment Document for Diesel Engine Exhaust. Prepared by the National Center for Environmental Assessment, Washington, DC, for the Office of Transportation and Air Quality; EPA/600/8-90/057F. Available from: National Technical Information Service, Springfield, VA;PB2002-107661, and <http://www.epa.gov/ncea>.

U.S. Environmental Protection Agency (EPA). 2003. Integrated Risk Information System (IRIS) database Available online at: http://www.epa.gov/iris/subst/index.html

FAR-FIELD
AIR QUALITY TECHNICAL SUPPORT DOCUMENT

RIVERTON DOME
COAL BED NATURAL GAS AND
CONVENTIONAL GAS DEVELOPMENT
DRAFT ENVIRONMENTAL IMPACT STATEMENT



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September 2007

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APPENDICES

1.0 INTRODUCTION

This report describes the process used to develop the Far-Field Air Quality Technical Support Document (AQTSD) for the Bureau of Indian Affairs (BIA), Wind River Agency, Environmental Impact Statement (EIS) for Riverton Dome Coal Bed Natural Gas and Conventional Gas Development Project (RD). The Riverton Dome Project Area (RDPA) is located approximately 5 miles southeast of Riverton, Wyoming (see **Figure 1-1**). Surface ownership of the 13,804 acres in the RDPA is in the project area is approximately 92 percent Tribal surface/Tribal minerals managed by the Bureau of Indian Affairs and 8 percent fee surface/fee minerals.

This document provides a detailed description of the procedures applied for the EIS analysis to quantify potential ambient air quality and air quality related values (AQRV) impacts that may result from the implementation of the RD project alone and in conjunction with other cumulative sources of air pollutant emissions.

This Far-Field AQTSD is one of three documents that support the air quality analysis presented in the EIS. The other supporting documents are the the Emissions Inventory for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Development Project (Buys and Associates 2007a) and theNear-Field Air Quality Technical Support Document for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Development Project (Buys and Associates 2007b).

1.1 OVERVIEW OF APPROACH

The RD far-field air quality assessment was performed in accordance with a written protocol defining methodologies designed to quantify potential air quality impacts from the proposed RD project and surrounding development. This protocol was prepared by Buys and Associates with refinements resulting from review and input from the Bureau of Indian Affairs, U.S. Environmental Agency Region 8, Wyoming Department of Environmental Quality Air Quality Division, U.S. Forest Service, National Park Service, and Project proponents. This procedure ensured that the air quality assessment methodology was technically acceptable to all parties providing input.

Potential ambient air quality impacts that could result upon implementation of the Project were assessed at two different distance scales. The Far-Field analysis is focused on project related and cumulative impacts upon areas of special concern (i.e., Federally designated Class I areas and areas sensitive Class II areas). The near-field analysis is focused on potential impacts for all areas within and within 50 kilometers of RD Project area.

To assess potential far-field impacts, the CALPUFF set of models were applied. The CALPUFF set of models (CALMET, CALPUFF, CALPOST, and associated utilities) were designed specifically to assess ambient air quality impacts at significant distances from the source and therefore long pollutant travel times. Another far-field analysis has recently been completed for the Draft Supplemental Pinedale Anticline Oil and Gas Exploration Environmental Impact Statement (BLM 2006). BLM provided copies of the models and data used for the Pinedale project and this information was used in the Riverton Dome analysis to ensure consistency with the nearby Pinedale analysis and because the data has been peer-reviewed for accuracy and completeness. The same set of models, meteorology and modeling grid were used for the RD project. These models included the CALMET34, CALPUFFC, and CALPOSTLCA all recompiled for the Pinedale project.

The CALPUFF set of models were applied for meteorological calendar years 2001, 2002, and 2003 and included cumulative impacts from the RD project sources, permitted sources, sources associated with reasonably foreseeable development, and sources associated with reasonably foreseeable future actions. The predicted pollutant concentrations were compared to the National Air Quality Standards (NAAQS) and to the Prevention of Significant Deterioration (PSD) Class I and II increments for informational purposes only. In addition, the predicted concentration and deposition results were processed to evaluate potential visibility and acid deposition impacts for comparison with the Federal Land Manager (FLM) Limits of Acceptable Change (LAC). The results of the CALPUFF analysis for the Proposed Action and Alternatives are provided in Section 6.

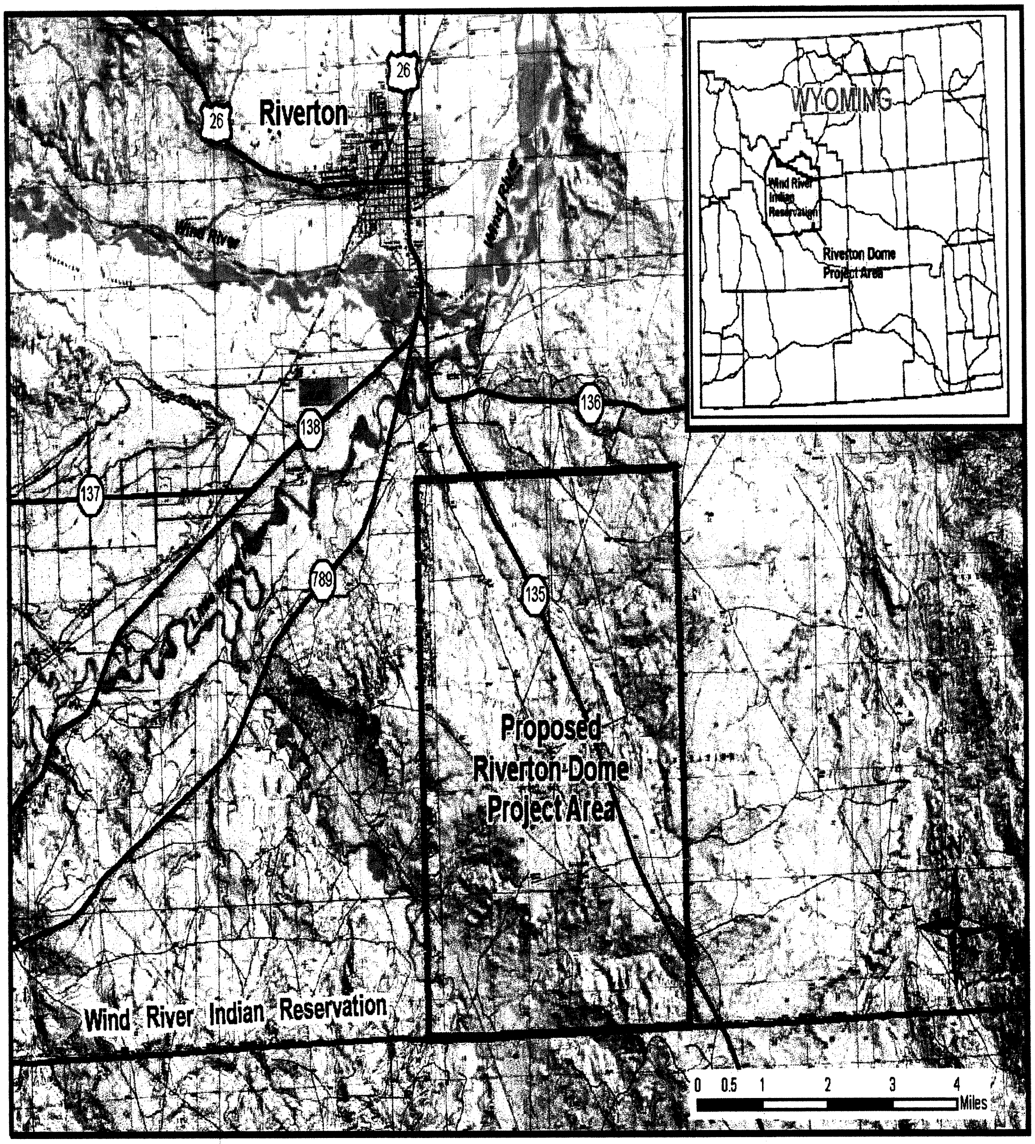

Figure 1-1. Location of Riverton Dome Project Area, Wind River Indian Reservation, Freemont County, Wyoming

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2.0 PROJECT DESCRIPTION

The existing wells in the RD Field include 30 producing conventional gas wells, 6 producing oil wells, 13 existing CBNG wells, and a road network of 53 miles. Current compression is 4,243 horsepower gas-fired engines at the Riverton Dome Gas Plant.

A pilot well program was approved in 2005 to evaluate the commercial quantities of CBNG, the amount and decline rate of produced water, and whether 80-acre spacing would be adequate. Currently, 10 CBNG wells have been drilled and are producing CBNG.

Devon proposes that 326 CBNG and 20 conventional wells could be developed over a 10-year period at an average rate of 33 CBNG wells and two conventional wells annually. Ancillary facilities would include 79 miles of new pipeline co-located with proposed roads and 9.8 miles of pipelines parallel to existing roads would be constructed within the RDPA. Gas and water pipelines from the wells to gathering system lines would average ¼ mile in length. Compressor engines would be added at the existing Riverton Dome Gas Plant such that compression would increase by 9,000 hp. No gas-fired field compression would be installed.

In addition to the Proposed Action, Alternative B is proposed to develop a mximum of 151 CBNG and 20 conventional wells over a 6-year period at the same development rate as the Proposed Action. Additionally, 53 miles of new pipeline co-located with proposed roads and 9.8 miles of pipelines parallel to existing roads would be constructed within the RDPA. Gas flowlines from the wells to gathering system lines would average 1,320 feet in length. Compressor engines would be added at the existing Riverton Dome Gas Plant such that compression would increase by 7,000 hp.

Since the majority of Alternative B development/operation impacts were equivalent to the Proposed Action impacts, no additional modeling beyond the Proposed Action was necessary.

Emissions from the Riverton Dome project would consist of the criteria pollutants nitrogen oxides (NO_x), carbon monoxide (CO), particulates (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and volatile organic compounds (VOC), and various hazardous air pollutants (HAP). These pollutants would be emitted from the following activities and sources:

- Well pad and road construction: equipment producing fugitive dust while moving and leveling earth;
- Drilling: drill rig engine exhaust and vehicles generating fugitive dust on access roads;
- Completion: vehicles generating fugitive dust on access roads;
- Vehicle tailpipe emissions associated with all development phases;
- Central production facility: compressor engine emissions.

The derivation of the emission rates applied for this analysis is detailed separately in the Emissions Inventory for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Development Project (Buys and Associates 2007a).

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3.0 METEOROLOGICAL MODELING

A far-field analysis was recently completed for the Draft Supplemental Pinedale Anticline Oil and Gas Exploration Environmental Impact Statement (BLM 2006). BLM provided copies of the models and data used for the Pinedale project and this information was used in the Riverton Dome analysis to ensure consistency with the nearby Pinedale analysis and because the data has been peer-reviewed for accuracy and completeness. The same set of models, meteorology and modeling grid were used for the RD project. These models included the CALMET34, CALPUFFC, and CALPOSTLCA, all recompiled for the Pinedale project.

The CALPUFF set of models were applied for meteorological calendar years 2001, 2002, and 2003 and included cumulative impacts from the RD project sources, permitted sources, sources associated with reasonably foreseeable development, and sources associated with reasonably foreseeable future actions.

3.1 MODEL DOMAIN

The initial step in the far-field analysis is determining the extent of the study area domain and performing the meteorological modeling. For this study, the study area domain was developed to be consistent with the Pinedale analysis. The far-field analysis domain is presented in **Figure 3-1**. The meteorological, computational and sampling grid sizes are all 524 km x 552 km (131 x 138 cells, 4 km spacing). The domain was the same as for the Pinedale analysis with one exception. The Riverton Dome analysis was extended 50 kilometers east to extend to an additional 50 km beyond the most distant Class II area. The domain is on a Lambert Conformal Conic projection (LCC), with a first and second standard latitude parallels at 30 degrees and 60 degrees. The reference latitude and longitude were chosen to coincide with the Pinedale analysis and defined the origin of the Lambert conformal projection coordinates (-232, -272) at 43.05° N, 109.80° W). The middle of the domain (0, 0) was again chosen to coincide with the Pinedale analysis.

3.2 METEOROLOGICAL, TERRAIN, AND LAND USE DATA

Three years of CALMET wind field data were developed and used for the modeling analysis. The years 2001, 2002, and 2003 MM5 data were provided by BLM. These three years were developed by EPA for a Regional Planning Organization and have undergone significant QA/QC verification and peer review, and are the most recent available consecutive three years of prognostic data. The MM5 data sets that were used include year 2001 data processed at 36-km spacing for EPA (Alpine Geophysics, LLC 2003), year 2002 data processed at 36-km spacing for WRAP (Western Regional Air Program) (Environ 2005), and year 2003 data processed at 36-km spacing for the Midwest RPO (Baker 2005).

The following files were used exclusively from the Pinedale analysis. Surface meteorology data for sites throughout the modeling domain were obtained from the National Climatic Data Center (NCDC) integrated surface observation data sets and the Clean Air Status and Trends Network (CASTNET) sites. Additionally, upper air data and precipitation data were obtained from NCDC. The complete listing of the surface, precipitation and upper air stations are shown below.

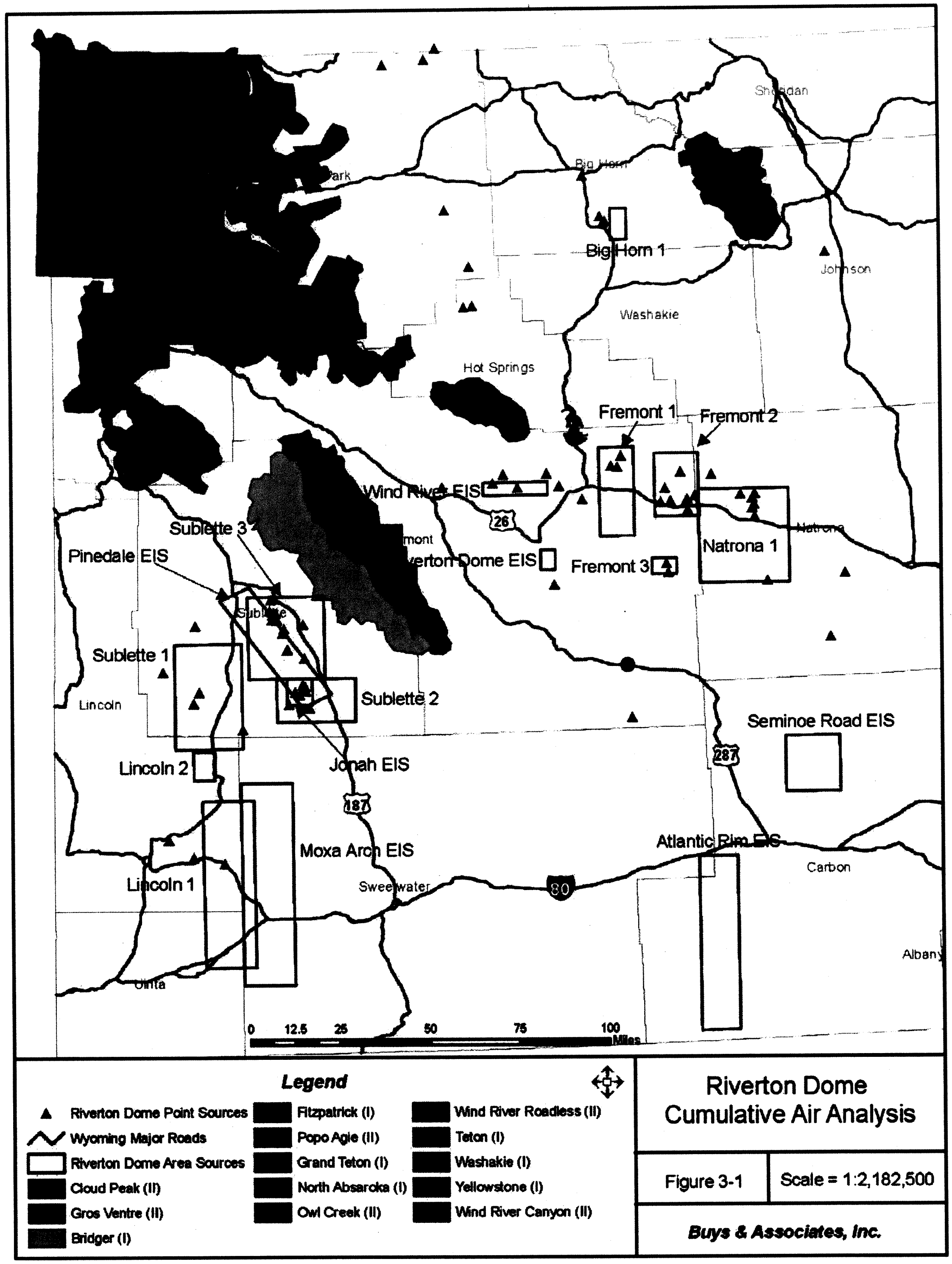
3.2.1 Terrain and Land Use Data

In order to refine the local wind fields, CALMET requires land use and terrain data. Land use and terrain data as developed by United States Geological Survey (USGS) are available for download for various 1-degree quadrangles (1:250,000 scale).

The terrain data were derived from 3-arc second (approximately 90-meter spacing) digital elevation model (DEM) produced by the United States Geological Survey (USGS).

The land use data was provided by BLM after being derived from USGS Composite Theme Grid (CTG) data that are provided with a resolution of 200 meters. The USGS land use data contains 38 different use categories, while the CALMET model is capable of utilizing only 14 use categories. Therefore, a cross-reference was applied to the USGS land use categories to format the data for use in CALMET. Land use categories were defined according the default parameters in CALMET pre-processing utilities. The USGS 200-meter grid data were overlain on the CALMET 4-km by 4-km grid, and the predominant land use type was selected to represent land use for the 4 km cell.

Figure 3-1. Modeling Domain



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Wind speed and wind direction data from observation stations were only allowed to influence the Step 1 wind field at a distance determined by setting the radius-of-influence parameter. The maximum radius of influence for surface (RMAX1) and upper air stations (RMAX2) was set to 20 km and 500 km, respectively. The distance from an observation station at which the observations and Step 1 wind field were equally weighted was set to 4 km for the surface layer (R1) and 10 km for layers aloft (R2). Radius of influence for terrain features (TERRAD) was set to 12 km.

3.3 CALMET METEOROLOGICAL MODELING

To develop the final wind field, stability class, precipitation, and other data needed by CALPUFF, the MM5, upper air, terrain, land use, surface meteorology, and precipitation data are all input into the CALMET model. When running the CALMET model, the user must select among a number of options through the CALMET input control file. The options within CALMET were set in accordance with the Interagency Workgroup on Air Quality Modeling (IWAQM) guidelines. Separate CALMET runs were conducted on a monthly basis for years 2001, 2002, and 2003. An example of the CALMET control file used for the January 2003 simulation is presented in **Appendix A**.

Table 3-1. Surface Meteorological Stations for Riverton Dome CALMET

Station Name	Station Identifier	Lambert Conformal X	Lambert Conformal Y
Pocatello, ID	KPIH	-218.401	-10.5105
Idaho Falls, ID	KIDA	-177.123	52.6585
Malad City, ID	KMLD	-198.548	-93.6136
Soda Springs, ID	KU78	-141.388	-41.3921
Rexburg, ID	KRXE	-155.419	86.02029
Rock Springs, WY	KRKS	59.16297	-155.548
Rawlins, WY	KRWL	209.1222	-130.919
Lander Hunt Field, WY	KLND	84.37669	-24.4643
Riverton, WY	KRIW	104.9627	2.69977
Evanston/Burns Field, WY	KEVW	-100.068	-190.862
Jackson Hole, WY	KJAC	-72.8003	59.48678
Johnson County Airport, WY	KBYG	237.2717	147.6913
Sheridan County Airport, WY	KSHR	216.5815	188.173
Yellowstone Lake, WY	P60	-47.358	161.2307
Worland, WY	KWRL	143.4329	100.1222
South Big Horn County, WY	KGEY	131.8567	158.92
Cody, WY	KCOD	60.13412	157.8
Big Piney, WY	KBPI	-23.8181	-50.1201
West Yellowstone, MT	KWEY	-99.6043	172.5908
Yellowstone, MT	KWYS	-100.848	176.1538
Billings, MT	KBIL	93.84694	295.9519
Dillon Airport, MT	KDLN	-208.458	239.764
Bozeman, MT	KBZN	-102.661	294.2709
Livingston, WY	KLVM	-47.6101	284.6734

Station Name	Station Identifier	Lambert Conformal X	Lambert Conformal Y
Craig-Moffat, CO	KCAG	187.6206	-271.501
Hayden/Yampa, CO	KHDN	209.556	-270.839
Logan-Cache Airport, CO	KLGU	-164.942	-134.031
Vernal, UT	KVEL	20.5709	-281.358
Salt Lake City, UT	KSLC	-177.265	-241.312
Ogden-Hinckley, UT	KOGD	-180.112	-196.346
Hill Air Force Base, UT	KHIF	-176.292	-205.384
Yellowstone, WY	CASTNET	-46.1218	162.2947
Pinedale, WY	CASTNET	0.9474	-12.9961
Jonah Field (BP), WY	BP	17.81917	-62.4956

Note: Lambert Conformal X is east and west

Lambert Conformal Y is north and south.

4.0 CALPUFF DISPERSION MODELING

The CALPUFF model utilizes the CALMET meteorological output in addition to emission source data and an extensive set of control parameters to calculate ambient concentrations of pollutants at each model receptor. An example CALPUFF input file (for RD Proposed Action Sources 2001) is presented in **Appendix B**. The CALPUFF input parameters utilized follow the IWAQM guidelines.

4.1 MODEL RECEPTORS

One of the primary inputs to the CALPUFF model is the receptor locations. For the RD analysis, the standard set of receptors for each Class I and sensitive Class II area were applied. Individual receptors were utilized in the model to represent seven high elevation lakes identified for acid deposition analysis.

The areas of special concern are shown on **Figure 3-1** and listed in **Table 4-1**.

Table 4-1. Identified Areas of Special Concern

Area of Special Concern	Managing Agency	PSD Classification
Bridger Wilderness Area	US Forest Service	I
Fitzpatrick Wilderness Area	US Forest Service	I
Grand Teton National Park	National Park Service	I
North Absaroka Wilderness Area	US Forest Service	I
Teton Wilderness Area	US Forest Service	I
Washakie Wilderness Area	US Forest Service	I
Yellowstone National Park	National Park Service	I
Cloud Peak Wilderness	US Forest Service	II
Popo Agie Wilderness Area	US Forest Service	II
Wind River Canyon	Bureau of Indian Affairs	II
Phlox Mountain	Bureau of Indian Affairs	II
Owl Creek Mountains	Bureau of Indian Affairs	II
Gros Ventre Wilderness Area	US Forest Service	II
Wind River Roadless Area	Bureau of Indian Affairs	II

The high elevation lakes identified for analysis were as follows:

Table 4-2. Special Concern Lakes

Lake	Area of Special Concern
Black Joe	Bridger Wilderness
Deep Lake	Bridger Wilderness
Emerald Lake	Cloud Peak Wilderness
Florence Lake	Cloud Peak Wilderness
Hobbs	Bridger Wilderness

Lake	Area of Special Concern
Lower Saddlebag	Popo Agie Wilderness
Ross	Fitzpatrick Wilderness
Stepping Stone	Absaroka-Beartooth
Twin Island	Absaroka-Beartooth
Upper Frozen	Bridger Wilderness
Lazyboy	Bridger Wilderness

Source: U.S. Department of Agriculture, Forest Service 2003.

4.2 OTHER CALPUFF CONSIDERATIONS

In addition to the meteorological data and receptor grids previously described, CALPUFF requires an ozone data file for use with the chemical transformation module. The ozone data utilized for this analysis made use of hourly data collected at Pinedale, WY, Centennial, WY, Yellowstone National Park, WY, Craters of the Moon National Park, ID, and Highland, UT Clean Air Status and Trends Network (CASTNet) ozone monitors.

A background ammonia concentration is also required for the chemical transformation calculations. The default ammonia concentration for arid lands of 1 ppb was assumed for the CALPUFF model.

Seven pollutant species were modeled in the analysis, with four species being emitted from sources and three species being computed internally by the model. The emitted and computed species were as follows:

- SO_2 (emitted)
- SO_4 (computed)
- NO_x (emitted)
- HNO_3 (computed)
- NO_3 (computed)
- PMC (emitted) [particulates less than 10 microns and greater than 2.5 microns in diameter)
- $PM_{2.5}$ (emitted) [particulates less than 2.5 microns in diameter]

In order to bracket impacts, the CALPUFF model was applied individually for three emission source groups. The three sets of CALPUFF runs were as follows:

- RD Proposed Action,
- RD Proposed Action and cumulative sources (permitted and NEPA projects),
- Cumulative negative emission sources.

The output files from each of the above listed model runs were subsequently post-processed to obtain the results. Since CALPUFF does not permit negative emissions, the negative cumulative sources output files were subtracted from the positive output files using the CALSUM post-processing program.

5.0 EMISSIONS

5.1 PROPOSED ACTION EMISSIONS

The complete derivation of the Proposed Action emissions is shown in the Emissions Inventory for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Development Project (Buys and Associates 2007a). The summary of the Proposed Action emissions is shown below in table 5-1. The well development emissions include those from vehicle and construction equipment exhaust, fugitive dust generated by construction activities and from travel on project roads, drill rig engines, and completion rig engines. Production emissions occur from well pad heaters for separation, vehicle tailpipe exhaust, and the increased compressor engines at the Riverton Dome Gas Plant.

Table 5-1. RDPA Annual Emissions for the Proposed Action

Pollutant	Project Emissions (tons/year)		Total Emissions (tons/year)
	Well Development	Project Production	
Criteria Pollutants & VOC			
NO_x	69.4	134.5	203.8
CO	20.1	48.1	68.2
VOC	2.7	85.4	88.0
SO_2	1.7	0.0	1.7
PM_{10}	226.5	13.3	239.8
$PM_{2.5}$	37.0	5.0	42.0

Note: CO and VOC emissions are shown for information only. These pollutants are not considered in the CALPUFF analysis.

For the CALPUFF emission input data, the following method was applied:

- All compressor engines emissions were placed at the location of the Riverton Dome Gas Plant.
- Drill rig engines emissions were placed at the center of four equal area quadrants of the RDPA. Twenty-five percent of the annual emissions were placed at each location.
- Completion rig engines emissions and heater separator emissions were apportioned in the same manner as the drill rig engine emissions.
- All fugitive emissions were equally apportioned to the four quadrants of the RDPA.

5.2 CUMULATIVE EMISSIONS

Two sources of cumulative emissions were gathered. The first was sources permitted by the State of Wyoming after January 1, 2005. The second source of data was from NEPA projects that have either been approved or are at a state of development such that project emissions can be estimated.

5.2.1 Permitted Sources

The first source of data was received from the State of Wyoming (Kelly Bott, WDEQ April 4, 2007 via email). All permits, waivers and modifications in Lincoln, Sublette, Fremont, Natrona, Johnson, Hot Springs, Park, Big Horn, Washakie and Teton Counties were included. The original list included 1,635 sources. The data was filtered according to the following criteria:

- All sources outside of the domain were eliminated.
- All point sources greater than five tons/year and decreases greater than five tons/year were individually included.
- Since the CALPUFF model does not accept the negative emissions as a result of either decreased emissions or closure of facilities, the negative emission sources shown in Table 5-3 were included in a separate CALPUFF run.

Stack parameters were not included in the email. Therefore, Buys and Associates inspected the permit files at Cheyenne, Wyoming. Only one of the sources included stack parameters. Therefore, the stack parameters were estimated based on the type of equipment listed in the permit files. This resulted in the final tally of 71 individual sources listed in **Table 5-2**.

Table 5-2. Cumulative Point Sources (from WDEQ)

Company	Facility	NO_x tons/year	PM_{10} tons/year	SO_x tons/year	Latitude or UTM easting	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
US Bentonite Processing, Inc.	Arminto Plant	223.6	69.8	131.8	315500	4783100	21.3	1.22	13.2	380.0
Jonah Gas Gathering Company	Bridger Compressor Station	196.4			606799	4697237	6.7	0.3048	133.5	725.6
Williams Field Services Company	Opal Gas Plant	118.7			41.79381	110.30447	6.7	0.3048	133.5	725.6
Jonah Gas Gathering Company	Paradise Compressor Station	74.4			42.71361	109.6925	6.7	0.3048	41.3	722.2
Noble Energy Inc.	Iron Horse Compressor Station	63.2					6.7	0.3048	41.3	722.2
McMurry Ready Mix	Portable Diesel Generator	61.7			42.59174	-106.81714	5.0	0.3048	32.5	939.0
American Colloid Company	Lovell Plant	59.1	-48.6	0.2	43.18782	-108.14207	12.2	1.9	14.7	429.8
Jonah Gas Gathering Company	Luman Compressor Station	49.6			42.38028	109.6625	6.7	0.3048	133.5	725.6
Jonah Gas Gathering Company	Bird Canyon/County Line Compressor Station	49.5			42.29722	-110.03056	6.7	0.3048	133.5	725.6
Cole Lumber & Construction Company	Red Desert 1 Mine	44.2	0.3		42.30595	-107.91854	6.7	0.3048	35.6	733.3
Voyager Exploration Incorporated	Silvertip Field Production Facility	41.4			662768	4981548	6.7	0.3048	133.5	725.6
Encana Energy Resources Inc.	Hendry Station	40.4			43.1595	107.5751	6.7	0.3048	41.3	722.2

Company	Facility	NO_x tons/ year	PM_{10} tons/ year	SO_x tons/ year	Latitude or UTM easting	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
Bill Barrett Corporation	Poison Creek Compressor Station	39.4			291445	4778257	6.7	0.3048	41.3	722.2
Bill Barrett Corporation	Cave Gulch Gas Conditioning Plant	38.8			320500	4776500	6.7	0.3048	40.1	720.6
Bill Barrett Corporation	Bull Frog 14-18	38.8			43.089	-107.19758	6.7	0.3048	41.3	722.2
Bill Barrett Corporation	Cave Gulch #24 Compressor Station	38.8			321279	4778149	6.7	0.3048	41.3	722.2
Bill Barrett Corporation	Cave Gulch 1-29	38.8			43.17972	-107.19197	6.7	0.3048	41.3	722.2
Bill Barrett Corporation	Sellers Draw Compressor Station	38.8			44.12901	-108.72098	6.7	0.3048	41.3	722.2
Encana Oil & Gas (USA), Inc.	Moneta Compressor Station	38.8			43.16249	-107.70918	6.7	0.3048	41.3	722.2
Enterprise Products	Pioneer Cryogenic Gas Plant	37.5			41.79381	-110.30447	15.2	0.2	0.1	811.0
Encana Oil & Gas (USA), Inc.	Midway Compressor Station	36.9			697150	4796500	6.7	0.3048	41.3	722.2
Bill Barrett Corporation	Hitchcock Draw	35.6			303068	4792891	6.7	0.3048	41.3	722.2
Williams Field Services Company	Moxa North Compressor Station	32.3			41.7677	-110.13785	6.7	0.3048	133.5	725.6
Encana Oil & Gas (USA), Inc.	Frenchie Draw Satellite/Graham West Station	21.5			291740	4782950	6.7	0.3048	41.3	722.2
Western Gas Resources, Inc.	Lysite Interconnect	21.2			289592	4794929	6.7	0.3048	41.3	722.2

Company	Facility	NO_x tons/ year	PM_{10} tons/ year	SO_x tons/ year	Latitude or UTM easting	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
Nance Petroleum Corporation	SRMGU 27-32	20.2			42.82972	-107.14444	6.7	0.3048	41.3	722.2
Bentonite Performance Minerals, LLC	Lovell Plant	20.1	0	0	44.82742	-108.15625	6.7	0.3048	41.3	722.2
AKA Energy Group LLC	Waterfall Compressor Station	19.6			41.86374	110.4365	6.7	0.3048	41.3	722.2
Noble Energy Inc.	Iron Horse Compressor Station	19.6			281979	4788185	4.6	0.3048	1.6	700.0
Encana Oil & Gas (USA), Inc.	GBU Monita 1 Central	19.4			43.16818	-107.65462	6.7	0.3048	41.3	722.2
Encana Oil & Gas (USA), Inc.	GBU Monita 1 Central	19.4			43.16818	-107.65462	6.7	0.3048	6.3	813.3
Encana Oil & Gas (USA), Inc.	Glasner Compression Facility	18.8			42.878	-107.68566	6.7	0.3048	40.1	720.6
Encana Oil & Gas (USA), Inc.	Castle Gardens Compression Facility	18.8			42.91558	107.6926	6.7	0.3048	41.3	722.2
Encana Oil & Gas (USA), Inc.	Bushwacker Compression Facility	18.8			43.2943	108.3305	12.2	1.9	14.7	429.8
Bighorn Basin Ethanol, LLC	Greybull Plant	18.5	66.5		44.48138	-108.06507	6.7	0.3048	41.3	722.2
Encana Oil & Gas (USA), Inc.	Five Mile Creek Booster Station	18.3			692335	4792662	6.7	0.3048	41.3	722.2
Encana Oil & Gas (USA), Inc.	South Pavillion Booster Station	18.3			43.24442	-108.26769	6.7	0.3048	35.6	733.3

Company	Facility	NO_x tons/ year	PM_{10} tons/ year	SO_x tons/ year	Latitude or UTM easting	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
Jonah Gas Gathering Company	Paradise Compressor Station	18.1			42.71361	109.6925	6.7	0.3048	41.3	722.2
Forest Oil Corporation	Elm Federal No. 23-12	17.1			42.395	109.7747	6.7	0.3048	35.6	733.3
Windsor Energy Group, LLC	Bennett Creek Central Station	16.8			44.95262	-109.16856	6.7	0.3048	41.3	722.2
Rock Well Petroleum	Poison Spider	14.7			42.84432	106.7208	6.7	0.3048	133.5	725.6
Williams Field Services Company	Opal Gas Plant	12			41.79381	-110.30447	6.7	0.3048	35.6	733.3
Questar Gas Management Company	Mesa Well 15-6 CDP	10.6		0.4	42.77158	-109.87258	4.6	0.3048	1.6	700.0
KCS Mountain Resources Incorporated	Manderson 41-19	10.2			44.29488	-107.95088	4.6	0.3048	1.6	700.0
McMurry Oil Company	Stud Horse Butte 10-33 PAD	9.5			42.71361	-110.28056	6.7	0.3048	35.6	733.3
Shell Rocky Mountain Production Company LLC	Big Piney Injection Facility	9.4			42.45071	-110.25998	4.6	0.3048	1.6	700.0
McMurry Oil Company	Jonah Federal 5-7 PAD	8.2			42.44694	-109.74028	4.6	0.3048	1.6	700.0
McMurry Oil Company	Stud Horse Butte 15-35 PAD	8.2			42.44694	-109.68194	4.6	0.3048	1.6	700.0
Questar Exploration & Production Company	Mesa 7-21 PAD	7.8			42.7333	109.8361	4.6	0.3048	1.6	700.0
Questar Gas Management Company	Pinedale Liquids Gathering Burp Site M1	7			42.73333	-109.83333	15.2	0.2	3.8	840.0
Questar Gas Management Company	Pinedale Liquids Gathering Burp Site SP1	7			42.81667	-109.86667	15.2	0.2	3.8	840.0

Company	Facility	NO_x tons/ year	PM_{10} tons/ year	SO_x tons/ year	Latitude or UTM easting	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
Encana Oil & Gas (USA), Inc.	Haymaker 14-21	7			43.24208	-108.49452	4.6	0.3048	1.6	700.0
Questar Exploration & Production Company	Mesa 3-20 PAD	6.2			42.73611	-109.86111	21.3	1.6	15.2	811.0
Rock Well Petroleum	Greybull Field Project	6.2			44.4833	108.0639	6.7	0.3048	40.1	720.6
KCS Mountain Resources Incorporated	Little Grass Creek Unit	6.1			43.97191	-108.70801	4.6	0.3048	1.6	700.0
Questar Exploration & Production Company	Mesa 10-8 Pad	6			42.7561	109.855	4.6	0.3048	1.6	700.0
Delta Exploration Company, Inc.	Gates Butte Unit #10-17	6			43.35567	-107.91771	4.6	0.3048	1.6	700.0
Delta Exploration Company, Inc.	Diamond State 36-13	6			43.31145	-107.94154	4.6	0.3048	1.6	700.0
Delta Exploration Company, Inc.	Copper Mountain Unit #35-13	6			43.31463	-107.97748	4.6	0.3048	1.6	700.0
Delta Exploration Company, Inc.	Diamond State 36-31	6			43.31145	-107.94154	6.7	0.3048	31.7	698.3
Encana Oil & Gas (USA), Inc.	Frenchie Draw/Graham Unit Compressor Station	5.9			293144	4784145	6.7	0.3048	22.5	714.4
Ultra Resources Incorporated	Mesa 10-35 PAD	5.7			42.69866	-109.79579	4.6	0.3048	1.6	700.0
Pinedale Energy, LLC	Petrogulf State 36-1	5.7			42.6163	-109.77646	4.6	0.3048	1.6	700.0
Pinedale Energy, LLC	Petrogulf State 36-CPF (compressor station)	5.7			42.6133	-109.77839	4.6	0.3048	1.6	700.0
McMurry Oil Company	Stud Horse Butte 16-33 PAD	5.5			42.4332	109.716	4.6	0.3048	1.6	700.0

Company	Facility	NO_x tons/ year	PM_{10} tons/ year	SO_x tons/ year	Latitude or UTM easting	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
McMurry Oil Company	Stud Horse Butte 11-35 PAD	5.4			42.46361	-109.68556	4.6	0.3048	1.6	700.0
KCS Mountain Resources Incorporated	Manderson 34-12	5.3			44.31343	-107.97679	4.6	0.3048	1.6	700.0
Questar Exploration & Production Company	Mesa 11-9	5.1			42.7603	109.8404	6.7	0.3048	22.5	714.4
Shell Rocky Mountain Production Company LLC	Jensen 4 PAD	5.1			42.68028	-109.80333	4.6	0.3048	1.6	700.0
Encana Oil & Gas (USA), Inc.	GBU Monita 1 Central	5.1			43.16818	-107.65462	6.7	0.3048	22.5	714.4
Jonah Gas Gathering Company	Falcon Compressor Station	5			42.58028	-109.68722	6.7	0.3048	41.3	722.2

Table 5-3. Cumulative Negative Emissions Point Sources (from WDEQ)

Company	Facility	NOx tons/ year	PM10 tons/ year	Sox tons/ year	Latitude or UTM	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
Williams Field Services Company	Big Piney Compressor Station	-1452			42.40389	-110.29333	6.7	0.3048	22.5	714.4
Williston Basin Interstate Pipeline Company	Elk Basin Compressor Station	-468			45.01333	-108.86939	15.2	0.2	0.1	811.0
Encana Oil & Gas (USA), Inc.	Pavillion Compressor Station	-183			669525	4790877	1.8	0.3048	40.9	541.7
Williston Basin Interstate Pipeline Company	Billy Creek Compressor	-80.4			361520	4886923	6.7	0.3048	6.3	813.3

Company	Facility	NOx tons/ year	PM10 tons/ year	Sox tons/ year	Latitude or UTM	Longitude or UTM	Stk Ht (m)	Stk Dia (m)	Vel (m/s)	Tmp (K)
Infinity Oil & Gas of Wyoming	Riley Ridge Compressor Facility #1 and Pod Compressor	-18.3			42.52989	-110.45656	1.8	0.3048	30.7	541.7
KCS Medallion Resources Incorporated	Manderson Tank Battery	-16.6			44.28579	-107.95871	4.6	0.3048	1.6	700.0
Bill Barrett Corporation	Poison Creek Compressor Station	-12.7			291445	4778257	6.7	0.3048	41.3	722.2
Devon Gas Services, L.P.	Beaver Creek Gas Plant	-10.1			719797	4747136	6.7	0.3048	22.5	714.4
McMurry Oil Company	Jonah Federal 5-7 PAD	-8.5			42.44694	-109.74028	4.6	0.3048	1.6	700.0
Encana Oil & Gas (USA), Inc.	Frenchie Draw Satellite/Graham West Station	-6.8			291740	4782950	6.7	0.3048	35.6	733.3
Marathon Oil Company	Oregon Basin Gas Plant	-6.7	-0.1	0	44.36147	-108.84824	1.8	0.3048	19.4	513.9
Bill Barrett Corporation	Cave Gulch Gas Conditioning Plant	-6.5			320500	4776500	6.7	0.3048	22.5	714.4
Western Gas Resources, Inc.	Lysite Interconnect	-6			289592	4794929	6.7	0.3048	41.3	722.2
Encana Oil & Gas (USA), Inc.	Haymaker 14-21	-5.6			43.24208	-108.49452	4.6	0.3048	1.6	700.0
Moncrief Oil	Cave Gulch 30-1	-5.5	0		43.16306	-107.20694	4.6	0.3048	1.6	700.0

All sources between five tons/year and minus five tons/year (generally individual well sites) were plotted using Surfer and grouped into area sources. This resulted in the modeling of the area sources shown in **Table 5-4**.

Table 5-4. Cumulative Areas for Sources Less than 5 Tons/Year

County	Model Designation	Area (m^2)	Model Side x (km)	Model Side y (km)	Tons/Year (NOx)	Model Emission Rate Tons/m^2/Year
Sublette	SUB1	1,305,000,000	29	45	47.8	3.66E-08
Sublette	SUB2	629,000,000	34	18.5	199	3.16E-07
Sublette	SUB3	1,171,500,000	33	35.5	241.7	2.06E-07
Lincoln	LIN1	1,584,000,000	22	72	84.1	5.31E-08
Lincoln	LIN2	108,000,000	9	12	18.8	1.74E-07
Fremont	FRE1	570,000,000	15	38	20	3.51E-08
Fremont	FRE2	513,000,000	19	27	58.6	1.14E-07
Fremont	FRE3	77,000,000	11	7	87.1	1.13E-06
Natrona	NAT1	1,559,250,000	38.5	40.5	66.5	4.26E-08
Big Horn	BGH1	94,500,000	7	13.5	18.8	1.99E-07

5.2.2 NEPA Projects

The final type of cumulative sources was the NEPA projects that are in development or recently completed. Emission data was obtained from the Air Quality Technical Support Documents that are available on the Wyoming BLM website. The only exception was the Moxa Arch EIS. Since the Moxa Arch results have not yet been published, an input file for CALPUFF that contained the annual emission rates was provided at the permission of BLM from the air quality consultant ENVIRON (Ralph E. Morris, Principal, ENVIRON, rmorris@environcorp.com, (415) 899-0708), June 6,2007).

The following is a listing or documents used for the cumulative inventory.

- Emissions Inventory for the Wind River Natural Gas Development Project, prepared for Bureau of Indian Affairs, Wind River Agency, Fort Washakie, Wyoming, March 2004.
- Final Air Quality Technical Support Document for the Jonah Infill Drilling Project Environmental Impact Statement, prepared for Bureau of Land Management, Pinedale Field Office, Pinedale, Wyoming, January 2006.
- Air Quality Impact Analysis Technical Support Document for the Draft Supplemental Pinedale Anticline Oil and Gas Exploration and Development Environmental Impact Statement, prepared for Pinedale Field Office, Pinedale, Wyoming, December 2006.
- Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and the Seminoe Road Gas Development Project, Wyoming, prepared for Bureau of Land Management, Rawlins Field Office, Rawlins, Wyoming, July 2006.

Where drill rig engine emissions were reported, the annual emissions were apportioned to a range from two to four equally spaced point sources within each project area. The same method was used for compressor engine emissions. All other emissions were apportioned to the project area and given an effective height of 7 meters to account for the mechanical generation of vehicular road dust and the release of pollutants from well sites. The area of the projects was idealized by rectangles with areas approximating the reported areas of the project areas. Drill rig and compressor engines exhaust parameters are shown in the following **Table 5-5** and cumulative emissions are shown in **Table 5-6**.

Table 5-5. Exhaust Parameters

Equipment	Stack Height (m)	Stack Diameter (m)	Exhaust Velocity (m/s)	Temperature (K)
Drill Rig Engine	7.6	0.1	35	800
Compressor Engine	9.1	.3048	25	811

Table 5-6. Cumulative Emissions from NEPA Projects

EIS Emissions	Area (m^2)	SO2 (tons/year) Development	Operations	NOx (ton/year) Development	Operations	PM10 (tons/year) Development	Operations	PM2.5 (tons/year) Development	Operations
Pinedale	798,626,881			809.15					
Drilling		55.7		3236.6		130.3		130.3	
Development Fugitives		14.4		559.4		415.9		82.7	
Granger Gas Plant					301.7				
Wind erosion							440.8		176.3
Operations Fugitives			0.6				73.7		17.8
Jonah Infill	123,429,121	34.1	0	580.6	116.1	107.1	174.2	97.4	30.7
Atlantic Rim	1,254,667,131	65.13	0.17	627.29	651.21	696.64	423.14	182.61	64.9
Seminoe Road	554,419,339	42.15	0		1111.35	199.54	315.77	73.75	47.27
Moxa Arch	1,927,517,714	65.28	0.00	1542.91	0.00	0.00	423.60	0.00	225.47
Wind River	153,521,095								
Drilling				173.87		2.91		2.82	
Development Fugitives				27.29	18.11	1754.13		421.58	
Compressor Engines					316.72		22.33		22.33
Operational Fugitives							350.25		150.25
EIS Emission Rates		**SO2 tons/m^2/year**		**NOx Tons/m^2/year**			**PM10 tons/m^2/year**	**PM25 tons/m^2/year**	
Pinedale Area Source		8.7776E-08		7.0045E-07			1.3282E-06	5.0975E-07	
Jonah Area Source		2.7627E-07		0			2.2790E-06	1.0378E-06	
Atlantic Rim Area Source		5.2046E-08		0			8.9249E-07	1.9727E-07	
Seminoe Road Area Source		7.6025E-08		0			9.2946E-07	2.1828E-07	
Moxa Arch Area Source		3.3867E-08		8.0046E-07			2.1976E-07	1.1698E-07	
Wind River Area Source		0.0000E+00		1.7774E-07			1.3707E-05	3.7248E-06	

6.0 PROCESSING OF CALPUFF MODEL RESULTS

6.1 APPEND, CALSUM AND POSTUTIL PROGRAMS

In order to obtain data for comparing to standards and levels of acceptable change (LACs), the CALPUFF model output files must be processed with the CALPOST model and associated utilities. Two utility programs were applied in order to prepare the CALPUFF results for use in CALPOST.

The CALSUM utility program was applied to combine the positive and negative cumulative sources for pollutant concentration, dry deposition flux, and wet deposition flux data.

The POSTUTIL utility program was applied to sum the wet and dry deposition fluxes and in turn calculate the total nitrogen (N) and total sulfur (S) deposition rates

6.2 CALPOST PROCESSING

The CALPOST program was then applied to determine the predicted pollutant concentrations, deposition fluxes and visibility impacts for each area of special concern.

6.2.1 Visibility Calculations

The visibility assessment methodology for this analysis utilized the "natural" background conditions referred to as Method 2, as recommended in the FLAG (2000) Guideline document. This method involves an analysis for visibility following the recommendations in the FLAG (2000) Guideline document. Specifically, this analysis compared daily modeled primary (PMC and $PM_{2.5}$) and secondary (sulfate and nitrate) particulate matter concentrations and daily relative humidity values calculated during the CALPUFF runs. From this comparison, a potential change in deciview was calculated. FLAG identified a 0.5 dv (5 percent change in extinction) threshold as the "Limit of Acceptable Change" (LAC) for a single source impact, and a 1.0 deciview (10 percent change in extinction) threshold for the cumulative impacts of several sources.

Visibility impacts were evaluated at both mandatory Federal Class I areas and at specific Class II areas of concern. The Class II areas included in this analysis have no visibility protection under local, State, or Federal laws. These areas are included in the analysis strictly to meet the disclosure requirements under NEPA and to provide decision-makers with sufficient information.

6.2.2 Calculating Changes in Lake Acid Neutralizing Capacity

The deposition of sulfate and nitrate species from air pollution sources may cause changes in water body chemistry and can impact the acid neutralizing capacity (ANC) of high elevation lakes. Potential ANC impacts were calculated manually by applying the screening methodology prescribed by the US Forest Service (USDA-FS, January 2000a). Total annual nitrogen (N) and sulfur (S) deposition fluxes as averaged by CALPOST were input to the following equations to calculate the potential change in ANC.

% Alkalinity Change = [Hdep/ANC(o)] X 100 where:

ANC(o) = baseline ANC for lake catchment in eq, or

$$ANC(o) = W * P * (1\text{-}Et) * A * (10{,}000 m^2/ha) * 10^6 \text{ eq}/\mu\text{eq} * 10^3 \text{ liters}/m^3$$

W = watershed area in ha

P = average annual precipitation in meters

Et = fraction of precipitation lost to evaporation and transpiration (0.33 assumed)

A = Baseline Alkalinity (μeq/l)

Hdep = acid deposition in eq = [H(s) + H(n0] * W * 10,000 m^2/ha

Hs = sulfur deposition in eq/m^2/yr = Ds * ha/10,000 m^2 * 1,000 g/kg * eq/16 g S

Hn = nitrogen deposition in eq/m^2/yr = Ds * ha/10,000 m^2 * 1,000 g/kg * eq/14 g N

Ds = sulfur deposition in kg/ha/yr for all sulfur species

Dn = nitrogen deposition in kg/ha/yr from all nitrogen species

As indicated in the above equations, baseline alkalinity levels for the high elevation lakes of concern are required for the ANC impact calculations. Baseline ANC data were obtained from BLM. The basis for the background ANC data is the 10th percentile of measurements observed at the lake outlet. **Table 6-1** summarizes the baseline ANC data for the lakes of interest.

Table 6-1. Background Acid Neutralizing Capacity (ANC) at Special Concern Lakes

Lake	Area of Special Concern	10% Lowest ANC Recorded at Outlet (μeq/l)	Number of Samples	Monitoring Period
Black Joe	Bridger Wilderness	67.0	61	1984 - 2003
Deep	Bridger Wilderness	59.9	58	1984 - 2003
Emerald Lake	Cloud Peak Wilderness	69.8	26	1993 - 2003
Florence Lake	Cloud Peak Wilderness	33.0	28	1993 - 2003
Hobbs	Bridger Wilderness	69.9	65	1984 - 2003
Lower Saddlebag	Popo Agie Wilderness	55.5	43	1989 - 2003
Ross	Fitzpatrick Wilderness	53.5	44	1988 - 2003
Upper Frozen	Bridger Wilderness	5.0	6	1997 - 2003
Lazyboy	Bridger Wilderness	18.8	1	1997

6.2.3 Terrestrial Deposition Calculations

Terrestrial deposition impacts were predicted for dry and wet nitrogen (N) and sulfur (S) chemical species using the CALPUFF multiple-resistance routine for predicting dry deposition and the empirical scavenging coefficient approach for predicting wet deposition. Dry and wet deposition fluxes of gaseous and particulate N and S species were processed through POSTUTIL and CALPOST to obtain total (wet + dry) N and S deposition reported as the rate of material deposited on an area (micrograms per cubic meter per second or μg m^{-3} sec^{-1}). These values were compared to the USDA-Forest Service (Fox *et al* 1989) threshold values of 3 kilograms per hectare per year (kg/ha/yr) for total sulfur and 5 kg/ha/yr for total nitrogen.

6.2.4 Ambient Air Quality Standard and PSD Increment Comparison

Predicted maximum pollutant concentrations that could occur as a result of the implementation of each alternative and cumulative sources are compared with the National ambient air quality standards and PSD Class I and Class II increments.

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7.0 ANALYSIS RESULTS

Results of the Far-Field analysis are summarized in the following tables. Impacts for the RD Proposed Action and the Cumulative plus RD Proposed Action are presented. For each scenario, impacts to air quality and air quality related values were predicted for each of the areas of special concern and the high elevation lakes.

7.1 VISIBILITY

The visibility analysis for the Proposed Action only indicated that visibility decreases would exceed the 0.5 deciview change at the Bridger Class I Wilderness Area on two days in model year 2002. There would no days with a 0.5 deciview change at Class I areas for model years 2001 and 2003. Two of the other sensitive areas, the Owl Creek Mountains and the Wind River Canyon, are predicted to have 3 and 11 days, respectively, of visibility changes greater than 0.5 deciviews, and 1 and 4 days, respectively, of visibility changes greater than 1.0 deciviews.

When the cumulative actions were added to the Proposed Action, the visibility impacts were considerably higher. Particularly, the number of days that visibility exceeded 0.5 and 1.0 deciviews, respectively, at the Bridger Class I Wilderness were 138 and 85, respectively. These numbers agree favorably with the recently completed Pinedale air quality analysis. The numbers for the Bridger Class I Wilderness were 127 and 88 days, respectively. The visibility results are shown in **Tables 7-1 through 7-6**.

7.2 AMBIENT AIR IMPACTS

The predicted concentrations of NO_2, SO_2, PM_{10} and $PM_{2.5}$ are shown in Tables 7-7 through 7-12. Additionally, the percentage of the PSD Class I and Class II increments are shown for the applicable pollutants in **Tables 7-13 through 7-15**.

7.3 TERRESTRIAL ACID DEPOSTION

Terrestrial deposition impacts were predicted for dry and wet nitrogen (N) and sulfur (S) chemical species using the CALPUFF multiple-resistance routine for predicting dry deposition and the empirical scavenging coefficient approach for predicting wet deposition. Dry and wet deposition fluxes of gaseous and particulate N and S species were processed through POSTUTIL and CALPOST to obtain total (wet + dry) N and S deposition reported as the rate of material deposited on an area (micrograms per cubic meter per second or $\mu g\ m^{-3}\ sec^{-1}$). These values were compared to the USDA-Forest Service (Fox *et al* 1989) threshold values of 3 kilograms per hectare per year (kg/ha/yr) for total sulfur and 5 kg/ha/yr for total nitrogen (**Tables 7-16 through 7-21**).

7.4 SENSITIVE LAKES ACID NEUTRALIZATION CAPACITY

Potential acid neutralizing capacity (ANC) impacts were calculated manually by applying the screening methodology prescribed by the USFS (USDA-FS, January 2000a). For the Proposed Action, predicted impacts at all lakes are less than 1 µeq/l or a 10 percent change in ANC. The results are shown in **Tables 7-22 through 7-27**.

Table 7-1. 2001 Proposed Action Visibility Impacts

Area	Class	# Days with Deciview Change > 0.5	# Days with Deciview Change > 1.0	Maximum Daily Deciview Change
Bridger	I	0	0	0.497
Fitzpatrick	I	0	0	0.262
North Absaroka	I	0	0	0.015
Teton National Park	I	0	0	0.071
Teton Wilderness Area	I	0	0	0.000
Washakie	I	0	0	0.209
Yellowstone	I	0	0	0.034
Owl Creek Mountain	II	1	0	0.518
Wind River Canyon	II	5	1	1.232
Wind River Roadless	II	1	0	0.585
Cloud Peak	II	0	0	0.166
Gros Ventre	II	0	0	0.097
Phlox Mountain	II	0	0	0.271
Popo Agie	II	1	0	0.928

Table 7-2. 2002 Proposed Action Visibility Impacts

Area	Class	# Days with Deciview Change > 0.5	# Days with Deciview Change > 1.0	Maximum Daily Deciview Change
Bridger	I	2	0	0.631
Fitzpatrick	I	0	0	0.125
North Absaroka	I	0	0	0.018
Teton National Park	I	0	0	0.021
Teton Wilderness Area	I	0	0	0.000
Washakie	I	0	0	0.061
Yellowstone	I	0	0	0.018
Owl Creek Mountain	II	3	1	1.032
Wind River Canyon	II	11	4	2.583
Wind River Roadless	II	0	0	0.458
Cloud Peak	II	0	0	0.090
Gros Ventre	II	0	0	0.024
Phlox Mountain	II	0	0	0.346
Popo Agie	II	2	0	0.891

Table 7-3. 2003 Proposed Action Visibility Impacts

Area	Class	# Days with Deciview Change > 0.5	# Days with Deciview Change > 1.0	Maximum Daily Deciview Change
Bridger	I	0	0	0.218
Fitzpatrick	I	0	0	0.047
North Absaroka	I	0	0	0.019
Teton National Park	I	0	0	0.008
Teton Wilderness Area	I	0	0	0.000
Washakie	I	0	0	0.040
Yellowstone	I	0	0	0.019
Owl Creek Mountain	II	0	0	0.426
Wind River Canyon	II	9	4	2.033
Wind River Roadless	II	0	0	0.143
Cloud Peak	II	0	0	0.094
Gros Ventre	II	0	0	0.011
Phlox Mountain	II	0	0	0.176
Popo Agie	II	0	0	0.338

Table 7-4. 2001 Cumulative Visibility Impacts

Area	Class	# Days with Deciview Change > 0.5	# Days with Deciview Change > 1.0	Maximum Daily Deciview Change
Bridger	I	138	85	8.117
Fitzpatrick	I	40	20	4.975
North Absaroka	I	2	1	1.441
Teton National Park	I	12	4	2.175
Teton Wilderness Area	I	0	0	0.000
Washakie	I	14	4	3.790
Yellowstone	I	5	0	0.945
Owl Creek Mountain	II	30	16	4.034
Wind River Canyon	II	113	76	8.572
Wind River Roadless	II	49	26	5.122
Cloud Peak	II	11	3	1.504
Gros Ventre	II	30	15	4.166
Phlox Mountain	II	13	4	2.186
Popo Agie	II	64	30	3.526

Table 7-5. 2002 Cumulative Visibility Impacts

Area	Class	# Days with Deciview Change > 0.5	# Days with Deciview Change > 1.0	Maximum Daily Deciview Change
Bridger	I	126	74	12.990
Fitzpatrick	I	34	17	7.981
North Absaroka	I	6	1	1.236
Teton National Park	I	13	6	1.924
Teton Wilderness Area	I	0	0	0.000
Washakie	I	15	5	2.255
Yellowstone	I	9	3	1.677
Owl Creek Mountain	II	44	19	5.245
Wind River Canyon	II	119	84	12.699
Wind River Roadless	II	43	20	7.697
Cloud Peak	II	8	1	1.242
Gros Ventre	II	23	12	2.184
Phlox Mountain	II	18	5	1.478
Popo Agie	II	59	32	6.946

Table 7-6. 2003 Cumulative Visibility Impacts

Area	Class	# Days with Deciview Change > 0.5	# Days with Deciview Change > 1.0	Maximum Daily Deciview Change
Bridger	I	131	82	16.598
Fitzpatrick	I	34	16	6.847
North Absaroka	I	2	1	1.030
Teton National Park	I	6	0	0.724
Teton Wilderness Area	I	0	0	0.000
Washakie	I	11	4	3.589
Yellowstone	I	6	1	1.016
Owl Creek Mountain	II	36	15	6.229
Wind River Canyon	II	106	73	9.129
Wind River Roadless	II	45	22	7.423
Cloud Peak	II	11	3	2.771
Gros Ventre	II	23	9	2.424
Phlox Mountain	II	13	4	3.148
Popo Agie	II	59	31	7.373

Table 7-7. Proposed Action Pollutant Concentrations for 2001 at Class I Areas (micrograms per cubic meter)

Pollutant	Averaging Period	Bridger WA	Fitzpatrick WA	North Absaroka WA	Teton NP	Teton WA	Washakie WA	Yellowstone NP
PM2.5	24-hr	1.8283E-02	5.4595E-03	1.4446E-03	4.8425E-03	3.8125E-03	3.8471E-03	2.3745E-03
	Annual	3.6930E-04	1.0307E-04	3.0544E-05	2.5810E-05	3.7858E-05	8.5444E-05	2.1552E-05
PM10	24-hr	4.7002E-02	1.2605E-02	4.1659E-03	1.1527E-02	8.4956E-03	1.0039E-02	5.1017E-03
	Annual	1.1007E-03	2.7948E-04	8.4440E-05	6.5478E-05	9.5892E-05	2.3176E-04	5.3198E-05
NO2	Annual	3.9611E-04	4.0861E-05	3.7075E-06	1.0022E-05	7.3903E-06	2.1201E-05	3.4697E-06
SO2	3-hr	7.5133E-04	3.2127E-04	1.2126E-04	1.4180E-04	1.4740E-04	2.2394E-04	7.8160E-05
	24-hr	3.7056E-04	9.3420E-05	3.3586E-05	7.2529E-05	6.1920E-05	5.6753E-05	3.6787E-05
	Annual	7.9293E-06	2.0590E-06	5.6325E-07	4.3665E-07	6.2126E-07	1.5233E-06	3.4972E-07

Table 7-8. Proposed Action Pollutant Concentrations for 2002 at Class I Areas (micrograms per cubic meter).

Pollutant	Averaging Period	Bridger WA	Fitzpatrick WA	North Absaroka WA	Teton NP	Teton WA	Washakie WA	Yellowstone NP
PM2.5	24-hr	2.0417E-02	5.3165E-03	1.0625E-03	1.4466E-03	1.6287E-03	3.6725E-03	1.3387E-03
	Annual	6.5102E-04	1.7666E-04	3.7193E-05	3.1541E-05	4.2454E-05	1.1517E-04	2.7709E-05
PM10	24-hr	5.8745E-02	1.2755E-02	3.7648E-03	3.3864E-03	4.2445E-03	8.0669E-03	3.3513E-03
	Annual	1.8959E-03	4.9177E-04	9.9132E-05	8.4125E-05	1.0981E-04	3.0379E-04	7.0415E-05
NO2	Annual	5.2853E-04	1.0578E-04	5.3563E-06	1.1395E-05	2.0482E-05	2.2773E-05	1.1675E-05
SO2	3-hr	1.3237E-03	4.8354E-04	6.2585E-05	1.1030E-04	1.7985E-04	1.7985E-04	7.9540E-05
	24-hr	4.5204E-04	1.1507E-04	2.1877E-05	3.3728E-05	4.7184E-05	4.7184E-05	2.9550E-05
	Annual	1.3426E-05	3.3988E-06	6.1404E-07	5.8317E-07	1.8542E-06	1.8542E-06	4.8027E-07

Table 7-9. Proposed Action Pollutant Concentrations for 2003 at Class I Areas (micrograms per cubic meter)

Pollutant	Averaging Period	Bridger WA	Fitzpatrick WA	North Absaroka WA	Teton NP	Teton WA	Washakie WA	Yellowstone NP
PM2.5	24-hr	1.8052E-02	4.4301E-03	1.0535E-03	5.7648E-04	8.5247E-04	3.1040E-03	9.1284E-04
	Annual	3.2849E-04	9.1876E-05	2.2423E-05	1.3570E-05	2.0288E-05	7.7489E-05	1.3325E-05
PM10	24-hr	5.1156E-02	1.0599E-02	3.1492E-03	2.2198E-03	2.3082E-03	7.1250E-03	3.4672E-03
	Annual	9.5737E-04	2.5619E-04	6.4813E-05	3.9999E-05	5.6074E-05	2.1491E-04	9.3345E-05
NO2	Annual	2.4837E-04	4.1141E-05	1.8007E-06	5.0171E-06	2.7287E-06	1.6483E-05	1.9334E-06
SO2	3-hr	1.0476E-03	2.3743E-04	8.8142E-05	4.7838E-05	6.0533E-05	1.1346E-04	1.9334E-06
	24-hr	3.1657E-04	5.8657E-05	2.6215E-05	1.2812E-05	1.7691E-05	4.2605E-05	2.5642E-05
	Annual	6.5173E-06	1.6579E-06	4.4896E-07	2.9285E-07	3.7652E-07	1.3507E-06	2.7305E-07

Table 7-10. Proposed Action Pollutant Concentrations for 2001 at Class II Areas (micrograms per cubic meter)

Pollutant	Averaging Period	Cloud Peak	Gros Ventre	Owl Creek Mountains	Phlox Mountain	Popo Agie	Wind River Canyon	Wind River Roadless Area
PM2.5	24-hr	8.93E-03	6.10E-03	3.42E-02	6.39E-03	3.73E-02	8.61E-02	1.35E-02
	Annual	3.79E-04	4.03E-05	7.08E-04	2.05E-04	6.16E-04	4.23E-03	3.19E-04
PM10	24-hr	8.93E-03	6.10E-03	3.42E-02	6.39E-03	3.73E-02	8.61E-02	1.35E-02
	Annual	3.79E-04	4.03E-05	7.08E-04	2.05E-04	6.16E-04	4.23E-03	3.19E-04
NO_2	Annual	2.82E-04	1.70E-05	8.00E-04	1.29E-04	8.04E-04	8.62E-03	3.11E-04
SO2	3-hr	3.57E-04	2.49E-04	1.60E-03	5.52E-04	1.60E-03	4.52E-03	8.61E-04
	24-hr	1.41E-04	1.17E-04	6.17E-04	1.07E-04	7.15E-04	1.63E-03	3.18E-04
	Annual	7.60E-06	7.51E-07	1.40E-05	3.87E-06	1.27E-05	9.94E-05	7.25E-06

Table 7-11. Proposed Action Pollutant Concentrations for 2002 at Class II Areas (micrograms per cubic meter)

Pollutant	Averaging Period	Cloud Peak	Gros Ventre	Owl Creek Mountains	Phlox Mountain	Popo Agie	Wind River Canyon	Wind River Roadless Area
PM2.5	24-hr	5.90E-03	1.69E-03	4.79E-02	1.65E-02	3.13E-02	9.79E-02	1.65E-02
	Annual	3.25E-04	4.77E-05	1.05E-03	2.91E-04	1.04E-03	5.48E-03	5.85E-04
PM10	24-hr	5.90E-03	1.69E-03	4.79E-02	1.65E-02	3.13E-02	9.79E-02	1.65E-02
	Annual	3.25E-04	4.77E-05	1.05E-03	2.91E-04	1.04E-03	5.48E-03	5.85E-04
NO_2	Annual	1.76E-04	1.79E-05	9.32E-04	1.40E-04	1.04E-03	9.64E-03	5.79E-04
SO2	3-hr	2.38E-04	1.68E-04	2.37E-03	6.25E-04	1.25E-03	6.68E-03	1.17E-03
	24-hr	8.26E-05	4.23E-05	8.84E-04	2.74E-04	4.79E-04	1.92E-03	4.98E-04
	Annual	5.85E-06	9.56E-07	1.84E-05	4.74E-06	2.13E-05	1.17E-04	1.20E-05

Table 7-12. Proposed Action Pollutant Concentrations for 2003 at Class II Areas (micrograms per cubic meter)

Pollutant	Averaging Period	Cloud Peak	Gros Ventre	Owl Creek Mountains	Phlox Mountain	Popo Agie	Wind River Canyon	Wind River Roadless Area
PM2.5	24-hr	3.43E-03	9.75E-04	3.26E-02	7.60E-03	3.31E-02	1.21E-01	1.10E-02
	Annual	2.70E-04	2.41E-05	8.96E-04	2.33E-04	5.04E-04	5.08E-03	2.95E-04
PM10	24-hr	3.43E-03	9.75E-04	3.26E-02	7.60E-03	3.31E-02	1.21E-01	1.10E-02
	Annual	2.70E-04	2.41E-05	8.96E-04	2.33E-04	5.04E-04	5.08E-03	2.95E-04
NO_2	Annual	2.00E-04	9.45E-06	1.03E-03	1.27E-04	5.06E-04	9.94E-03	2.09E-04
SO2	3-hr	2.24E-04	8.98E-05	2.55E-03	4.38E-04	1.37E-03	4.24E-03	8.69E-04
	24-hr	7.16E-05	1.99E-05	7.40E-04	1.29E-04	6.10E-04	2.39E-03	2.18E-04
	Annual	5.17E-06	4.69E-07	1.72E-05	4.25E-06	9.99E-06	1.09E-04	5.77E-06

Table 7-13. 2001 Proposed Action Pollutant Percent of PSD Increment at Class I Areas

Pollutant	Averaging Period	Bridger WA	Fitzpatrick WA	North Absaroka WA	Teton NP	Teton WA	Washakie WA	Yellowstone NP
PM10	24-hr	0.59%	0.16%	0.05%	0.14%	0.11%	0.13%	0.06%
	Annual	0.03%	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
NO2	Annual	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SO2	3-hr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	24-hr	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Annual	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

PSD Class I Increments
NO2: 2.5 μg/m^3
PM10: 24-hr 8 μg/m^3
PM10: Annual 4 μg/m^3
SO2: 3-hr 25 μg/m^3
SO2: 24-hr 5 μg/m^3
SO2: Annual 2 μg/m^3

Table 7-14. 2002 Proposed Action Pollutant Percent of PSD Increment at Class I Areas

Pollutant	Averaging Period	Bridger WA	Fitzpatrick WA	North Absaroka WA	Teton NP	Teton WA	Washakie WA	Yellowstone NP
PM10	24-hr	0.73%	0.16%	0.05%	0.04%	0.05%	0.10%	0.04%
	Annual	0.05%	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
NO2	Annual	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SO2	3-hr	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	24-hr	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Annual	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

PSD Class I Increments
NO2: 2.5 μg/m^3
PM10: 24-hr 8 μg/m^3
PM10: Annual 4 μg/m^3
SO2: 3-hr 25 μg/m^3
SO2: 24-hr 5 μg/m^3
SO2: Annual 2 μg/m^3

Table 7-15. 2003 Proposed Action Pollutant Percent of PSD Increment at Class I Areas

Pollutant	Averaging Period	Bridger WA	Fitzpatrick WA	North Absaroka WA	Teton NP	Teton WA	Washakie WA	Yellowstone NP
PM10	24-hr	0.64%	0.13%	0.04%	0.03%	0.03%	0.09%	0.04%
	Annual	0.02%	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
NO2	Annual	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SO2	3-hr	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	24-hr	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Annual	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

PSD Class I Increments
NO2: 2.5 $\mu g/m^3$
PM10: 24-hr 8 $\mu g/m^3$
PM10: Annual 4 $\mu g/m^3$
SO2: 3-hr 25 $\mu g/m^3$
SO2: 24-hr 5 $\mu g/m^3$
SO2: Annual 2 $\mu g/m^3$

Table 7-16. Proposed Action Nitrogen and Sulfur Deposition (2001)

Area	Class	Nitrogen Deposition (kg/ha/yr)	Percent of Level of Concern (5 kg/ha/yr)	Sulfur Deposition (kg/ha/yr)	Percent of Level of Concern (3 kg/ha/yr)
Bridger	I	2.64E-04	0.01%	4.29E-06	0.00%
Fitzpatrick	I	6.03E-05	0.00%	1.08E-06	0.00%
North Absaroka	I	1.78E-05	0.00%	4.32E-07	0.00%
Teton Nat Park	I	1.47E-05	0.00%	2.60E-07	0.00%
Teton Wild Area	I	2.59E-05	0.00%	4.69E-07	0.00%
Washakie	I	7.31E-05	0.00%	1.80E-06	0.00%
Yellowstone	I	1.49E-05	0.00%	2.68E-07	0.00%
Cloud Peak	II	2.22E-04	0.00%	4.61E-06	0.00%
Gros Ventre	II	2.86E-05	0.00%	4.47E-07	0.00%
Owl Creek Mountains	II	2.32E-04	0.00%	5.38E-06	0.00%
Phlox Mountain	II	1.33E-04	0.00%	3.27E-06	0.00%
Popo Agie	II	4.27E-04	0.01%	6.63E-06	0.00%
Wind River Canyon	II	1.51E-03	0.03%	2.98E-05	0.00%
Wind River Roadless Area	II	1.73E-04	0.00%	3.43E-06	0.00%

Table 7-17. Proposed Action Nitrogen and Sulfur Deposition (2002)

Area	Class	Nitrogen Deposition (kg/ha/yr)	Percent of Level of Concern (5 kg/ha/yr)	Sulfur Deposition (kg/ha/yr)	Percent of Level of Concern (3 kg/ha/yr)
Bridger	I	3.71E-04	0.01%	7.22E-06	0.00%
Fitzpatrick	I	1.70E-04	0.00%	2.59E-06	0.00%
North Absaroka	I	2.75E-05	0.00%	5.31E-07	0.00%
Teton Nat Park	I	5.96E-05	0.00%	8.66E-07	0.00%
Teton Wild Area	I	6.15E-05	0.00%	1.04E-06	0.00%
Washakie	I	7.15E-05	0.00%	1.24E-06	0.00%
Yellowstone	I	3.65E-05	0.00%	6.21E-07	0.00%
Cloud Peak	II	1.80E-04	0.00%	3.70E-06	0.00%
Gros Ventre	II	9.52E-05	0.00%	1.34E-06	0.00%
Owl Creek Mountains	II	2.40E-04	0.00%	5.09E-06	0.00%
Phlox Mountain	II	1.11E-04	0.00%	2.27E-06	0.00%
Popo Agie	II	5.76E-04	0.01%	1.11E-05	0.00%
Wind River Canyon	II	1.38E-03	0.03%	2.64E-05	0.00%
Wind River Roadless Area	II	3.31E-04	0.01%	6.24E-06	0.00%

Table 7-18. Proposed Action Nitrogen and Sulfur Deposition (2003)

Area	Class	Nitrogen Deposition (kg/ha/yr)	Percent of Level of Concern (5 kg/ha/yr)	Sulfur Deposition (kg/ha/yr)	Percent of Level of Concern (3 kg/ha/yr)
Bridger	I	1.21E-04	0.00%	3.84E-06	0.00%
Fitzpatrick	I	1.05E-04	0.00%	1.49E-06	0.00%
North Absaroka	I	7.12E-05	0.00%	9.19E-07	0.00%
Teton Nat Park	I	4.07E-05	0.00%	7.12E-07	0.00%
Teton Wild Area	I	6.53E-05	0.00%	8.79E-07	0.00%
Washakie	I	7.87E-05	0.00%	1.45E-06	0.00%
Yellowstone	I	7.20E-05	0.00%	8.88E-07	0.00%
Cloud Peak	II	1.70E-04	0.00%	3.52E-06	0.00%
Gros Ventre	II	4.55E-05	0.00%	7.37E-07	0.00%
Owl Creek Mountains	II	3.78E-04	0.01%	6.48E-06	0.00%
Phlox Mountain	II	1.70E-04	0.00%	3.03E-06	0.00%
Popo Agie	II	2.77E-04	0.01%	5.55E-06	0.00%
Wind River Canyon	II	1.52E-03	0.03%	2.78E-05	0.00%
Wind River Roadless Area	II	1.63E-04	0.00%	3.44E-06	0.00%

Table 7-19. Cumulative Nitrogen and Sulfur Deposition (2001)

Area	Class	Nitrogen Deposition (kg/ha/yr)	Percent of Level of Concern (5 kg/ha/yr)	Sulfur Deposition (kg/ha/yr)	Percent of Level of Concern (3 kg/ha/yr)
Bridger	I	8.36E-02	1.67%	3.92E-03	0.13%
Fitzpatrick	I	1.12E-02	0.22%	9.25E-04	0.03%
North Absaroka	I	1.79E-03	0.04%	1.41E-04	0.00%
Teton Nat Park	I	3.53E-03	0.07%	1.87E-04	0.01%
Teton Wild Area	I	3.80E-03	0.08%	2.31E-04	0.01%
Washakie	I	4.14E-03	0.08%	3.68E-04	0.01%
Yellowstone	I	2.11E-03	0.04%	1.42E-04	0.00%
Cloud Peak	II	3.20E-03	0.06%	4.52E-04	0.02%
Gros Ventre	II	8.84E-03	0.18%	4.50E-04	0.02%
Owl Creek Mountains	II	5.60E-03	0.11%	5.89E-04	0.02%
Phlox Mountain	II	3.49E-03	0.07%	4.32E-04	0.01%
Popo Agie	II	2.86E-02	0.57%	1.73E-03	0.06%
Wind River Canyon	II	3.27E-02	0.65%	1.06E-03	0.04%
Wind River Roadless Area	II	1.65E-02	0.33%	1.27E-03	0.04%

Table 7-20. Cumulative Nitrogen and Sulfur Deposition (2002)

Area	Class	Nitrogen Deposition (kg/ha/yr)	Percent of Level of Concern (0.005 kg/ha/yr)	Sulfur Deposition (kg/ha/yr)	Percent of Level of Concern (0.005 kg/ha/yr)
Bridger	I	8.11E-02	1.62%	3.43E-03	0.11%
Fitzpatrick	I	1.02E-02	0.20%	8.29E-04	0.03%
North Absaroka	I	4.52E-03	0.09%	2.85E-04	0.01%
Teton Nat Park	I	5.59E-03	0.11%	3.47E-04	0.01%
Teton Wild Area	I	4.53E-03	0.09%	3.27E-04	0.01%
Washakie	I	4.87E-03	0.10%	3.72E-04	0.01%
Yellowstone	I	3.49E-03	0.07%	2.30E-04	0.01%
Cloud Peak	II	4.25E-03	0.09%	4.91E-04	0.02%
Gros Ventre	II	1.11E-02	0.22%	6.82E-04	0.02%
Owl Creek Mountains	II	6.19E-03	0.12%	5.78E-04	0.02%
Phlox Mountain	II	4.04E-03	0.08%	4.26E-04	0.01%
Popo Agie	II	2.94E-02	0.59%	1.73E-03	0.06%
Wind River Canyon	II	2.77E-02	0.55%	1.01E-03	0.03%
Wind River Roadless Area	II	1.76E-02	0.35%	1.14E-03	0.04%

Table 7-21. Cumulative Nitrogen and Sulfur Deposition (2003)

Area	Class	Nitrogen Deposition (kg/ha/yr)	Percent of Level of Concern (5 kg/ha/yr)	Sulfur Deposition (kg/ha/yr)	Percent of Level of Concern (3 kg/ha/yr)
Bridger	I	7.81E-02	1.56%	3.27E-03	0.11%
Fitzpatrick	I	9.88E-03	0.20%	8.44E-04	0.03%
North Absaroka	I	2.78E-03	0.06%	1.83E-04	0.01%
Teton Nat Park	I	5.37E-03	0.11%	2.90E-04	0.01%
Teton Wild Area	I	4.40E-03	0.09%	2.70E-04	0.01%
Washakie	I	4.38E-03	0.09%	3.08E-04	0.01%
Yellowstone	I	2.63E-03	0.05%	1.79E-04	0.01%
Cloud Peak	II	3.13E-03	0.06%	4.20E-04	0.01%
Gros Ventre	II	9.81E-03	0.20%	4.78E-04	0.02%
Owl Creek Mountains	II	8.39E-03	0.17%	7.48E-04	0.02%
Phlox Mountain	II	4.40E-03	0.09%	4.48E-04	0.01%
Popo Agie	II	2.77E-02	0.55%	1.70E-03	0.06%
Wind River Canyon	II	3.39E-02	0.68%	1.28E-03	0.04%
Wind River Roadless Area	II	1.53E-02	0.31%	1.25E-03	0.04%

Table 7-22. Acid Neutralization Capacity Impacts (Proposed Action 2001)

High Elevation Lake of Special Concern	Baseline Lake Outlet ANC (A) (µeq/l)	Annual Precipitation (P) (meters)	Watershed (W) Catchment Area (hectares)	Nitrogen (Dn) Deposition (kg/ha/yr)	Sulfur (Ds) Deposition (kg/ha/yr)	Lake Catchment Baseline ANC(o) (eq)	Nitrogen (Hn) Deposition (eq/m^2/yr)	Sulfur (Hs) Deposition (eq/m^2/yr)	Total (Hdep) Deposition (eq)	ANC Change (µeq/l)	Percent ANC Change
Black Joe Lake	67.0	0.925	890	1.59E-04	2.81E-06	3.70E+05	1.13E-06	1.76E-08	1.03E+01	0.00186	0.003%
Deep Lake	59.9	0.925	205	1.62E-04	2.82E-06	7.61E+04	1.16E-06	1.76E-08	2.41E+00	0.00190	0.003%
Emerald Lake	69.8	0.780	293	2.22E-04	4.61E-06	1.07E+05	1.59E-06	2.88E-08	4.73E+00	0.00309	0.004%
Florence Lake	33.0	0.780	417	2.22E-04	4.61E-06	7.19E+04	1.59E-06	2.88E-08	6.74E+00	0.00309	0.009%
Hobbs Lake	69.9	1.080	293	4.56E-05	7.78E-07	1.48E+05	3.25E-07	4.86E-09	9.68E-01	0.00046	0.001%
Lower Saddlebag	55.5	1.000	155	2.95E-04	4.79E-06	5.76E+04	2.11E-06	2.99E-08	3.31E+00	0.00319	0.006%
Ross Lake	53.5	1.080	4455	3.65E-05	6.42E-07	1.72E+06	2.61E-07	4.01E-09	1.18E+01	0.00037	0.001%
Upper Frozen Lake	5.0	0.925	65	1.70E-04	2.90E-06	2.01E+03	1.22E-06	1.81E-08	8.01E-01	0.00199	0.040%
Lazy Boy	18.8	0.907	335	3.44E-05	5.89E-07	3.83E+04	2.46E-07	3.68E-09	8.36E-01	0.00041	0.002%

Table 7-23. Acid Neutralization Capacity Impacts (Proposed Action 2002)

High Elevation Lake of Special Concern	Baseline Lake Outlet ANC (A) (μeq/l)	Annual Precipitation (P) (meters)	Watershed (W) Catchment Area (hectares)	Nitrogen (Dn) Deposition (kg/ha/yr)	Sulfur (Ds) Deposition (kg/ha/yr)	Lake Catchment Baseline ANC(o) (eq)	Nitrogen (Hn) Deposition (eq/m^2/yr)	Sulfur (Hs) Deposition (eq/m^2/yr)	Total (Hdep) Deposition (eq)	ANC Change (μeq/l)	Percent ANC Change
Black Joe Lake	67.0	0.925	890	2.60E-04	4.95E-06	3.70E+05	1.86E-06	3.10E-08	1.68E+01	0.00305	0.005%
Deep Lake	59.9	0.925	205	2.63E-04	4.98E-06	7.61E+04	1.88E-06	3.11E-08	3.92E+00	0.00308	0.005%
Emerald Lake	69.8	0.780	293	2.22E-04	4.61E-06	1.07E+05	1.59E-06	2.88E-08	4.73E+00	0.00309	0.004%
Florence Lake	33.0	0.780	417	2.22E-04	4.61E-06	7.19E+04	1.59E-06	2.88E-08	6.74E+00	0.00309	0.009%
Hobbs Lake	69.9	1.080	293	1.29E-04	1.89E-06	1.48E+05	9.23E-07	1.18E-08	2.74E+00	0.00129	0.002%
Lower Saddlebag	55.5	1.000	155	4.16E-04	8.09E-06	5.76E+04	2.97E-06	5.06E-08	4.68E+00	0.00451	0.008%
Ross Lake	53.5	1.080	4455	1.15E-04	1.98E-06	1.72E+06	8.20E-07	1.24E-08	3.71E+01	0.00115	0.002%
Upper Frozen Lake	5.0	0.925	65	2.69E-04	5.09E-06	2.01E+03	1.92E-06	3.18E-08	1.27E+00	0.00315	0.063%
Lazy Boy	18.8	0.907	335	1.10E-04	1.84E-06	3.83E+04	7.82E-07	1.15E-08	2.66E+00	0.00131	0.007%

Table 7-24. Acid Neutralization Capacity Impacts (Proposed Action 2003)

High Elevation Lake of Special Concern	Baseline Lake Outlet ANC (A) (μeq/l)	Annual Precipitation (P) (meters)	Watershed (W) Catchment Area (hectares)	Nitrogen (Dn) Deposition (kg/ha/yr)	Sulfur (Ds) Deposition (kg/ha/yr)	Lake Catchment Baseline ANC(o) (eq)	Nitrogen (Hn) Deposition (eq/m^2/yr)	Sulfur (Hs) Deposition (eq/m^2/yr)	Total (Hdep) Deposition (eq)	ANC Change (μeq/l)	Percent ANC Change
Black Joe Lake	67.0	0.925	890	1.21E-04	2.60E-06	3.70E+05	8.64E-07	1.62E-08	7.84E+00	0.00142	0.002%
Deep Lake	59.9	0.925	205	1.21E-04	2.58E-06	7.61E+04	8.64E-07	1.61E-08	1.80E+00	0.00142	0.002%
Emerald Lake	69.8	0.780	293	2.22E-04	4.91E-04	1.07E+05	1.59E-06	3.07E-06	1.36E+01	0.00891	0.013%
Florence Lake	33.0	0.780	417	2.22E-04	4.91E-04	7.19E+04	1.59E-06	3.07E-06	1.94E+01	0.00891	0.027%
Hobbs Lake	69.9	1.080	293	5.06E-05	1.02E-06	1.48E+05	3.62E-07	6.35E-09	1.08E+00	0.00051	0.001%
Lower Saddlebag	55.5	1.000	155	2.04E-04	4.22E-06	5.76E+04	1.46E-06	2.64E-08	2.30E+00	0.00221	0.004%
Ross Lake	53.5	1.080	4455	8.80E-05	1.20E-06	1.72E+06	6.29E-07	7.51E-09	2.84E+01	0.00088	0.002%
Stepping Stone	19.9	1.46	26.4	7.12E-05	2.85E-04	5.13E+03	5.08E-07	1.78E-06	6.05E-01	0.00234	0.012%
Twin Island	17.6	1.3	44.9	7.12E-05	2.85E-04	6.90E+03	5.08E-07	1.78E-06	1.03E+00	0.00263	0.015%
Upper Frozen Lake	5.0	0.925	65	1.24E-04	2.62E-06	2.01E+03	8.84E-07	1.64E-08	5.84E-01	0.00145	0.029%
Lazy Boy	18.8	0.907	335	7.18E-05	1.05E-06	3.83E+04	5.13E-07	6.56E-09	1.74E+00	0.00086	0.005%

Table 7-25. Acid Neutralization Capacity Impacts (Cumulative 2001)

High Elevation Lake of Special Concern	Baseline Lake Outlet ANC (A) (μeq/l)	Annual Precipitation (P) (meters)	Watershed (W) Catchment Area (hectares)	Nitrogen (Dn) Deposition (kg/ha/yr)	Sulfur (Ds) Deposition (kg/ha/yr)	Lake Catchment Baseline ANC(o) (eq)	Nitrogen (Hn) Deposition ($eq/m^2/yr$)	Sulfur (Hs) Deposition ($eq/m^2/yr$)	Total (Hdep) Deposition (eq)	ANC Change (μeq/l)	Percent ANC Change
Black Joe Lake	67.0	0.925	890	2.41E-02	1.62E-03	3.70E+05	1.72E-04	1.01E-05	1.62E+03	0.29449	0.440%
Deep Lake	59.9	0.925	205	2.63E-02	1.71E-03	7.61E+04	1.88E-04	1.07E-05	4.07E+02	0.32034	0.535%
Emerald Lake	69.8	0.780	293	4.25E-03	4.91E-04	1.07E+05	3.03E-05	3.07E-06	9.79E+01	0.06393	0.092%
Florence Lake	33.0	0.780	417	4.25E-03	4.91E-04	7.19E+04	3.03E-05	3.07E-06	1.39E+02	0.06393	0.194%
Hobbs Lake	69.9	1.080	293	1.20E-02	8.71E-04	1.48E+05	8.57E-05	5.44E-06	2.67E+02	0.12598	0.180%
Lower Saddlebag	55.5	1.000	155	2.66E-02	1.69E-03	5.76E+04	1.90E-04	1.06E-05	3.11E+02	0.29955	0.540%
Ross Lake	53.5	1.080	4455	4.51E-03	3.43E-04	1.72E+06	3.22E-05	2.14E-06	1.53E+03	0.04745	0.089%
Stepping Stone	19.9	1.46	26.4	4.52E-03	2.85E-04	5.13E+03	3.23E-05	1.78E-06	8.99E+00	0.03481	0.175%
Twin Island	17.6	1.3	44.9	4.52E-03	2.85E-04	6.90E+03	3.23E-05	1.78E-06	1.53E+01	0.03910	0.222%
Upper Frozen Lake	5.0	0.925	65	2.93E-02	1.85E-03	2.01E+03	2.10E-04	1.15E-05	1.43E+02	0.35672	7.134%
Lazy Boy	18.8	0.907	335	5.25E-03	3.79E-04	3.83E+04	3.75E-05	2.37E-06	1.34E+02	0.06558	0.349%

Table 7-26. Acid Neutralization Capacity Impacts (Cumulative 2002)

High Elevation Lake of Special Concern	Baseline Lake Outlet ANC (A) (μeq/l)	Annual Precipitation (P) (meters)	Watershed (W) Catchment Area (hectares)	Nitrogen (Dn) Deposition (kg/ha/yr)	Sulfur (Ds) Deposition (kg/ha/yr)	Lake Catchment Baseline ANC(o) (eq)	Nitrogen (Hn) Deposition ($eq/m^2/yr$)	Sulfur (Hs) Deposition ($eq/m^2/yr$)	Total (Hdep) Deposition (eq)	ANC Change (μeq/l)	Percent ANC Change
Black Joe Lake	67.0	0.925	890	2.15E-02	1.38E-03	3.70E+05	1.54E-04	8.62E-06	1.45E+03	0.26214	0.391%
Deep Lake	59.9	0.925	205	2.31E-02	1.44E-03	7.61E+04	1.65E-04	9.01E-06	3.57E+02	0.28074	0.469%
Emerald Lake	69.8	0.780	293	4.25E-03	4.91E-04	1.07E+05	3.03E-05	3.07E-06	9.79E+01	0.06393	0.092%
Florence Lake	33.0	0.780	417	4.25E-03	4.91E-04	7.19E+04	3.03E-05	3.07E-06	1.39E+02	0.06393	0.194%
Hobbs Lake	69.9	1.080	293	1.18E-02	8.29E-04	1.48E+05	8.44E-05	5.18E-06	2.62E+02	0.12373	0.177%
Lower Saddlebag	55.5	1.000	155	2.71E-02	1.68E-03	5.76E+04	1.93E-04	1.05E-05	3.16E+02	0.30401	0.548%
Ross Lake	53.5	1.080	4455	7.26E-03	5.20E-04	1.72E+06	5.19E-05	3.25E-06	2.45E+03	0.07615	0.142%
Stepping Stone	19.9	1.46	26.4	4.52E-03	2.85E-04	5.13E+03	3.23E-05	1.78E-06	8.99E+00	0.03481	0.175%
Twin Island	17.6	1.3	44.9	4.52E-03	2.85E-04	6.90E+03	3.23E-05	1.78E-06	1.53E+01	0.03910	0.222%
Upper Frozen Lake	5.0	0.925	65	2.52E-02	1.55E-03	2.01E+03	1.80E-04	9.68E-06	1.23E+02	0.30624	6.125%
Lazy Boy	18.8	0.907	335	8.16E-03	5.64E-04	3.83E+04	5.83E-05	3.53E-06	2.07E+02	0.10168	0.541%

Table 7-27. Acid Neutralization Capacity Impacts (Cumulative 2003)

High Elevation Lake of Special Concern	Baseline Lake Outlet ANC (A) (μeq/l)	Annual Precipitation (P) (meters)	Watershed (W) Catchment Area (hectares)	Nitrogen (Dn) Deposition (kg/ha/yr)	Sulfur (Ds) Deposition (kg/ha/yr)	Lake Catchment Baseline ANC(o) (eq)	Nitrogen (Hn) Deposition ($eq/m^2/yr$)	Sulfur (Hs) Deposition ($eq/m^2/yr$)	Total (Hdep) Deposition (eq)	ANC Change (μeq/l)	Percent ANC Change
Black Joe Lake	67.0	0.925	890	2.21E-02	1.58E-03	3.70E+05	1.58E-04	9.90E-06	1.50E+03	0.27111	0.405%
Deep Lake	59.9	0.925	205	2.40E-02	1.67E-03	7.61E+04	1.72E-04	1.04E-05	3.73E+02	0.29384	0.491%
Emerald Lake	69.8	0.780	293	4.25E-03	4.91E-04	1.07E+05	3.03E-05	3.07E-06	9.79E+01	0.06393	0.092%
Florence Lake	33.0	0.780	417	4.25E-03	4.91E-04	7.19E+04	3.03E-05	3.07E-06	1.39E+02	0.06393	0.194%
Hobbs Lake	69.9	1.080	293	1.05E-02	7.86E-04	1.48E+05	7.48E-05	4.91E-06	2.34E+02	0.11022	0.158%
Lower Saddlebag	55.5	1.000	155	2.57E-02	1.66E-03	5.76E+04	1.83E-04	1.04E-05	3.00E+02	0.28897	0.521%
Ross Lake	53.5	1.080	4455	5.60E-03	3.70E-04	1.72E+06	4.00E-05	2.31E-06	1.89E+03	0.05851	0.109%
Stepping Stone	19.9	1.46	26.4	4.52E-03	2.85E-04	5.13E+03	3.23E-05	1.78E-06	8.99E+00	0.03481	0.175%
Twin Island	17.6	1.3	44.9	4.52E-03	2.85E-04	6.90E+03	3.23E-05	1.78E-06	1.53E+01	0.03910	0.222%
Upper Frozen Lake	5.0	0.925	65	2.65E-02	1.78E-03	2.01E+03	1.89E-04	1.12E-05	1.30E+02	0.32309	6.462%
Lazy Boy	18.8	0.907	335	6.31E-03	4.06E-04	3.83E+04	4.51E-05	2.54E-06	1.59E+02	0.07835	0.417%

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8.0 REFERENCES

Buys & Associates. 2007a. Emissions Inventory for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Oil & Gas Development Draft EIS. Prepared for Bureau of Indian Affairs.

Buys & Associates. 2007b. Near-Field Air Quality Impact Assessment Report for the Riverton Dome Coal Bed Natural Gas and Conventional Gas Oil & Gas Development Draft EIS. Prepared for Bureau of Indian Affairs.

Fox, Douglas, et al., 1989. A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas. Report RM-168. US Department of Agriculture, Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO.

APPENDIX A

EXAMPLE CALMET INPUT FILE

```
Riverton Dome EIS CALMET Input File
Meteorological Data - 2003 MM5 Data, 34 sfc, 59 precip, & 2 ua stations
131 x 138 Modeling Domain w/ 4 km spacing - Lambert Conformal Coordinates
---------------- Run title (3 lines) ------------------------------------------

                    CALMET MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names


Subgroup (a)
------------
Default Name  Type          File Name
------------  ----          ---------
GEO.DAT       input    ! GEODAT= RDEISGEO.DAT       !
SURF.DAT      input    ! SRFDAT= SURF03_final.DAT       !
CLOUD.DAT     input    * CLDDAT=                  *
PRECIP.DAT    input    ! PRCDAT= PRECIP03.DAT     !
MM4.DAT       input    ! MM4DAT= pinedale_2003-01.mm5 !
WT.DAT        input    * WTDAT=                   *

CALMET.LST    output   ! METLST= jan03met.LST     !
CALMET.DAT    output   ! METDAT= jan03met.DAT     !
PACOUT.DAT    output   * PACDAT=                *

All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE

NUMBER OF UPPER AIR & OVERWATER STATIONS:

    Number of upper air stations (NUSTA)  No default     ! NUSTA =  2  !
    Number of overwater met stations
                                 (NOWSTA) No default     ! NOWSTA =  0  !

                        !END!
-------------------------------------------------------------------------------
Subgroup (b)
---------------------------------
Upper air files (one per station)
---------------------------------
Default Name  Type       File Name
------------  ----       ---------
UP1.DAT       input     1  ! UPDAT=upriw03_rev.dat! !END!
UP2.DAT       input     2  ! UPDAT=upslc03_rev.dat! !END!
-------------------------------------------------------------------------------
Subgroup (c)
-----------------------------------------
Overwater station files (one per station)
-----------------------------------------
Default Name  Type       File Name
------------  ----       ---------
-------------------------------------------------------------------------------
Subgroup (d)
----------------
Other file names
----------------

Default Name  Type       File Name
------------  ----       ---------
DIAG.DAT      input      * DIADAT=                *
PROG.DAT      input      * PRGDAT=                *

TEST.PRT      output     * TSTPRT=                *
TEST.OUT      output     * TSTOUT=                *
```

```
TEST.KIN      output     * TSTKIN=                    *
TEST.FRD      output     * TSTFRD=                    *
TEST.SLP      output     * TSTSLP=                    *

-------------------------------------------------------------------------------
NOTES: (1) File/path names can be up to 70 characters in length
       (2) Subgroups (a) and (d) must have ONE 'END' (surround by
           delimiters) at the end of the group
       (3) Subgroups (b) and (c) must have an 'END' (surround by
           delimiters) at the end of EACH LINE

                          !END!

-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

     Starting date:   Year (IBYR) -- No default        ! IBYR=  2003  !
                     Month (IBMO) -- No default        ! IBMO=  1  !
                       Day (IBDY) -- No default        ! IBDY=  1  !
                      Hour (IBHR) -- No default        ! IBHR=  0  !

     Base time zone        (IBTZ) -- No default        ! IBTZ=  7  !
        PST = 08, MST = 07
        CST = 06, EST = 05

     Length of run (hours) (IRLG) -- No default        ! IRLG=  744  !

     Run type            (IRTYPE) -- Default: 1        ! IRTYPE=  1  !

        0 = Computes wind fields only
        1 = Computes wind fields and micrometeorological variables
            (u*, w*, L, zi, etc.)
        (IRTYPE must be 1 to run CALPUFF or CALGRID)

     Compute special data fields required
     by CALGRID (i.e., 3-D fields of W wind
     components and temperature)
     in additional to regular            Default: T    ! LCALGRD = T !
     fields ? (LCALGRD)
     (LCALGRD must be T to run CALGRID)

      Flag to stop run after
      SETUP phase (ITEST)             Default: 2       ! ITEST=  2   !
      (Used to allow checking
      of the model inputs, files, etc.)
      ITEST = 1 - STOPS program after SETUP phase
      ITEST = 2 - Continues with execution of
                  COMPUTATIONAL phase after SETUP

 !END!

-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Map Projection and Grid control parameters
--------------

      Projection for all (X,Y):
      -------------------------

      Map projection
      (PMAP)                       Default: UTM    ! PMAP = LCC  !

          UTM :  Universal Transverse Mercator
          TTM :  Tangential Transverse Mercator
          LCC :  Lambert Conformal Conic
           PS :  Polar Stereographic
           EM :  Equatorial Mercator
         LAZA :  Lambert Azimuthal Equal Area
```

```
False Easting and Northing (km) at the projection origin
(Used only if PMAP= TTM, LCC, or LAZA)
(FEAST)                    Default=0.0       ! FEAST  = 0.000  !
(FNORTH)                   Default=0.0       ! FNORTH = 0.000  !

UTM zone (1 to 60)
(Used only if PMAP=UTM)
(IUTMZN)                   No Default        ! IUTMZN =  12   !

Hemisphere for UTM projection?
(Used only if PMAP=UTM)
(UTMHEM)                   Default: N        ! UTMHEM = N  !
    N   :  Northern hemisphere projection
    S   :  Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0)                    No Default        ! RLAT0 = 43.05N  !
(RLON0)                    No Default        ! RLON0 = 109.80W  !

    TTM :  RLON0 identifies central (true N/S) meridian of projection
           RLAT0 selected for convenience
    LCC :  RLON0 identifies central (true N/S) meridian of projection
           RLAT0 selected for convenience
    PS  :  RLON0 identifies central (grid N/S) meridian of projection
           RLAT0 selected for convenience
    EM  :  RLON0 identifies central meridian of projection
           RLAT0 is REPLACED by 0.0N (Equator)
    LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
           RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1)                    No Default        ! XLAT1 = 30.000N  !
(XLAT2)                    No Default        ! XLAT2 = 60.000N  !

    LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
    PS  :  Projection plane slices through Earth at XLAT1
           (XLAT2 is not used)

----------
Note:  Latitudes and longitudes should be positive, and include a
       letter N,S,E, or W indicating north or south latitude, and
       east or west longitude.  For example,
       35.9  N Latitude  =  35.9N
       118.7 E Longitude = 118.7E


Datum-region
------------

The Datum-Region for the coordinates is identified by a character
string.  Many mapping products currently available use the model of the
Earth known as the World Geodetic System 1984 (WGS-G ).  Other local
models may be in use, and their selection in CALMET will make its output
consistent with local mapping products.  The list of Datum-Regions with
official transformation parameters provided by the National Imagery and
Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)
------------------------------------------------------------------------------
WGS-G     WGS-84 GRS 80, Global coverage
NAS-C     NORTH AMERICAN 1927 Clarke 1866, MEAN FOR (CONUS)
NWS-27    NWS 6370KM Radius, Global Sphere (NAD27)
NWS-84    NWS 6370KM Radius, Global Sphere (WGS84)
ESR-S     ESRI REFERENCE Normal Sphere (6371KM Radius), Global Reference Sphere

Datum-region for output coordinates
(DATUM)                    Default: WGS-G     ! DATUM = WGS-G   !
```

```
    Horizontal grid definition:
    ---------------------------

    Rectangular grid defined for projection PMAP,
    with X the Easting and Y the Northing coordinate

           No. X grid cells (NX)      No default     ! NX =   131  !
           No. Y grid cells (NY)      No default     ! NY =   138  !

    Grid spacing (DGRIDKM)            No default     ! DGRIDKM = 4. !
                                      Units: km

    Reference grid coordinate of
    SOUTHWEST corner of grid cell (1,1)

       X coordinate (XORIGKM)         No default     ! XORIGKM = -232.000 !
       Y coordinate (YORIGKM)         No default     ! YORIGKM = -272.000 !
                                      Units: km


    Vertical grid definition:
    -------------------------

       No. of vertical layers (NZ)    No default     ! NZ =  10  !

       Cell face heights in arbitrary
       vertical grid (ZFACE(NZ+1))    No defaults
                                      Units: m
       ! ZFACE = 0.,20.,40.,100.,160.,320.,560.,1000.,1500.,2250.,3200. !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Output Options
--------------

    DISK OUTPUT OPTION

       Save met. fields in an unformatted
       output file ?              (LSAVE)  Default: T     ! LSAVE = T !
       (F = Do not save, T = Save)

       Type of unformatted output file:
       (IFORMO)                            Default: 1    ! IFORMO =  1  !

            1 = CALPUFF/CALGRID type file (CALMET.DAT)
            2 = MESOPUFF-II type file     (PACOUT.DAT)


    LINE PRINTER OUTPUT OPTIONS:

       Print met. fields ?  (LPRINT)       Default: F     ! LPRINT = F !
       (F = Do not print, T = Print)
       (NOTE: parameters below control which
              met. variables are printed)

       Print interval
       (IPRINF) in hours                   Default: 1     ! IPRINF =  1  !
       (Meteorological fields are printed
        every  1  hours)


       Specify which layers of U, V wind component
       to print (IUVOUT(NZ)) -- NOTE: NZ values must be entered
       (0=Do not print, 1=Print)
       (used only if LPRINT=T)        Defaults: NZ*0
       ! IUVOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !
```

```
-----------------------

Specify which levels of the W wind component to print
(NOTE: W defined at TOP cell face --  10  values)
(IWOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                      Defaults: NZ*0
 ! IWOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !


Specify which levels of the 3-D temperature field to print
(ITOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                      Defaults: NZ*0
 ! ITOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !

Specify which meteorological fields
to print
(used only if LPRINT=T)              Defaults: 0 (all variables)
-----------------------


   Variable            Print ?
                   (0 = do not print,
                    1 = print)
   --------        ------------------

!  STABILITY  =           0           ! - PGT stability class
!  USTAR      =           0           ! - Friction velocity
!  MONIN      =           0           ! - Monin-Obukhov length
!  MIXHT      =           0           ! - Mixing height
!  WSTAR      =           0           ! - Convective velocity scale
!  PRECIP     =           0           ! - Precipitation rate
!  SENSHEAT   =           0           ! - Sensible heat flux
!  CONVZI     =           0           ! - Convective mixing ht.


 Testing and debug print options for micrometeorological module

    Print input meteorological data and
    internal variables (LDB)          Default: F       ! LDB = F !
    (F = Do not print, T = print)
    (NOTE: this option produces large amounts of output)

    First time step for which debug data
    are printed (NN1)                 Default: 1       ! NN1 =  1  !

    Last time step for which debug data
    are printed (NN2)                 Default: 1       ! NN2 =  2  !


 Testing and debug print options for wind field module
 (all of the following print options control output to
  wind field module's output files: TEST.PRT, TEST.OUT,
  TEST.KIN, TEST.FRD, and TEST.SLP)

    Control variable for writing the test/debug
    wind fields to disk files (IOUTD)
    (0=Do not write, 1=write)         Default: 0       ! IOUTD =  0  !

    Number of levels, starting at the surface,
    to print (NZPRN2)                 Default: 1       ! NZPRN2 =  1  !

    Print the INTERPOLATED wind components ?
    (IPR0) (0=no, 1=yes)              Default: 0       !  IPR0 =  0  !
```

```
     Print the TERRAIN ADJUSTED surface wind
     components ?
     (IPR1) (0=no, 1=yes)              Default: 0       ! IPR1 =  0  !

     Print the SMOOTHED wind components and
     the INITIAL DIVERGENCE fields ?
     (IPR2) (0=no, 1=yes)              Default: 0       ! IPR2 =  0  !

     Print the FINAL wind speed and direction
     fields ?
     (IPR3) (0=no, 1=yes)              Default: 0       ! IPR3 =  0  !

     Print the FINAL DIVERGENCE fields ?
     (IPR4) (0=no, 1=yes)              Default: 0       ! IPR4 =  0  !

     Print the winds after KINEMATIC effects
     are added ?
     (IPR5) (0=no, 1=yes)              Default: 0       ! IPR5 =  0  !

     Print the winds after the FROUDE NUMBER
     adjustment is made ?
     (IPR6) (0=no, 1=yes)              Default: 0       ! IPR6 =  0  !

     Print the winds after SLOPE FLOWS
     are added ?
     (IPR7) (0=no, 1=yes)              Default: 0       ! IPR7 =  0  !

     Print the FINAL wind field components ?
     (IPR8) (0=no, 1=yes)              Default: 0       ! IPR8 =  0  !

!END!

--------------------------------------------------------------------------------

INPUT GROUP: 4 -- Meteorological data options
--------------

    NO OBSERVATION MODE              (NOOBS)  Default: 0     ! NOOBS =  0   !
          0 = Use surface, overwater, and upper air stations
          1 = Use surface and overwater stations (no upper air observations)
              Use MM5 for upper air data
          2 = No surface, overwater, or upper air observations
              Use MM5 for surface, overwater, and upper air data

    NUMBER OF SURFACE & PRECIP. METEOROLOGICAL STATIONS

       Number of surface stations   (NSSTA)  No default     ! NSSTA =  34  !

       Number of precipitation stations
       (NPSTA=-1: flag for use of MM5 precip data)
                                    (NPSTA)  No default     ! NPSTA =  59  !

    CLOUD DATA OPTIONS
       Gridded cloud fields:
                                   (ICLOUD)  Default: 0     ! ICLOUD =  0  !
       ICLOUD = 0 - Gridded clouds not used
       ICLOUD = 1 - Gridded CLOUD.DAT generated as OUTPUT
       ICLOUD = 2 - Gridded CLOUD.DAT read as INPUT
       ICLOUD = 3 - Gridded cloud cover from Prognostic Rel. Humidity

    FILE FORMATS

       Surface meteorological data file format
                                   (IFORMS)  Default: 2     ! IFORMS =  2  !
       (1 = unformatted (e.g., SMERGE output))
       (2 = formatted   (free-formatted user input))

       Precipitation data file format
                                   (IFORMP)  Default: 2     ! IFORMP =  2  !
       (1 = unformatted (e.g., PMERGE output))
```

```
      (2 = formatted   (free-formatted user input))

      Cloud data file format
                                    (IFORMC)  Default: 2     ! IFORMC =  2  !
      (1 = unformatted - CALMET unformatted output)
      (2 = formatted   - free-formatted CALMET output or user input)

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 5 -- Wind Field Options and Parameters
--------------

    WIND FIELD MODEL OPTIONS
       Model selection variable (IWFCOD)     Default: 1      ! IWFCOD =  1  !
          0 = Objective analysis only
          1 = Diagnostic wind module

       Compute Froude number adjustment
       effects ? (IFRADJ)                    Default: 1      ! IFRADJ =  1  !
       (0 = NO, 1 = YES)

       Compute kinematic effects ? (IKINE)   Default: 0      ! IKINE  =  0  !
       (0 = NO, 1 = YES)

       Use O'Brien procedure for adjustment
       of the vertical velocity ? (IOBR)     Default: 0      ! IOBR =  0  !
       (0 = NO, 1 = YES)

       Compute slope flow effects ? (ISLOPE) Default: 1      ! ISLOPE  =  1  !
       (0 = NO, 1 = YES)

       Extrapolate surface wind observations
       to upper layers ? (IEXTRP)            Default: -4     ! IEXTRP = -4  !
       (1 = no extrapolation is done,
        2 = power law extrapolation used,
        3 = user input multiplicative factors
            for layers 2 - NZ used (see FEXTRP array)
        4 = similarity theory used
        -1, -2, -3, -4 = same as above except layer 1 data
            at upper air stations are ignored

       Extrapolate surface winds even
       if calm? (ICALM)                      Default: 0      ! ICALM  =  0  !
       (0 = NO, 1 = YES)

       Layer-dependent biases modifying the weights of
       surface and upper air stations (BIAS(NZ))
         -1<=BIAS<=1
       Negative BIAS reduces the weight of upper air stations
         (e.g. BIAS=-0.1 reduces the weight of upper air stations
       by 10%; BIAS= -1, reduces their weight by 100 %)
       Positive BIAS reduces the weight of surface stations
         (e.g. BIAS= 0.2 reduces the weight of surface stations
       by 20%; BIAS=1 reduces their weight by 100%)
       Zero BIAS leaves weights unchanged (1/R**2 interpolation)
       Default: NZ*0
                            ! BIAS =  -1 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !

       Minimum distance from nearest upper air station
       to surface station for which extrapolation
       of surface winds at surface station will be allowed
       (RMIN2: Set to -1 for IEXTRP = 4 or other situations
        where all surface stations should be extrapolated)
                                             Default: 4.     ! RMIN2 = -1.0 !

       Use gridded prognostic wind field model
       output fields as input to the diagnostic
```

```
  wind field model (IPROG)              Default: 0       ! IPROG =  14  !
  (0 = No, [IWFCOD = 0 or 1]
   1 = Yes, use CSUMM prog. winds as Step 1 field, [IWFCOD = 0]
   2 = Yes, use CSUMM prog. winds as initial guess field [IWFCOD = 1]
   3 = Yes, use winds from MM4.DAT file as Step 1 field [IWFCOD = 0]
   4 = Yes, use winds from MM4.DAT file as initial guess field [IWFCOD = 1]
   5 = Yes, use winds from MM4.DAT file as observations [IWFCOD = 1]
   13 = Yes, use winds from MM5.DAT file as Step 1 field [IWFCOD = 0]
   14 = Yes, use winds from MM5.DAT file as initial guess field [IWFCOD = 1]
   15 = Yes, use winds from MM5.DAT file as observations [IWFCOD = 1]

  Timestep (hours) of the prognostic
  model input data   (ISTEPPG)           Default: 1       ! ISTEPPG =  1   !

RADIUS OF INFLUENCE PARAMETERS

  Use varying radius of influence        Default: F       ! LVARY =  F!
  (if no stations are found within RMAX1,RMAX2,
   or RMAX3, then the closest station will be used)

  Maximum radius of influence over land
  in the surface layer (RMAX1)           No default       ! RMAX1 = 20. !
                                         Units: km
  Maximum radius of influence over land
  aloft (RMAX2)                          No default       ! RMAX2 = 40. !
                                         Units: km
  Maximum radius of influence over water
  (RMAX3)                                No default       ! RMAX3 = 40. !
                                         Units: km


OTHER WIND FIELD INPUT PARAMETERS

  Minimum radius of influence used in
  the wind field interpolation (RMIN)    Default: 0.1     ! RMIN = 0.1 !
                                         Units: km
  Radius of influence of terrain
  features (TERRAD)                      No default       ! TERRAD = 15. !

                                         Units: km
  Relative weighting of the first
  guess field and observations in the
  SURFACE layer (R1)                     No default       ! R1 = 5. !
  (R1 is the distance from an            Units: km
  observational station at which the
  observation and first guess field are
  equally weighted)

  Relative weighting of the first
  guess field and observations in the
  layers ALOFT (R2)                      No default       ! R2 = 15. !
  (R2 is applied in the upper layers     Units: km
  in the same manner as R1 is used in
  the surface layer).

  Relative weighting parameter of the
  prognostic wind field data (RPROG)     No default       ! RPROG = 0. !
  (Used only if IPROG = 1)               Units: km
  ------------------------

  Maximum acceptable divergence in the
  divergence minimization procedure
  (DIVLIM)                               Default: 5.E-6   ! DIVLIM= 5.0E-06 !

  Maximum number of iterations in the
  divergence min. procedure (NITER)      Default: 50      ! NITER =  50  !

  Number of passes in the smoothing
  procedure (NSMTH(NZ))
  NOTE: NZ values must be entered
       Default: 2,(mxnz-1)*4 ! NSMTH =
```

```
2 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4 ,  4  !

      Maximum number of stations used in
      each layer for the interpolation of
      data to a grid point (NINTR2(NZ))
      NOTE: NZ values must be entered       Default: 99.     ! NINTR2 =
99 ,  99 ,  99 ,  99 ,  99 ,  99 ,  99 ,  99 ,  99 ,  99  !

      Critical Froude number (CRITFN)       Default: 1.0     ! CRITFN = 1. !

      Empirical factor controlling the
      influence of kinematic effects
      (ALPHA)                               Default: 0.1     ! ALPHA = 0.1 !

      Multiplicative scaling factor for
      extrapolation of surface observations
      to upper layers (FEXTR2(NZ))          Default: NZ*0.0
      ! FEXTR2 = 0., 0., 0., 0., 0., 0., 0., 0., 0., 0. !
      (Used only if IEXTRP = 3 or -3)


   BARRIER INFORMATION

      Number of barriers to interpolation
      of the wind fields (NBAR)             Default: 0       ! NBAR =  0  !

      THE FOLLOWING 4 VARIABLES ARE INCLUDED
      ONLY IF NBAR > 0
      NOTE: NBAR values must be entered     No defaults
            for each variable               Units: km

         X coordinate of BEGINNING
         of each barrier (XBBAR(NBAR))      ! XBBAR = 0. !
         Y coordinate of BEGINNING
         of each barrier (YBBAR(NBAR))      ! YBBAR = 0. !

         X coordinate of ENDING
         of each barrier (XEBAR(NBAR))      ! XEBAR = 0. !
         Y coordinate of ENDING
         of each barrier (YEBAR(NBAR))      ! YEBAR = 0. !


   DIAGNOSTIC MODULE DATA INPUT OPTIONS

      Surface temperature (IDIOPT1)         Default: 0       ! IDIOPT1 =  0  !
         0 = Compute internally from
             hourly surface observations
         1 = Read preprocessed values from
             a data file (DIAG.DAT)

         Surface met. station to use for
         the surface temperature (ISURFT)   No default      ! ISURFT =  18  !
         (Must be a value from 1 to NSSTA)
         (Used only if IDIOPT1 = 0)
         --------------------------

      Domain-averaged temperature lapse
      rate (IDIOPT2)                        Default: 0      ! IDIOPT2 =  0  !
         0 = Compute internally from
             twice-daily upper air observations
         1 = Read hourly preprocessed values
             from a data file (DIAG.DAT)

         Upper air station to use for
         the domain-scale lapse rate (IUPT) No default      ! IUPT    =  1 !
         (Must be a value from 1 to NUSTA)
         (Used only if IDIOPT2 = 0)
         --------------------------

         Depth through which the domain-scale
         lapse rate is computed (ZUPT)      Default: 200.  ! ZUPT = 200. !
```

```
   (Used only if IDIOPT2 = 0)         Units: meters
   --------------------------

Domain-averaged wind components
(IDIOPT3)                             Default: 0     ! IDIOPT3 =  0  !
   0 = Compute internally from
       twice-daily upper air observations
   1 = Read hourly preprocessed values
       a data file (DIAG.DAT)

   Upper air station to use for
   the domain-scale winds (IUPWND)    Default: -1    ! IUPWND = -1  !
   (Must be a value from -1 to NUSTA)
   (Used only if IDIOPT3 = 0)
   --------------------------

   Bottom and top of layer through
   which the domain-scale winds
   are computed
   (ZUPWND(1), ZUPWND(2))        Defaults: 1., 1000. ! ZUPWND= 1., 1000. !
   (Used only if IDIOPT3 = 0)    Units: meters
   --------------------------

Observed surface wind components
for wind field module (IDIOPT4)  Default: 0     ! IDIOPT4 =  0  !
   0 = Read WS, WD from a surface
       data file (SURF.DAT)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

Observed upper air wind components
for wind field module (IDIOPT5)  Default: 0     ! IDIOPT5 =  0  !
   0 = Read WS, WD from an upper
       air data file (UP1.DAT, UP2.DAT, etc.)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

LAKE BREEZE INFORMATION

   Use Lake Breeze Module  (LLBREZE)
                                  Default: F      ! LLBREZE = F !

    Number of lake breeze regions (NBOX)          ! NBOX =  0  !

 X Grid line 1 defining the region of interest
                                                ! XG1 = 0. !
 X Grid line 2 defining the region of interest
                                                ! XG2 = 0. !
 Y Grid line 1 defining the region of interest
                                                ! YG1 = 0. !
 Y Grid line 2 defining the region of interest
                                                ! YG2 = 0. !

  X Point defining the coastline (Straight line)
           (XBCST)  (KM)   Default: none    ! XBCST = 0. !

  Y Point defining the coastline (Straight line)
           (YBCST)  (KM)   Default: none    ! YBCST = 0. !

  X Point defining the coastline (Straight line)
           (XECST)  (KM)   Default: none    ! XECST = 0. !

  Y Point defining the coastline (Straight line)
           (YECST)  (KM)   Default: none    ! YECST = 0. !


Number of stations in the region     Default: none ! NLB =  0 !
(Surface stations + upper air stations)

Station ID's  in the region   (METBXID(NLB))
(Surface stations first, then upper air stations)
```

```
        ! METBXID =  0 !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 6 -- Mixing Height, Temperature and Precipitation Parameters
--------------

    EMPIRICAL MIXING HEIGHT CONSTANTS

       Neutral, mechanical equation
       (CONSTB)                             Default: 1.41    ! CONSTB = 1.41 !
       Convective mixing ht. equation
       (CONSTE)                             Default: 0.15    ! CONSTE = 0.15 !
       Stable mixing ht. equation
       (CONSTN)                             Default: 2400.   ! CONSTN = 2400.!
       Overwater mixing ht. equation
       (CONSTW)                             Default: 0.16    ! CONSTW = 0.16 !
       Absolute value of Coriolis
       parameter (FCORIOL)                  Default: 1.E-4   ! FCORIOL = 1.0E-04!
                                            Units: (1/s)

    SPATIAL AVERAGING OF MIXING HEIGHTS

       Conduct spatial averaging
       (IAVEZI)  (0=no, 1=yes)              Default: 1       ! IAVEZI =  1  !

       Max. search radius in averaging
       process (MNMDAV)                     Default: 1       ! MNMDAV =  1  !
                                            Units: Grid
                                                   cells

       Half-angle of upwind looking cone
       for averaging (HAFANG)               Default: 30.     ! HAFANG = 30. !
                                            Units: deg.

       Layer of winds used in upwind
       averaging (ILEVZI)                   Default: 1       ! ILEVZI =  1  !
       (must be between 1 and NZ)

    OTHER MIXING HEIGHT VARIABLES

       Minimum potential temperature lapse
       rate in the stable layer above the
       current convective mixing ht.        Default: 0.001   ! DPTMIN = 0.001 !
       (DPTMIN)                             Units: deg. K/m
       Depth of layer above current conv.
       mixing height through which lapse    Default: 200.    ! DZZI = 200. !
       rate is computed (DZZI)              Units: meters

       Minimum overland mixing height       Default:  50.    ! ZIMIN = 50. !
       (ZIMIN)                              Units: meters
       Maximum overland mixing height       Default: 3000.   ! ZIMAX = 3000. !
       (ZIMAX)                              Units: meters
       Minimum overwater mixing height      Default:   50.   ! ZIMINW = 50. !
       (ZIMINW) -- (Not used if observed    Units: meters
       overwater mixing hts. are used)
       Maximum overwater mixing height      Default: 3000.   ! ZIMAXW = 3000. !
       (ZIMAXW) -- (Not used if observed    Units: meters
       overwater mixing hts. are used)


    TEMPERATURE PARAMETERS

       3D temperature from observations or
       from prognostic data? (ITPROG)       Default:0          !ITPROG =  0   !

          0 = Use Surface and upper air stations
              (only if NOOBS = 0)
          1 = Use Surface stations (no upper air observations)
              Use MM5 for upper air data
```

```
            (only if NOOBS = 0,1)
         2 = No surface or upper air observations
             Use MM5 for surface and upper air data
             (only if NOOBS = 0,1,2)

      Interpolation type
      (1 = 1/R ; 2 = 1/R**2)                   Default:1          ! IRAD =  1  !

      Radius of influence for temperature
      interpolation (TRADKM)                   Default: 500.      ! TRADKM = 500. !
                                               Units: km

      Maximum Number of stations to include
      in temperature interpolation (NUMTS)     Default: 5         ! NUMTS = 5  !

      Conduct spatial averaging of temp-
      eratures (IAVET)  (0=no, 1=yes)            Default: 1      ! IAVET =  1  !
      (will use mixing ht MNMDAV,HAFANG
       so make sure they are correct)

      Default temperature gradient          Default: -.0098 ! TGDEFB = -0.0098 !
      below the mixing height over
      water (K/m) (TGDEFB)

      Default temperature gradient          Default: -.0045 ! TGDEFA = -0.0045 !
      above the mixing height over
      water (K/m) (TGDEFA)

      Beginning (JWAT1) and ending (JWAT2)
      land use categories for temperature                      ! JWAT1 =  999  !
      interpolation over water -- Make                         ! JWAT2 =  999  !
      bigger than largest land use to disable

   PRECIP INTERPOLATION PARAMETERS

      Method of interpolation (NFLAGP)        Default = 2     ! NFLAGP =  2  !
       (1=1/R,2=1/R**2,3=EXP/R**2)
      Radius of Influence (km) (SIGMAP)       Default = 100.0  ! SIGMAP = 100. !
       (0.0 => use half dist. btwn
        nearest stns w & w/out
        precip when NFLAGP = 3)
      Minimum Precip. Rate Cutoff (mm/hr)     Default = 0.01  ! CUTP = 0.01 !
       (values < CUTP = 0.0 mm/hr)
!END!

-------------------------------------------------------------------------------

INPUT GROUP: 7 -- Surface meteorological station parameters
--------------

     SURFACE STATION VARIABLES
     (One record per station --  34  records in all)


              1      2
           Name   ID            X coord.   Y coord.   Time   Anem.
                                  (km)       (km)     zone   Ht.(m)
          ----------------------------------------------------------
! SS1   ='KPIH' 25780       -218.40091   -10.51052  7      10.0 !
! SS2   ='KIDA' 25785       -177.12294    52.6585   7       7.9 !
! SS3   ='KMLD' 25786       -198.54764   -93.61361  7       7.9 !
! SS4   ='KU78' 25868       -141.38824   -41.39212  7       9.1 !
! SS5   ='KRXE' 26818       -155.41907    86.02029  7      10.0 !
! SS6   ='KRKS' 25744         59.16297  -155.54793  7      10.0 !
! SS7   ='KRWL' 25745        209.12218  -130.91878  7      10.1 !
! SS8   ='KLND' 25760         84.37669   -24.46433  7      10.0 !
! SS9   ='KRIW' 25765        104.96267     2.69977  7      10.1 !
! SS10  ='KEVW' 25775       -100.06805  -190.8622   7      10.1 !
! SS11  ='KJAC' 25776        -72.8003     59.48678  7      10.1 !
! SS12  ='KBYG' 26654        237.27166   147.69128  7      10.0 !
```

```
! SS13 ='KSHR' 26660        216.58147   188.17299  7     10.0 !
! SS14 =' P60' 26664        -47.35795   161.23067  7     10.1 !
! SS15 ='KWRL' 26665        143.43285   100.12221  7      6.1 !
! SS16 ='KGEY' 26667        131.85671   158.91996  7     10.0 !
! SS17 ='KCOD' 26700         60.13412   157.80002  7     10.0 !
! SS18 ='KBPI' 26710        -23.81807   -50.12008  7     10.1 !
! SS19 ='KWEY' 26763        -99.60432   172.59078  7      9.8 !
! SS20 ='KWYS' 26764       -100.84845   176.15375  7     10.0 !
! SS21 ='KBIL' 26770         93.84694   295.95191  7     10.0 !
! SS22 ='KDLN' 26796       -208.45779   239.76404  7     10.1 !
! SS23 ='KBZN' 26797       -102.66088   294.27092  7     10.1 !
! SS24 ='KLVM' 26798        -47.61005   284.67335  7     10.1 !
! SS25 ='KCAG' 25700        187.62061  -271.50088  7     10.1 !
! SS26 ='KHDN' 25715        209.55603  -270.83858  7     10.1 !
! SS27 ='KLGU' 24796       -164.94212  -134.03061  7     10.1 !
! SS28 ='KVEL' 25705         20.5709   -281.35837  7     10.1 !
! SS29 ='KSLC' 25720       -177.26493  -241.31181  7     10.0 !
! SS30 ='KOGD' 25750       -180.11159  -196.34621  7     10.1 !
! SS31 ='KHIF' 25755       -176.2922   -205.38351  7      4.0 !
! SS32 ='YEL ' 40800        -46.12183   162.29469  7     10.0 !
! SS33 ='PND ' 16500          0.9474    -12.99608  7     10.0 !
! SS34 ='BP  ' 88888         17.81917   -62.49556  7     10.0 !
-------------------
      1
        Four character string for station name
        (MUST START IN COLUMN 9)

      2
        Five digit integer for station ID

!END!
```

```
INPUT GROUP: 8 -- Upper air meteorological station parameters
--------------

     UPPER AIR STATION VARIABLES
     (One record per station --  2  records in all)

             1      2
          Name     ID      X coord.   Y coord.  Time zone
                             (km)       (km)
         ----------------------------------------------
! US1  ='KRIW'   24061   104.96267    2.69977    7  !
! US2  ='KSLC'   24127  -177.26493 -241.31181    7  !
-------------------
      1
        Four character string for station name
        (MUST START IN COLUMN 9)

      2
        Five digit integer for station ID

!END!
```

```
INPUT GROUP: 9 -- Precipitation station parameters
--------------

     PRECIPITATION STATION VARIABLES
     (One record per station -- 59  records in all)
     (NOT INCLUDED IF NPSTA = 0)

            1           2
          Name    Station    X coord.  Y coord.
                   Code        (km)      (km)
         ------------------------------------
```

```
! PS1  ='wy01'   480697    -25.18903     -55.48678   !
! PS2  ='wy02'   481000    127.85275      38.89125   !
! PS3  ='wy03'   482715     11.71824      51.87955   !
! PS4  ='wy04'   483100    -93.33238    -190.96246   !
! PS5  ='wy05'   484910    -75.60488      46.95638   !
! PS6  ='wy06'   485345    -46.03946     163.04547   !
! PS7  ='wy07'   485390     84.37669     -24.46433   !
! PS8  ='wy08'   486440    -60.83393      86.2015    !
! PS9  ='wy09'   486555    -43.25857    -191.4888    !
! PS10 ='wy10'   486597     71.60517    -185.85961   !
! PS11 ='wy11'   486875    128.4441      -52.41299   !
! PS12 ='wy12'   487375    221.908         2.07873   !
! PS13 ='wy13'   487388     78.96463     186.56739   !
! PS14 ='wy14'   487760    112.90137      -0.81532   !
! PS15 ='wy15'   487845     59.16297    -155.54793   !
! PS16 ='wy16'   488155    216.58147     188.17299   !
! PS17 ='wy17'   488626    222.41663     168.61917   !
! PS18 ='wy18'   488852    187.05716     112.02419   !
! PS19 ='wy19'   488858    189.11058      85.23487   !
! PS20 ='wy20'   488875    124.73298      65.67754   !
! PS21 ='wy21'   488888     85.65817      72.21319   !
! PS22 ='wy22'   489770    141.99217     105.45823   !
! PS23 ='mt01'   238880     31.4484      268.46619   !
! PS24 ='mt02'   241102     66.84776     245.46093   !
! PS25 ='mt03'   241995    -12.7135      211.18771   !
! PS26 ='mt04'   242414   -214.10091     223.85037   !
! PS27 ='mt05'   244038   -117.00852     196.19446   !
! PS28 ='mt06'   244820   -154.6657      168.36357   !
! PS29 ='mt07'   245030   -213.25997     173.66436   !
! PS30 ='mt08'   245106    184.21809     246.17434   !
! PS31 ='mt09'   248866    -99.57469     174.41529   !
! PS32 ='mt10'   249240    141.37159     245.0234    !
! PS33 ='id01'   102707   -185.15259     131.62072   !
! PS34 ='id02'   103732   -154.80382     -48.27933   !
! PS35 ='id03'   104230   -132.85674     -12.88857   !
! PS36 ='id04'   104456   -155.3827       34.14257   !
! PS37 ='id05'   104598   -120.54867     147.9516    !
! PS38 ='id06'   107211   -218.40091     -10.51052   !
! PS39 ='id07'   109065   -115.21477      86.97115   !
! PS40 ='id08'   109158   -181.07979     -42.21091   !
! PS41 ='ut01'   420342   -154.37442    -256.21165   !
! PS42 ='ut02'   420820   -170.20753    -234.28564   !
! PS43 ='ut03'   421590   -110.16865    -226.63895   !
! PS44 ='ut04'   421759   -162.65911    -259.56512   !
! PS45 ='ut05'   422385   -133.18577    -222.55076   !
! PS46 ='ut06'   422726   -173.81347    -216.21337   !
! PS47 ='ut07'   423348   -221.51477    -259.67418   !
! PS48 ='ut08'   425186   -161.0086     -137.67918   !
! PS49 ='ut09'   425194   -167.92116    -146.42983   !
! PS50 ='ut10'   425815    -57.47079    -266.71134   !
! PS51 ='ut11'   425892   -156.9036     -245.38432   !
! PS52 ='ut12'   426374   -117.32655    -248.04269   !
! PS53 ='ut13'   426404   -174.52533    -191.1179    !
! PS54 ='ut14'   426414   -181.31211    -192.76148   !
! PS55 ='ut15'   426648   -140.72813    -254.68803   !
! PS56 ='ut16'   426757   -180.66118    -169.42997   !
! PS57 ='ut17'   426938   -188.80849    -124.34066   !
! PS58 ='ut18'   427598   -177.26493    -241.31181   !
! PS59 ='ut19'   427846   -146.29735    -261.78067   !
```

1

Four character string for station name (MUST START IN COLUMN 9)

2

Six digit station code composed of state code (first 2 digits) and station ID (last 4 digits)

!END!

APPENDIX B

EXAMPLE CALPUFF INPUT FILE

```
CALPUFF Run for Riverton Dome
Proposed Action 40-acre Spacing
CALMET Year 2001
---------------- Run title (3 lines) ------------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =             *
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
--------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =PA01lst.lst !
CONC.DAT      output   ! CONDAT =PA01con.dat !
DFLX.DAT      output   ! DFDAT  =PA01dry.dat !
WFLX.DAT      output   ! WFDAT  =PA01wet.dat !

VISB.DAT      output   ! VISDAT =pa01VIS.dat !
RESTARTE.DAT  output   * RSTARTE=             *
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =             *
VOLEMARB.DAT  input    * VOLDAT =             *
BAEMARB.DAT   input    * ARDAT  =             *
LNEMARB.DAT   input    * LNDAT  =             *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    ! OZDAT  =2001ozone.dat    !
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
H2O2.DAT      input    * H2O2DAT=             *
HILL.DAT      input    * HILDAT=              *
HILLRCT.DAT   input    * RCTDAT=              *
COASTLN.DAT   input    * CSTDAT=              *
FLUXBDY.DAT   input    * BDYDAT=              *
BCON.DAT      input    * BCNDAT=              *
DEBUG.DAT     output   * DEBUG =              *
MASSFLX.DAT   output   * FLXDAT=              *
MASSBAL.DAT   output   * BALDAT=              *
FOG.DAT       output   * FOGDAT=              *
--------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                                Default: 1       ! NMETDAT =   12  !

     Number of PTEMARB.DAT files for run (NPTDAT)
```

```
                                           Default: 0        ! NPTDAT =   0   !

     Number of BAEMARB.DAT files for run (NARDAT)
                                           Default: 0        ! NARDAT =   0   !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                           Default: 0        ! NVOLDAT =   0   !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
 none         input    ! METDAT=jan01met.DAT     !  !END!
 none         input    ! METDAT=feb01met.DAT     !  !END!
 none         input    ! METDAT=mar01met.DAT     !  !END!
 none         input    ! METDAT=apr01met.DAT     !  !END!
 none         input    ! METDAT=may01met.DAT     !  !END!
 none         input    ! METDAT=jun01met.DAT     !  !END!
 none         input    ! METDAT=jul01met.DAT     !  !END!
 none         input    ! METDAT=aug01met.DAT     !  !END!
 none         input    ! METDAT=sep01met.DAT     !  !END!
 none         input    ! METDAT=oct01met.DAT     !  !END!
 none         input    ! METDAT=nov01met.DAT     !  !END!
 none         input    ! METDAT=dec01met.DAT     !  !END!

--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

        METRUN = 0 - Run period explicitly defined below
        METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR = 2001 !
     (used only if   Month (IBMO) -- No default       ! IBMO =  1   !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =  1   !
                      Hour (IBHR) -- No default       ! IBHR =  1   !

     Base time zone        (XBTZ) -- No default       ! XBTZ = 7.0  !
        PST = 8., MST = 7.
        CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default       ! IRLG = 8759 !

     Number of chemical species (NSPEC)
                                    Default: 5        ! NSPEC =  7   !

     Number of chemical species
     to be emitted  (NSE)           Default: 3        ! NSE =  4   !

     Flag to stop run after
     SETUP phase (ITEST)            Default: 2        ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)     Default: 0        ! MRESTART =  0   !
```

```
        0 = Do not read or write a restart file
        1 = Read a restart file at the beginning of
            the run
        2 = Write a restart file during run
        3 = Read a restart file at beginning of run
            and write a restart file during run

     Number of periods in Restart
     output cycle (NRESPD)          Default: 0        ! NRESPD =   0    !

        0 = File written only at last period
       >0 = File updated every NRESPD periods

   Meteorological Data Format (METFM)
                                    Default: 1        ! METFM =  1    !

        METFM = 1 - CALMET binary file (CALMET.MET)
        METFM = 2 - ISC ASCII file (ISCMET.MET)
        METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
        METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                    surface parameters file (SURFACE.DAT)

    PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
    Averaging Time (minutes) (AVET)
                                    Default: 60.0     ! AVET = 60. !
    PG Averaging Time (minutes) (PGTIME)
                                    Default: 60.0     ! PGTIME = 60. !


!END!

-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)                  Default: 1     ! MGAUSS =  1    !
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                             Default: 3     ! MCTADJ =  3    !
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                         Default: 0     ! MCTSG =  0    !
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)                  Default: 0     ! MSLUG =  0    !
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                             Default: 1     ! MTRANS =  1    !
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)           Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Vertical wind shear modeled above
```

```
stack top? (MSHEAR)                    Default: 0     ! MSHEAR =  0  !
   0 = no  (i.e., vertical wind shear not modeled)
   1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT)       Default: 0     ! MSPLIT =  0  !
   0 = no (i.e., puffs not split)
   1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)        Default: 1     ! MCHEM =  1   !
   0 = chemical transformation not
       modeled
   1 = transformation rates computed
       internally (MESOPUFF II scheme)
   2 = user-specified transformation
       rates used
   3 = transformation rates computed
       internally (RIVAD/ARM3 scheme)
   4 = secondary organic aerosol formation
       computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)         Default: 0     ! MAQCHEM =  0   !
   0 = aqueous phase transformation
       not modeled
   1 = transformation rates adjusted
       for aqueous phase reactions

Wet removal modeled ? (MWET)           Default: 1     ! MWET =  1   !
   0 = no
   1 = yes

Dry deposition modeled ? (MDRY)        Default: 1     ! MDRY =  1   !
   0 = no
   1 = yes
   (dry deposition method specified
    for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)                   Default: 3     ! MDISP =  3   !

   1 = dispersion coefficients computed from measured values
       of turbulence, sigma v, sigma w
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.
   5 = CTDM sigmas used for stable and neutral conditions.
       For unstable conditions, sigmas are computed as in
       MDISP = 3, described above.  MDISP = 5 assumes that
       measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)          Default: 3     ! MTURBVW =  3  !
   1 = use sigma-v or sigma-theta measurements
       from PROFILE.DAT to compute sigma-y
       (valid for METFM = 1, 2, 3, 4)
   2 = use sigma-w measurements
       from PROFILE.DAT to compute sigma-z
       (valid for METFM = 1, 2, 3, 4)
   3 = use both sigma-(v/theta) and sigma-w
       from PROFILE.DAT to compute sigma-y and sigma-z
       (valid for METFM = 1, 2, 3, 4)
   4 = use sigma-theta measurements
       from PLMMET.DAT to compute sigma-y
       (valid only if METFM = 3)

Back-up method used to compute dispersion
```

```
when measured turbulence data are
missing (MDISP2)                        Default: 3     ! MDISP2 =  3  !
(used only if MDISP = 1 or 5)
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness?       Default: 0     ! MROUGH =  0  !
(MROUGH)
   0 = no
   1 = yes

Partial plume penetration of           Default: 1     ! MPARTL =  1  !
elevated inversion?
(MPARTL)
   0 = no
   1 = yes

Strength of temperature inversion      Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                       Default: 0     ! MPDF =  0  !
(MPDF)
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                       Default: 0     ! MSGTIBL = 0  !
(MSGTIBL)
   0 = no
   1 = yes

Boundary conditions (concentration) modeled?
                                       Default: 0     ! MBCON = 0  !
(MBCON)
   0 = no
   1 = yes


Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors.  Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                                       Default: 0     ! MFOG =  0  !
(MFOG)
   0 = no
   1 = yes  - report results in PLUME Mode format
   2 = yes  - report results in RECEPTOR Mode format


Test options specified to see if
they conform to regulatory
values? (MREG)                         Default: 1     ! MREG =  0  !
```

```
       0 = NO checks are made
       1 = Technical options must conform to USEPA
           Long Range Transport (LRT) guidance
                      METFM    1 or 2
                      AVET     60. (min)
                      PGTIME   60. (min)
                      MGAUSS   1
                      MCTADJ   3
                      MTRANS   1
                      MTIP     1
                      MCHEM    1 or 3 (if modeling SOx, NOx)
                      MWET     1
                      MDRY     1
                      MDISP    2 or 3
                      MPDF     0 if MDISP=3
                               1 if MDISP=2
                      MROUGH   0
                      MPARTL   1
                      SYTDEP   550. (m)
                      MHFTSZ   0

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =          NOX !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =          PMC !         !END!
! CSPEC =         PM25 !         !END!


                                                          Dry                 OUTPUT GROUP
    SPECIES          MODELED          EMITTED         DEPOSITED                  NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)     (0=NO,                   (0=NONE,
   (Limit: 12                                         1=COMPUTED-GAS          1=1st CGRUP,
    Characters                                        2=COMPUTED-PARTICLE     2=2nd CGRUP,
    in length)                                        3=USER-SPECIFIED)       3= etc.)

!           SO2  =         1,               1,            1,                 0    !
!           SO4  =         1,               0,            2,                 0    !
!           NOX  =         1,               1,            1,                 0    !
!          HNO3  =         1,               0,            1,                 0    !
!           NO3  =         1,               0,            2,                 0    !
!           PMC  =         1,               1,            2,                 0    !
!          PM25  =         1,               1,            2,                 0    !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.
```

```
--------------------------------------------------------------------------------

INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                     Default: UTM    ! PMAP = LCC  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                    Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                   Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                   No Default      ! IUTMZN =  12   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                   Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                    No Default      ! RLAT0 =  43.05N  !
     (RLON0)                    No Default      ! RLON0 =  109.80W  !

         TTM :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         LCC :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
         PS  :  RLON0 identifies central (grid N/S) meridian of projection
                RLAT0 selected for convenience
         EM  :  RLON0 identifies central meridian of projection
                RLAT0 is REPLACED by 0.0N (Equator)
         LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
                RLAT0 identifies latitude of tangent-point of mapping plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 =  30N  !
     (XLAT2)                    No Default      ! XLAT2 =  60N  !

         LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
         PS  :  Projection plane slices through Earth at XLAT1
                (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
```

```
------------

The Datum-Region for the coordinates is identified by a character
string.  Many mapping products currently available use the model of the
Earth known as the World Geodetic System 1984 (WGS-G ).  Other local
models may be in use, and their selection in CALMET will make its output
consistent with local mapping products.  The list of Datum-Regions with
official transformation parameters provided by the National Imagery and
Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)
------------------------------------------------------------------------------
WGS-G     WGS-84 GRS 80, Global coverage
NAS-C     NORTH AMERICAN 1927 Clarke 1866, MEAN FOR (CONUS)
NWS-27    NWS 6370KM Radius, Global Sphere (NAD27)
NWS-84    NWS 6370KM Radius, Global Sphere (WGS84)
ESR-S     ESRI REFERENCE Normal Sphere (6371KM Radius), Global Reference Sphere

Datum-region for output coordinates
(DATUM)                    Default: WGS-G     ! DATUM = WGS-G  !


METEOROLOGICAL Grid:

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX =  131   !
            No. Y grid cells (NY)      No default     ! NY =  138  !
       No. vertical layers (NZ)        No default     ! NZ =  10   !

          Grid spacing (DGRIDKM)       No default     ! DGRIDKM = 4. !
                                       Units: km

               Cell face heights
                   (ZFACE(nz+1))       No defaults
                                       Units: m
    ! ZFACE = 0.,20.,40.,100.,160.,320.,560.,1000.,1500.,2250.,3200. !


          Reference Coordinates
         of SOUTHWEST corner of
               grid cell(1, 1):

    X coordinate (XORIGKM)             No default     ! XORIGKM = -232.000 !
    Y coordinate (YORIGKM)             No default     ! YORIGKM = -272.000 !
                                      Units: km


COMPUTATIONAL Grid:

     The computational grid is identical to or a subset of the MET. grid.
     The lower left (LL) corner of the computational grid is at grid point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
     computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
     The grid spacing of the computational grid is the same as the MET. grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1   !
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1   !
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =  131   !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default     ! JECOMP =  138   !
                  (1 <= JECOMP <= NY)
```

```
SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)          Default: T      ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)       No default      ! IBSAMP =   1   !
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)       No default      ! JBSAMP =   1   !
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)       No default      ! IESAMP =   1   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)       No default      ! JESAMP =   1   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                       Default: 1      ! MESHDN =  2  !
        (MESHDN is an integer >= 1)

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                              *                          *
     FILE                       DEFAULT VALUE              VALUE THIS RUN
     ----                       -------------              --------------

   Concentrations (ICON)              1                    !  ICON =  1   !
   Dry Fluxes (IDRY)                  1                    !  IDRY =  1   !
   Wet Fluxes (IWET)                  1                    !  IWET =  1   !
   Relative Humidity (IVIS)           1                    !  IVIS =  1   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                            Default: T         ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                          Default: 0         ! IMFLX =  0  !
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                          Default: 0         ! IMBAL =  0  !
         0 = no
```

```
       1 = yes (MASSBAL.DAT filename is
            specified in Input Group 0)


   LINE PRINTER OUTPUT OPTIONS:

      Print concentrations (ICPRT)    Default: 0        ! ICPRT =  0   !
      Print dry fluxes (IDPRT)        Default: 0        ! IDPRT =  0   !
      Print wet fluxes (IWPRT)        Default: 0        ! IWPRT =  0   !
      (0 = Do not print, 1 = Print)

      Concentration print interval
      (ICFRQ) in hours                Default: 1        ! ICFRQ =  1   !
      Dry flux print interval
      (IDFRQ) in hours                Default: 1        ! IDFRQ =  1   !
      Wet flux print interval
      (IWFRQ) in hours                Default: 1        ! IWFRQ =  1   !

      Units for Line Printer Output
      (IPRTU)                         Default: 1        ! IPRTU =  3   !
                         for          for
                    Concentration   Deposition
          1 =          g/m**3        g/m**2/s
          2 =         mg/m**3       mg/m**2/s
          3 =         ug/m**3       ug/m**2/s
          4 =         ng/m**3       ng/m**2/s
          5 =        Odour Units

      Messages tracking progress of run
      written to the screen ?
      (IMESG)                         Default: 2        ! IMESG =  2   !
        0 = no
        1 = yes (advection step, puff ID)
        2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------
-- MASS FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?
SAVED ON DISK?
   -------       ------------------------   ------------------------   ------------------------
---------------
!          SO2 =     0,            1,           0,            1,           0,            1,
0   !
!          SO4 =     0,            1,           0,            1,           0,            1,
0   !
!          NOX =     0,            1,           0,            1,           0,            1,
0   !
!         HNO3 =     0,            1,           0,            1,           0,            1,
0   !
!          NO3 =     0,            1,           0,            1,           0,            1,
0   !
!          PMC =     0,            1,           0,            1,           0,            1,
0   !
!         PM25 =     0,            1,           0,            1,           0,            1,
0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                Default: F     ! LDEBUG = F !

       First puff to track
       (IPFDEB)                                Default: 1     ! IPFDEB =  1  !

       Number of puffs to track
       (NPFDEB)                                Default: 1     ! NPFDEB =  1  !
```

```
      Met. period to start output
      (NN1)                                 Default: 1      ! NN1 =   1   !

      Met. period to end output
      (NN2)                                 Default: 10     ! NN2 =   10  !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
      Number of terrain features (NHILL)    Default: 0      ! NHILL =   0   !

      Number of special complex terrain
      receptors  (NCTREC)                   Default: 0      ! NCTREC =  0   !

      Terrain and CTSG Receptor data for
      CTSG hills input in CTDM format ?
      (MHILL)                               No Default      ! MHILL =   0   !
      1 = Hill and Receptor data created
          by CTDM processors & read from
          HILL.DAT and HILLRCT.DAT files
      2 = Hill data created by OPTHILL &
          input below in Subgroup (6b);
          Receptor data in Subgroup (6c)

      Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
      to meters (MHILL=1)

      Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
      to meters (MHILL=1)

      X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

      Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL          XC        YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2
AMAX1     AMAX2
 NO.         (km)      (km)      (deg.)   (m)      (m)       (m)       (m)        (m)        (m)
(m)        (m)
----         ----      ----      ------  -----  ------    ------    ------   -------    -------
-----     -----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                        XRCT         YRCT        ZRCT          XHH
                        (km)         (km)         (m)
                       ------       -----       ------         ----
```

1

```
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a separate
           input subgroup and therefore must end with an input group terminator.
```

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
----

```
      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY     MESOPHYLL RESISTANCE      HENRY'S
LAW COEFFICIENT
       NAME         (cm**2/s)                                                               (s/cm)
(dimensionless)
      -------     -----------      ----------      ----------     --------------------      -------
----------------

!             SO2  =       0.1509,           1000.,           8.,                  0.,
0.04 !
!             NOX  =       0.1656,              1.,           8.,                  5.,
3.5 !
!            HNO3  =       0.1628,              1.,          18.,                  0.,
0.00000008 !

!END!
```

INPUT GROUP: 8 -- Size parameters for dry deposition of particles
----

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

```
      SPECIES     GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME            DIAMETER                   DEVIATION
                       (microns)                  (microns)
      -------     -------------------        ------------------
!        SO4 =           0.48,                      2.    !
```

```
!         NO3 =          0.48,                       2.   !
!         PMC =          3.00,                       2.   !
!        PM25 =          0.48,                       2.   !

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                           Default: 30     !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                             Default: 10     !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                          Default: 8      ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                            Default: 9      !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                            Default: 1      !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =        3.0E-05,              0.0E00 !
!          SO4 =        1.0E-04,             3.0E-05 !
!         HNO3 =        6.0E-05,              0.0E00 !
!          NO3 =        1.0E-04,             3.0E-05 !
!          PMC =        1.0E-04,             3.0E-05 !
!         PM25 =        1.0E-04,             3.0E-05 !

!END!

-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1           ! MOZ =  1   !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                     Default: 12*80.
     !  BCKO3 = 42.12, 44.68, 47.43, 52.43, 48.98, 44.10, 42.05, 45.54, 42.34, 42.66, 36.46,
```

```
43.05 !

      Monthly ammonia concentrations
      (Used only if MCHEM = 1, or 3)
      (BCKNH3) in ppb                   Default: 12*10.
      !  BCKNH3 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !

      Nighttime SO2 loss rate (RNITE1)
      in percent/hour                   Default: 0.2          ! RNITE1 = .2 !

      Nighttime NOx loss rate (RNITE2)
      in percent/hour                   Default: 2.0          ! RNITE2 = 2.0 !

      Nighttime HNO3 formation rate (RNITE3)
      in percent/hour                   Default: 2.0          ! RNITE3 = 2.0 !

      H2O2 data input option (MH2O2)    Default: 1            ! MH2O2 =  1   !
      (Used only if MAQCHEM = 1)
         0 = use a monthly background H2O2 value
         1 = read hourly H2O2 concentrations from
             the H2O2.DAT data file

      Monthly H2O2 concentrations
      (Used only if MQACHEM = 1 and
       MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
      (BCKH2O2) in ppb                  Default: 12*1.
      !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
      (used only if MCHEM = 4)

      The SOA module uses monthly values of:
           Fine particulate concentration in ug/m^3 (BCKPMF)
           Organic fraction of fine particulate      (OFRAC)
           VOC / NOX ratio (after reaction)          (VCNX)
      to characterize the air mass when computing
      the formation of SOA from VOC emissions.
      Typical values for several distinct air mass types are:

         Month    1    2    3    4    5    6    7    8    9   10   11   12
                 Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

      Clean Continental
         BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
         OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
         VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

      Clean Marine (surface)
         BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
         OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
         VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

      Urban - low biogenic (controls present)
         BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
         OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
         VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

      Urban - high biogenic (controls present)
         BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
         OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
         VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

      Regional Plume
         BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
         OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
         VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

      Urban - no controls present
         BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
         OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
```

```
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
     !   VCNX    = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00,
50.00 !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP = 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                  Default: 0      ! MHFTSZ =  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                              Default: 5      ! JSUP =  5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1 = .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                   Default: 0.1    ! CONK2 = .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                     Default: 0.5    ! TBD = .5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                            Default: 10     ! IURB1 =  10  !
                                                        19     ! IURB2 =  19  !

     Site characterization parameters for single-point Met data files ---------
     (needed for METFM = 2,3,4)

        Land use category for modeling domain
        (ILANDUIN)                             Default: 20     ! ILANDUIN =  20  !

        Roughness length (m) for modeling domain
        (Z0IN)                                 Default: 0.25   ! Z0IN = .25 !

        Leaf area index for modeling domain
        (XLAIIN)                               Default: 3.0    ! XLAIIN = 3.0 !

        Elevation above sea level (m)
        (ELEVIN)                               Default: 0.0    ! ELEVIN = .0 !

        Latitude (degrees) for met location
        (XLATIN)                               Default: -999.  ! XLATIN = -999.0 !

        Longitude (degrees) for met location
        (XLONIN)                               Default: -999.  ! XLONIN = -999.0 !
```

```
Specialized information for interpreting single-point Met data files -----

   Anemometer height (m) (Used only if METFM = 2,3)
   (ANEMHT)                                  Default: 10.     ! ANEMHT = 10.0 !

   Form of lateral turbulance data in PROFILE.DAT file
   (Used only if METFM = 4 or MTURBVW = 1 or 3)
   (ISIGMAV)                                 Default: 1       ! ISIGMAV =  0  !
       0 = read sigma-theta
       1 = read sigma-v

   Choice of mixing heights (Used only if METFM = 4)
   (IMIXCTDM)                                Default: 0       ! IMIXCTDM =  0  !
       0 = read PREDICTED mixing heights
       1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                                     Default: 1.0     ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                                    Default: 1.0     ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                                      Default: 99      ! MXNEW =  99   !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                      Default: 99      ! MXSAM =  99   !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                                     Default: 2       ! NCOUNT =  2   !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                      Default: 1.0     ! SYMIN = 1.0  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                      Default: 1.0     ! SZMIN = 1.0  !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))       Default SVMIN : .50,  .50,  .50,  .50,  .50,  .50
                              Default SWMIN : .20,  .12,  .08,  .06,  .03,  .016

                            Stability Class :  A     B     C     D     E     F
                                              ---   ---   ---   ---   ---   ---
                                   ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
                                   ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                                    Default: 0.0,0.0  ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                                     Default: 0.5     ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                                     Default: 3000.   ! XMAXZI = 3000.0 !
```

```
Minimum mixing height (m)
(XMINZI)                                Default: 50.     ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                    Default    :
                              ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                   Wind Speed Class :  1     2     3     4     5
                                      ---   ---   ---   ---   ---
                         ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                     Default    : ISC RURAL values
                              ISC RURAL : .07, .07, .10, .15, .35, .55
                              ISC URBAN : .15, .15, .20, .25, .30, .30

                    Stability Class :  A     B     C     D     E     F
                                      ---   ---   ---   ---   ---   ---
                          ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                     Default: 0.020, 0.035
                                 ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))                Stability Class :  A     B     C     D     E     F
                           Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                         ---   ---   ---   ---   ---   ---
                           !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                            Default: 10.        ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

  VERTICAL SPLIT
  --------------

  Number of puffs that result every time a puff
  is split - nsplit=2 means that 1 puff splits
  into 2
  (NSPLIT)                         Default:   3        ! NSPLIT =  3  !

  Time(s) of a day when split puffs are eligible to
  be split once again; this is typically set once
  per day, around sunset before nocturnal shear develops.
  24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
  0=do not re-split    1=eligible for re-split
  (IRESPLIT(24))                   Default:  Hour 17 = 1
  !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

  Split is allowed only if last hour's mixing
  height (m) exceeds a minimum value
  (ZISPLIT)                        Default: 100.       ! ZISPLIT = 100.0 !

  Split is allowed only if ratio of last hour's
  mixing ht to the maximum mixing ht experienced
  by the puff is less than a maximum value (this
  postpones a split until a nocturnal layer develops)
  (ROLDMAX)                        Default: 0.25       ! ROLDMAX = 0.25 !


  HORIZONTAL SPLIT
```

```
        ----------------

        Number of puffs that result every time a puff
        is split - nsplith=5 means that 1 puff splits
        into 5
        (NSPLITH)                          Default:   5        ! NSPLITH =  5  !

        Minimum sigma-y (Grid Cells Units) of puff
        before it may be split
        (SYSPLITH)                         Default:  1.0       ! SYSPLITH = 1.0 !

        Minimum puff elongation rate (SYSPLITH/hr) due to
        wind shear, before it may be split
        (SHSPLITH)                         Default:  2.        ! SHSPLITH = 2.0 !

        Minimum concentration (g/m^3) of each
        species in puff before it may be split
        Enter array of NSPEC values; if a single value is
        entered, it will be used for ALL species
        (CNSPLITH)                         Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

      Integration control variables ------------------------

        Fractional convergence criterion for numerical SLUG
        sampling integration
        (EPSSLUG)                          Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

        Fractional convergence criterion for numerical AREA
        source integration
        (EPSAREA)                          Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

        Trajectory step-length (m) used for numerical rise
        integration
        (DSRISE)                           Default:   1.0      ! DSRISE = 1.0 !

!END!


--------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 = 13 !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   4  !
           1 =       g/s
           2 =      kg/hr
           3 =      lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 = 0 !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
```

```
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------

          POINT SOURCE: CONSTANT DATA
          -----------------------------
                                                                              b         c
 Source      X UTM      Y UTM     Stack    Base      Stack    Exit  Exit     Bldg.  Emission
  No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.    Dwash   Rates
            (km)       (km)      (m)      (m)       (m)   (m/s) (deg. K)
 ------  ---------- ---------- ------  ------   -------- ----- -------- ----- --------

   1 ! SRCNAM = COMP !
   1 ! X =  114.443,   -10.687,    9.1,  1617,  0.3048,  25.00, 811.00, 0.0,
             0.00,  0.00,  130.357,  0.00,  0.00,  0.00,  3.152 ! !END!
   1 ! FMFAC  =   1.0 !   !END!

   2 ! SRCNAM = NWDRILL !
   2 ! X =  113.443,  -5.932,    7.60,   1562,   0.10,   35.00, 800.00, 0.0,
             0.276,  0.00,  16.399,  0.00,  0.00,  0.392,  0.327 ! !END!
   2 ! FMFAC  =   1.0 !   !END!

   3 ! SRCNAM = NEDRILL !
   3 ! X =  116.547,  -5.882,    7.60,   1583,   0.10,   35.00, 800.00, 0.0,
             0.276,  0.00,  16.399,  0.00,  0.00,  0.392,  0.327 ! !END!
   3 ! FMFAC  =   1.0 !   !END!

   4 ! SRCNAM = SEDRILL !
   4 ! X =  116.631,  -10.072,    7.60,   1634,   0.10,   35.00, 800.00, 0.0,
             0.276,  0.00,  16.399,  0.00,  0.00,  0.392,  0.327 ! !END!
   4 ! FMFAC  =   1.0 !   !END!

   5 ! SRCNAM = SWDRILL !
   5 ! X =  113.517,  -10.115,    7.60,   1598,   0.10,   35.00, 800.00, 0.0,
             0.276,  0.00,  16.399,  0.00,  0.00,  0.392,  0.327 ! !END!
   5 ! FMFAC  =   1.0 !   !END!

   6 ! SRCNAM = NWCOMP !
   6 ! X =  113.443,  -5.932,    9.1,   1562,  0.3048,  25.00, 811.00, 0.0,
             0.032,  0.00,  1.927,  0.00,  0.00,  0.048,  0.04 ! !END!
   6 ! FMFAC  =   1.0 !   !END!

   7 ! SRCNAM = NECOMP !
   7 ! X =  116.547,  -5.882,    9.1,   1583,  0.3048,  25.00, 811.00, 0.0,
             0.032,  0.00,  1.927,  0.00,  0.00,  0.048,  0.04 ! !END!
   7 ! FMFAC  =   1.0 !   !END!

   8 ! SRCNAM = SECOMP !
   8 ! X =  116.631,  -10.072,    9.1,   1634,  0.3048,  25.00, 811.00, 0.0,
             0.032,  0.00,  1.927,  0.00,  0.00,  0.048,  0.04 ! !END!
   8 ! FMFAC  =   1.0 !   !END!

   9 ! SRCNAM = SWCOMP !
   9 ! X =  113.517,  -10.115,    9.1,   1598,  0.3048,  25.00, 811.00, 0.0,
             0.032,  0.00,  1.927,  0.00,  0.00,  0.048,  0.04 ! !END!
   9 ! FMFAC  =   1.0 !   !END!

  10 ! SRCNAM = NWHEAT !
  10 ! X =  113.443,  -5.932,    4.6,   1562,  0.3048,  1.6, 700.00, 0.0,
             0.00,  0.00,  0.986,  0.00,  0.00,  0.00,  0.075 ! !END!
  10 ! FMFAC  =   1.0 !   !END!

  11 ! SRCNAM = NEHEAT !
  11 ! X =  116.547,  -5.882,    4.6,   1583,  0.3048,  1.6, 700.00, 0.0,
             0.00,  0.00,  0.986,  0.00,  0.00,  0.00,  0.075 ! !END!
  11 ! FMFAC  =   1.0 !   !END!
```

```
12 ! SRCNAM = SEHEAT !
12 ! X =  116.631,  -10.072,    4.6,  1634,  0.3048,   1.6, 700.00, 0.0,
          0.00,  0.00,  0.986,  0.00,  0.00,  0.00,  0.075 ! !END!
12 ! FMFAC  =   1.0 !   !END!

13 ! SRCNAM = SWHEAT !
13 ! X =  113.517,  -10.115,    4.6,  1598,  0.3048,   1.6, 700.00, 0.0,
          0.00,  0.00,  0.986,  0.00,  0.00,  0.00,  0.075 ! !END!
13 ! FMFAC  =   1.0 !   !END!
```

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

SRCNAM is a 12-character name for a source (No default)
X is an array holding the source data listed by the column headings (No default)
SIGYZI is an array holding the initial sigma-y and sigma-z (m) (Default: 0.,0.)
FMFAC is a vertical momentum flux factor (0. or 1.0) used to represent the effect of rain-caps or other physical configurations that reduce momentum rise associated with the actual exit velocity. (Default: 1.0 -- full momentum used)

[b] 0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

[c] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No.	Effective building width and height (in meters) every 10 degrees[a]

----

[a] Each pair of width and height values is treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA[a]

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY)   Default: 0
    0 = Constant
    1 = Diurnal cycle (24 scaling factors: hours 1-24)

```
          2 =       Monthly cycle (12 scaling factors: months 1-12)
          3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                   where first group is DEC-JAN-FEB)
          4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                   first group is Stability Class A,
                                   and the speed classes have upper
                                   bounds (m/s) defined in Group 12
          5 =       Temperature   (12 scaling factors, where temperature
                                   classes have upper bounds (C) of:
                                   0, 5, 10, 15, 20, 25, 30, 35, 40,
                                   45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


--------------------------------------------------------------------------------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  4   !

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   4  !
          1 =        g/m**2/s
          2 =       kg/m**2/hr
          3 =       lb/m**2/hr
          4 =     tons/m**2/yr
          5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
          6 =     Odour Unit * m/min
          7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                            a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                                        b
Source           Effect.   Base      Initial    Emission
 No.             Height   Elevation  Sigma z     Rates
                  (m)       (m)       (m)
-------          ------   ------     --------   ---------

* FUGITIVES CONSTRUCTION, VEHICLE AND EQUIPMENT EXHAUST, TRAFFIC DUST*

1! SRCNAM = NWARFUG !
1! X =           7.0,  1562,         1.0, 2.40E-09,  0.0E00, 6.98E-08,
```

```
 0.0E00,  0.0E00, 3.540E-06, 6.70E-07 !
!END!

2! SRCNAM = NEARFUG !
2! X =           7.0,  1583,         1.0, 2.40E-09,  0.0E00, 6.98E-08,
 0.0E00,  0.0E00, 3.54E-06, 6.70E-07 !
!END!

3! SRCNAM = SEARFUG !
3! X =           7.0,  1634,         1.0, 2.40E-09,  0.0E00, 6.98E-08,
 0.0E00,  0.0E00, 3.54E-06, 6.70E-07 !
!END!

4! SRCNAM = SWARFUG !
4! X =           7.0,  1598,         1.0, 2.40E-09,  0.0E00, 6.98E-08,
 0.0E00,  0.0E00, 3.54E-06, 6.70E-07 !
!END!

---------------
Subgroup (14b)
--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled,  but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

          COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON
          --------------------------------------------------------
Source                                                             a
 No.      Ordered list of X followed by list of Y,  grouped by source
------    ------------------------------------------------------------
1     ! SRCNAM = NWARFUG !
1     ! XVERT = 111.961, 111.891, 114.995, 115.074!
1     ! YVERT = -10.127,  -5.957,  -5.907, -10.104!
!END!

2     ! SRCNAM = NEARFUG !
2     ! XVERT = 115.074, 114.995, 118.099, 118.188!
2     ! YVERT = -10.104,  -5.907, -5.857, -10.04 !
!END!

3     ! SRCNAM = SEARFUG !
3     ! XVERT = 115.153, 115.074, 114.995, 118.277!
3     ! YVERT = -14.605, -10.104,  -5.907, -14.223!
!END!

4     ! SRCNAM = SWARFUG !
4     ! XVERT = 112.030, 111.9605, 115.074, 115.1535!
4     ! YVERT = -14.298, -10.1275, -10.104, -14.2605!
!END!



--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
```

```
                                                  a
     AREA SOURCE: VARIABLE EMISSIONS DATA
     --------------------------------------

  Use this subgroup to describe temporal variations in the emission
  rates given in 14b.  Factors entered multiply the rates in 14b.
  Skip sources here that have constant emissions.  For more elaborate
  variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

  IVARY determines the type of variation, and is source-specific:
  (IVARY)                                Default: 0
        0 =       Constant
        1 =       Diurnal cycle (24 scaling factors: hours 1-24)
        2 =       Monthly cycle (12 scaling factors: months 1-12)
        3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                 where first group is DEC-JAN-FEB)
        4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                 first group is Stability Class A,
                                 and the speed classes have upper
                                 bounds (m/s) defined in Group 12
        5 =       Temperature   (12 scaling factors, where temperature
                                 classes have upper bounds (C) of:
                                 0, 5, 10, 15, 20, 25, 30, 35, 40,
                                 45, 50, 50+)


--------
    a
  Data for each species are treated as a separate input subgroup
  and therefore must end with an input group terminator.


--------------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

  Number of buoyant line sources
  with variable location and emission
  parameters (NLN2)                          No default  !  NLN2 =  0   !

  (If NLN2 > 0, ALL parameter data for
   these sources are read from the file: LNEMARB.DAT)

  Number of buoyant line sources (NLINES)    No default   ! NLINES =  0  !

  Units used for line source
  emissions below              (ILNU)        Default: 1  !  ILNU =   1  !
        1 =        g/s
        2 =       kg/hr
        3 =       lb/hr
        4 =      tons/yr
        5 =      Odour Unit * m**3/s  (vol. flux of odour compound)
        6 =      Odour Unit * m**3/min
        7 =      metric tons/yr

  Number of source-species
  combinations with variable
  emissions scaling factors
  provided below in (15c)      (NSLN1) Default: 0  !  NSLN1 =  0  !

  Maximum number of segments used to model
  each line (MXNSEG)                         Default: 7   ! MXNSEG =  7  !

  The following variables are required only if NLINES > 0.  They are
  used in the buoyant line source plume rise calculations.
```

```
        Number of distances at which              Default: 6    ! NLRISE =   6   !
        transitional rise is computed

        Average building length (XL)              No default    ! XL = .0 !
                                                  (in meters)

        Average building height (HBL)             No default    ! HBL = .0 !
                                                  (in meters)

        Average building width (WBL)              No default    ! WBL = .0 !
                                                  (in meters)

        Average line source width (WML)           No default    ! WML = .0 !
                                                  (in meters)

        Average separation between buildings (DXL) No default   ! DXL = .0 !
                                                  (in meters)

        Average buoyancy parameter (FPRIMEL)      No default    ! FPRIMEL = .0 !
                                                  (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------
                                                                                    a
Source   Beg. X      Beg. Y      End. X     End. Y     Release    Base        Emission
 No.    Coordinate  Coordinate  Coordinate Coordinate  Height   Elevation      Rates
          (km)        (km)        (km)       (km)       (m)       (m)
------  ----------  ----------  ---------  ----------  -------  ---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                      a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                              Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
```

classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

----

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

```
     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   4  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0   !

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!
```

Subgroup (16b)

VOLUME SOURCE: CONSTANT DATA[a]

X UTM Coordinate (km)	Y UTM Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (m)	Initial Sigma z (m)	Emission Rates[b]

----

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU

```
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                                       a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ----------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                              Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


--------------------------------------------------------------------------------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  1985  !

!END!

---------------
Subgroup (17b)
---------------
                                                     a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------

                    X UTM        Y UTM        Ground         Height   b
Receptor         Coordinate   Coordinate    Elevation    Above Ground
  No.               (km)         (km)          (m)            (m)
--------         ----------   ----------    ---------    ------------

1 !   X =     51.107,   -47.717,   2770.0,    0.0!  !END! Bridger WA (Class_I)
2  !  X  =    52.425,   -47.706,   2871.0,    0.0!  !END!  Bridger WA    (Class_I)
3  !  X  =    53.744,   -47.695,   2906.0,    0.0!  !END!  Bridger WA    (Class_I)
4  !  X  =    55.063,   -47.684,   2987.0,    0.0!  !END!  Bridger WA    (Class_I)
5  !  X  =    56.382,   -47.672,   2811.0,    0.0!  !END!  Bridger WA    (Class_I)
6  !  X  =    57.701,   -47.660,   2815.0,    0.0!  !END!  Bridger WA    (Class_I)
7  !  X  =    59.020,   -47.648,   2876.0,    0.0!  !END!  Bridger WA    (Class_I)
8  !  X  =    60.338,   -47.636,   2987.0,    0.0!  !END!  Bridger WA    (Class_I)
```

9	!	X	=	61.657,	-47.623,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
10	!	X	=	49.774,	-45.935,	2863.0,	0.0!	!END!	Bridger WA	(Class_I)
11	!	X	=	51.092,	-45.925,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
12	!	X	=	52.411,	-45.914,	2859.0,	0.0!	!END!	Bridger WA	(Class_I)
13	!	X	=	53.729,	-45.903,	2985.0,	0.0!	!END!	Bridger WA	(Class_I)
14	!	X	=	55.047,	-45.892,	3203.0,	0.0!	!END!	Bridger WA	(Class_I)
15	!	X	=	56.366,	-45.880,	3218.0,	0.0!	!END!	Bridger WA	(Class_I)
16	!	X	=	57.684,	-45.868,	3052.0,	0.0!	!END!	Bridger WA	(Class_I)
17	!	X	=	59.003,	-45.856,	2951.0,	0.0!	!END!	Bridger WA	(Class_I)
18	!	X	=	60.321,	-45.844,	3277.0,	0.0!	!END!	Bridger WA	(Class_I)
19	!	X	=	61.640,	-45.831,	3625.0,	0.0!	!END!	Bridger WA	(Class_I)
20	!	X	=	47.123,	-44.164,	2936.0,	0.0!	!END!	Bridger WA	(Class_I)
21	!	X	=	48.441,	-44.154,	2895.0,	0.0!	!END!	Bridger WA	(Class_I)
22	!	X	=	49.760,	-44.144,	3117.0,	0.0!	!END!	Bridger WA	(Class_I)
23	!	X	=	51.078,	-44.133,	2998.0,	0.0!	!END!	Bridger WA	(Class_I)
24	!	X	=	52.396,	-44.122,	3044.0,	0.0!	!END!	Bridger WA	(Class_I)
25	!	X	=	53.714,	-44.111,	2947.0,	0.0!	!END!	Bridger WA	(Class_I)
26	!	X	=	55.032,	-44.100,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
27	!	X	=	56.350,	-44.088,	3600.0,	0.0!	!END!	Bridger WA	(Class_I)
28	!	X	=	57.668,	-44.077,	3485.0,	0.0!	!END!	Bridger WA	(Class_I)
29	!	X	=	58.986,	-44.064,	3060.0,	0.0!	!END!	Bridger WA	(Class_I)
30	!	X	=	60.304,	-44.052,	3444.0,	0.0!	!END!	Bridger WA	(Class_I)
31	!	X	=	45.792,	-42.382,	2945.0,	0.0!	!END!	Bridger WA	(Class_I)
32	!	X	=	47.110,	-42.372,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
33	!	X	=	48.428,	-42.362,	3414.0,	0.0!	!END!	Bridger WA	(Class_I)
34	!	X	=	49.745,	-42.352,	3414.0,	0.0!	!END!	Bridger WA	(Class_I)
35	!	X	=	51.063,	-42.341,	3205.0,	0.0!	!END!	Bridger WA	(Class_I)
36	!	X	=	52.381,	-42.331,	3495.0,	0.0!	!END!	Bridger WA	(Class_I)
37	!	X	=	53.699,	-42.320,	3063.0,	0.0!	!END!	Bridger WA	(Class_I)
38	!	X	=	58.970,	-42.273,	3164.0,	0.0!	!END!	Bridger WA	(Class_I)
39	!	X	=	45.779,	-40.590,	2905.0,	0.0!	!END!	Bridger WA	(Class_I)
40	!	X	=	47.097,	-40.580,	2932.0,	0.0!	!END!	Bridger WA	(Class_I)
41	!	X	=	48.414,	-40.570,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
42	!	X	=	49.731,	-40.560,	3124.0,	0.0!	!END!	Bridger WA	(Class_I)
43	!	X	=	51.049,	-40.550,	3388.0,	0.0!	!END!	Bridger WA	(Class_I)
44	!	X	=	52.366,	-40.539,	3188.0,	0.0!	!END!	Bridger WA	(Class_I)
45	!	X	=	45.766,	-38.798,	2991.0,	0.0!	!END!	Bridger WA	(Class_I)
46	!	X	=	47.083,	-38.789,	3149.0,	0.0!	!END!	Bridger WA	(Class_I)
47	!	X	=	48.400,	-38.779,	3265.0,	0.0!	!END!	Bridger WA	(Class_I)
48	!	X	=	49.717,	-38.769,	3328.0,	0.0!	!END!	Bridger WA	(Class_I)
49	!	X	=	51.034,	-38.758,	3499.0,	0.0!	!END!	Bridger WA	(Class_I)
50	!	X	=	52.351,	-38.747,	3244.0,	0.0!	!END!	Bridger WA	(Class_I)
51	!	X	=	43.120,	-37.025,	2854.0,	0.0!	!END!	Bridger WA	(Class_I)
52	!	X	=	44.437,	-37.016,	2922.0,	0.0!	!END!	Bridger WA	(Class_I)
53	!	X	=	45.753,	-37.007,	3043.0,	0.0!	!END!	Bridger WA	(Class_I)
54	!	X	=	47.070,	-36.997,	3160.0,	0.0!	!END!	Bridger WA	(Class_I)
55	!	X	=	48.387,	-36.987,	3343.0,	0.0!	!END!	Bridger WA	(Class_I)
56	!	X	=	49.703,	-36.977,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
57	!	X	=	51.020,	-36.966,	3668.0,	0.0!	!END!	Bridger WA	(Class_I)
58	!	X	=	52.336,	-36.956,	3647.0,	0.0!	!END!	Bridger WA	(Class_I)
59	!	X	=	41.792,	-35.242,	2986.0,	0.0!	!END!	Bridger WA	(Class_I)
60	!	X	=	43.108,	-35.234,	2959.0,	0.0!	!END!	Bridger WA	(Class_I)
61	!	X	=	44.424,	-35.224,	2880.0,	0.0!	!END!	Bridger WA	(Class_I)
62	!	X	=	45.740,	-35.215,	2949.0,	0.0!	!END!	Bridger WA	(Class_I)
63	!	X	=	47.057,	-35.205,	3250.0,	0.0!	!END!	Bridger WA	(Class_I)
64	!	X	=	48.373,	-35.195,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
65	!	X	=	49.689,	-35.185,	3228.0,	0.0!	!END!	Bridger WA	(Class_I)
66	!	X	=	51.005,	-35.175,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
67	!	X	=	52.322,	-35.164,	3658.0,	0.0!	!END!	Bridger WA	(Class_I)
68	!	X	=	25.989,	-33.535,	2784.0,	0.0!	!END!	Bridger WA	(Class_I)
69	!	X	=	27.305,	-33.530,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
70	!	X	=	28.621,	-33.524,	2765.0,	0.0!	!END!	Bridger WA	(Class_I)
71	!	X	=	33.884,	-33.498,	2944.0,	0.0!	!END!	Bridger WA	(Class_I)
72	!	X	=	37.832,	-33.476,	2804.0,	0.0!	!END!	Bridger WA	(Class_I)
73	!	X	=	39.148,	-33.468,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
74	!	X	=	40.464,	-33.459,	2989.0,	0.0!	!END!	Bridger WA	(Class_I)
75	!	X	=	41.780,	-33.451,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
76	!	X	=	43.096,	-33.442,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
77	!	X	=	44.412,	-33.433,	3268.0,	0.0!	!END!	Bridger WA	(Class_I)
78	!	X	=	45.727,	-33.423,	3029.0,	0.0!	!END!	Bridger WA	(Class_I)
79	!	X	=	47.043,	-33.414,	2983.0,	0.0!	!END!	Bridger WA	(Class_I)

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80   !  X  =    48.359,   -33.404,   3048.0,    0.0!  !END!  Bridger WA    (Class_I)
81   !  X  =    49.675,   -33.394,   3235.0,    0.0!  !END!  Bridger WA    (Class_I)
82   !  X  =    50.991,   -33.383,   3241.0,    0.0!  !END!  Bridger WA    (Class_I)
83   !  X  =    52.307,   -33.372,   3573.0,    0.0!  !END!  Bridger WA    (Class_I)
84   !  X  =    25.982,   -31.744,   2673.0,    0.0!  !END!  Bridger WA    (Class_I)
85   !  X  =    27.297,   -31.738,   2803.0,    0.0!  !END!  Bridger WA    (Class_I)
86   !  X  =    28.613,   -31.732,   2852.0,    0.0!  !END!  Bridger WA    (Class_I)
87   !  X  =    29.928,   -31.726,   2926.0,    0.0!  !END!  Bridger WA    (Class_I)
88   !  X  =    31.244,   -31.720,   2963.0,    0.0!  !END!  Bridger WA    (Class_I)
89   !  X  =    32.559,   -31.713,   2987.0,    0.0!  !END!  Bridger WA    (Class_I)
90   !  X  =    33.875,   -31.706,   2987.0,    0.0!  !END!  Bridger WA    (Class_I)
91   !  X  =    35.190,   -31.699,   2988.0,    0.0!  !END!  Bridger WA    (Class_I)
92   !  X  =    36.506,   -31.692,   2987.0,    0.0!  !END!  Bridger WA    (Class_I)
93   !  X  =    37.821,   -31.684,   2865.0,    0.0!  !END!  Bridger WA    (Class_I)
94   !  X  =    39.137,   -31.676,   2984.0,    0.0!  !END!  Bridger WA    (Class_I)
95   !  X  =    40.452,   -31.668,   2987.0,    0.0!  !END!  Bridger WA    (Class_I)
96   !  X  =    41.768,   -31.659,   3164.0,    0.0!  !END!  Bridger WA    (Class_I)
97   !  X  =    43.083,   -31.650,   3180.0,    0.0!  !END!  Bridger WA    (Class_I)
98   !  X  =    44.399,   -31.641,   3334.0,    0.0!  !END!  Bridger WA    (Class_I)
99   !  X  =    45.714,   -31.632,   3432.0,    0.0!  !END!  Bridger WA    (Class_I)
100  !  X  =    47.030,   -31.622,   3142.0,    0.0!  !END!  Bridger WA    (Class_I)
101  !  X  =    48.345,   -31.612,   3414.0,    0.0!  !END!  Bridger WA    (Class_I)
102  !  X  =    25.974,   -29.952,   2865.0,    0.0!  !END!  Bridger WA    (Class_I)
103  !  X  =    27.290,   -29.947,   2926.0,    0.0!  !END!  Bridger WA    (Class_I)
104  !  X  =    28.605,   -29.941,   2926.0,    0.0!  !END!  Bridger WA    (Class_I)
105  !  X  =    29.920,   -29.935,   2979.0,    0.0!  !END!  Bridger WA    (Class_I)
106  !  X  =    31.235,   -29.928,   2979.0,    0.0!  !END!  Bridger WA    (Class_I)
107  !  X  =    32.550,   -29.922,   3021.0,    0.0!  !END!  Bridger WA    (Class_I)
108  !  X  =    33.865,   -29.915,   3047.0,    0.0!  !END!  Bridger WA    (Class_I)
109  !  X  =    35.180,   -29.908,   3104.0,    0.0!  !END!  Bridger WA    (Class_I)
110  !  X  =    36.496,   -29.900,   3132.0,    0.0!  !END!  Bridger WA    (Class_I)
111  !  X  =    37.811,   -29.892,   2926.0,    0.0!  !END!  Bridger WA    (Class_I)
112  !  X  =    39.126,   -29.884,   3048.0,    0.0!  !END!  Bridger WA    (Class_I)
113  !  X  =    40.441,   -29.876,   3043.0,    0.0!  !END!  Bridger WA    (Class_I)
114  !  X  =    41.756,   -29.868,   3131.0,    0.0!  !END!  Bridger WA    (Class_I)
115  !  X  =    43.071,   -29.859,   3210.0,    0.0!  !END!  Bridger WA    (Class_I)
116  !  X  =    44.386,   -29.850,   3644.0,    0.0!  !END!  Bridger WA    (Class_I)
117  !  X  =    23.337,   -28.171,   2856.0,    0.0!  !END!  Bridger WA    (Class_I)
118  !  X  =    24.652,   -28.166,   2743.0,    0.0!  !END!  Bridger WA    (Class_I)
119  !  X  =    25.967,   -28.161,   2743.0,    0.0!  !END!  Bridger WA    (Class_I)
120  !  X  =    27.282,   -28.155,   2865.0,    0.0!  !END!  Bridger WA    (Class_I)
121  !  X  =    28.597,   -28.149,   2984.0,    0.0!  !END!  Bridger WA    (Class_I)
122  !  X  =    29.911,   -28.143,   2987.0,    0.0!  !END!  Bridger WA    (Class_I)
123  !  X  =    31.226,   -28.137,   2992.0,    0.0!  !END!  Bridger WA    (Class_I)
124  !  X  =    32.541,   -28.130,   3048.0,    0.0!  !END!  Bridger WA    (Class_I)
125  !  X  =    33.856,   -28.123,   3082.0,    0.0!  !END!  Bridger WA    (Class_I)
126  !  X  =    35.170,   -28.116,   3109.0,    0.0!  !END!  Bridger WA    (Class_I)
127  !  X  =    36.485,   -28.109,   3153.0,    0.0!  !END!  Bridger WA    (Class_I)
128  !  X  =    37.800,   -28.101,   3048.0,    0.0!  !END!  Bridger WA    (Class_I)
129  !  X  =    39.115,   -28.093,   3050.0,    0.0!  !END!  Bridger WA    (Class_I)
130  !  X  =    40.430,   -28.085,   3231.0,    0.0!  !END!  Bridger WA    (Class_I)
131  !  X  =    41.744,   -28.076,   3414.0,    0.0!  !END!  Bridger WA    (Class_I)
132  !  X  =    43.059,   -28.067,   3364.0,    0.0!  !END!  Bridger WA    (Class_I)
133  !  X  =    44.374,   -28.058,   3284.0,    0.0!  !END!  Bridger WA    (Class_I)
134  !  X  =    23.331,   -26.379,   2902.0,    0.0!  !END!  Bridger WA    (Class_I)
135  !  X  =    24.645,   -26.374,   2893.0,    0.0!  !END!  Bridger WA    (Class_I)
136  !  X  =    25.960,   -26.369,   2907.0,    0.0!  !END!  Bridger WA    (Class_I)
137  !  X  =    27.274,   -26.364,   2924.0,    0.0!  !END!  Bridger WA    (Class_I)
138  !  X  =    28.588,   -26.358,   2986.0,    0.0!  !END!  Bridger WA    (Class_I)
139  !  X  =    29.903,   -26.352,   3000.0,    0.0!  !END!  Bridger WA    (Class_I)
140  !  X  =    31.217,   -26.345,   3040.0,    0.0!  !END!  Bridger WA    (Class_I)
141  !  X  =    32.532,   -26.339,   3081.0,    0.0!  !END!  Bridger WA    (Class_I)
142  !  X  =    33.846,   -26.332,   3048.0,    0.0!  !END!  Bridger WA    (Class_I)
143  !  X  =    35.160,   -26.325,   3108.0,    0.0!  !END!  Bridger WA    (Class_I)
144  !  X  =    36.475,   -26.317,   3217.0,    0.0!  !END!  Bridger WA    (Class_I)
145  !  X  =    37.789,   -26.309,   3170.0,    0.0!  !END!  Bridger WA    (Class_I)
146  !  X  =    39.104,   -26.301,   3131.0,    0.0!  !END!  Bridger WA    (Class_I)
147  !  X  =    40.418,   -26.293,   3158.0,    0.0!  !END!  Bridger WA    (Class_I)
148  !  X  =    41.732,   -26.285,   3292.0,    0.0!  !END!  Bridger WA    (Class_I)
149  !  X  =    43.047,   -26.276,   3331.0,    0.0!  !END!  Bridger WA    (Class_I)
150  !  X  =    44.361,   -26.267,   3532.0,    0.0!  !END!  Bridger WA    (Class_I)
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151	!	X	=	22.010,	-24.593,	2804.0,	0.0!	!END!	Bridger WA	(Class_I)
152	!	X	=	23.324,	-24.588,	2925.0,	0.0!	!END!	Bridger WA	(Class_I)
153	!	X	=	24.638,	-24.583,	2938.0,	0.0!	!END!	Bridger WA	(Class_I)
154	!	X	=	25.952,	-24.578,	2976.0,	0.0!	!END!	Bridger WA	(Class_I)
155	!	X	=	27.266,	-24.572,	2979.0,	0.0!	!END!	Bridger WA	(Class_I)
156	!	X	=	28.580,	-24.566,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
157	!	X	=	29.894,	-24.560,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
158	!	X	=	31.208,	-24.554,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
159	!	X	=	32.522,	-24.547,	3164.0,	0.0!	!END!	Bridger WA	(Class_I)
160	!	X	=	33.836,	-24.540,	3103.0,	0.0!	!END!	Bridger WA	(Class_I)
161	!	X	=	35.150,	-24.533,	3198.0,	0.0!	!END!	Bridger WA	(Class_I)
162	!	X	=	36.465,	-24.526,	3299.0,	0.0!	!END!	Bridger WA	(Class_I)
163	!	X	=	37.779,	-24.518,	3484.0,	0.0!	!END!	Bridger WA	(Class_I)
164	!	X	=	39.093,	-24.510,	3108.0,	0.0!	!END!	Bridger WA	(Class_I)
165	!	X	=	40.407,	-24.502,	3228.0,	0.0!	!END!	Bridger WA	(Class_I)
166	!	X	=	41.721,	-24.493,	3401.0,	0.0!	!END!	Bridger WA	(Class_I)
167	!	X	=	14.122,	-22.824,	2413.0,	0.0!	!END!	Bridger WA	(Class_I)
168	!	X	=	15.436,	-22.821,	2438.0,	0.0!	!END!	Bridger WA	(Class_I)
169	!	X	=	16.749,	-22.817,	2412.0,	0.0!	!END!	Bridger WA	(Class_I)
170	!	X	=	18.063,	-22.814,	2555.0,	0.0!	!END!	Bridger WA	(Class_I)
171	!	X	=	19.377,	-22.810,	2743.0,	0.0!	!END!	Bridger WA	(Class_I)
172	!	X	=	20.690,	-22.806,	2892.0,	0.0!	!END!	Bridger WA	(Class_I)
173	!	X	=	22.004,	-22.801,	2872.0,	0.0!	!END!	Bridger WA	(Class_I)
174	!	X	=	23.318,	-22.796,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
175	!	X	=	24.631,	-22.791,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
176	!	X	=	25.945,	-22.786,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
177	!	X	=	27.259,	-22.781,	3060.0,	0.0!	!END!	Bridger WA	(Class_I)
178	!	X	=	28.572,	-22.775,	3089.0,	0.0!	!END!	Bridger WA	(Class_I)
179	!	X	=	29.886,	-22.769,	3079.0,	0.0!	!END!	Bridger WA	(Class_I)
180	!	X	=	31.200,	-22.762,	3069.0,	0.0!	!END!	Bridger WA	(Class_I)
181	!	X	=	32.513,	-22.756,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
182	!	X	=	33.827,	-22.749,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
183	!	X	=	35.141,	-22.742,	3199.0,	0.0!	!END!	Bridger WA	(Class_I)
184	!	X	=	36.454,	-22.734,	3347.0,	0.0!	!END!	Bridger WA	(Class_I)
185	!	X	=	37.768,	-22.726,	3196.0,	0.0!	!END!	Bridger WA	(Class_I)
186	!	X	=	39.081,	-22.718,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
187	!	X	=	40.395,	-22.710,	3351.0,	0.0!	!END!	Bridger WA	(Class_I)
188	!	X	=	15.431,	-21.029,	2276.0,	0.0!	!END!	Bridger WA	(Class_I)
189	!	X	=	16.745,	-21.026,	2409.0,	0.0!	!END!	Bridger WA	(Class_I)
190	!	X	=	18.058,	-21.022,	2423.0,	0.0!	!END!	Bridger WA	(Class_I)
191	!	X	=	19.371,	-21.018,	2621.0,	0.0!	!END!	Bridger WA	(Class_I)
192	!	X	=	20.684,	-21.014,	2828.0,	0.0!	!END!	Bridger WA	(Class_I)
193	!	X	=	21.998,	-21.010,	2902.0,	0.0!	!END!	Bridger WA	(Class_I)
194	!	X	=	23.311,	-21.005,	2845.0,	0.0!	!END!	Bridger WA	(Class_I)
195	!	X	=	24.624,	-21.000,	2861.0,	0.0!	!END!	Bridger WA	(Class_I)
196	!	X	=	25.938,	-20.995,	2903.0,	0.0!	!END!	Bridger WA	(Class_I)
197	!	X	=	27.251,	-20.989,	2939.0,	0.0!	!END!	Bridger WA	(Class_I)
198	!	X	=	28.564,	-20.983,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
199	!	X	=	29.877,	-20.977,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
200	!	X	=	31.191,	-20.971,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
201	!	X	=	32.504,	-20.964,	3072.0,	0.0!	!END!	Bridger WA	(Class_I)
202	!	X	=	33.817,	-20.957,	3216.0,	0.0!	!END!	Bridger WA	(Class_I)
203	!	X	=	35.131,	-20.950,	3282.0,	0.0!	!END!	Bridger WA	(Class_I)
204	!	X	=	36.444,	-20.943,	3319.0,	0.0!	!END!	Bridger WA	(Class_I)
205	!	X	=	37.757,	-20.935,	3502.0,	0.0!	!END!	Bridger WA	(Class_I)
206	!	X	=	15.427,	-19.238,	2548.0,	0.0!	!END!	Bridger WA	(Class_I)
207	!	X	=	16.740,	-19.234,	2652.0,	0.0!	!END!	Bridger WA	(Class_I)
208	!	X	=	18.053,	-19.231,	2712.0,	0.0!	!END!	Bridger WA	(Class_I)
209	!	X	=	19.366,	-19.227,	2637.0,	0.0!	!END!	Bridger WA	(Class_I)
210	!	X	=	20.679,	-19.223,	2682.0,	0.0!	!END!	Bridger WA	(Class_I)
211	!	X	=	21.991,	-19.218,	2682.0,	0.0!	!END!	Bridger WA	(Class_I)
212	!	X	=	23.304,	-19.213,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
213	!	X	=	24.617,	-19.208,	2895.0,	0.0!	!END!	Bridger WA	(Class_I)
214	!	X	=	25.930,	-19.203,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
215	!	X	=	27.243,	-19.198,	2947.0,	0.0!	!END!	Bridger WA	(Class_I)
216	!	X	=	28.556,	-19.192,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
217	!	X	=	29.869,	-19.186,	3046.0,	0.0!	!END!	Bridger WA	(Class_I)
218	!	X	=	31.182,	-19.179,	3082.0,	0.0!	!END!	Bridger WA	(Class_I)
219	!	X	=	32.495,	-19.173,	3143.0,	0.0!	!END!	Bridger WA	(Class_I)
220	!	X	=	33.808,	-19.166,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
221	!	X	=	35.121,	-19.159,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)

222	!	X	=	36.433,	-19.151,	3719.0,	0.0!	!END!	Bridger WA	(Class_I)
223	!	X	=	15.422,	-17.446,	2743.0,	0.0!	!END!	Bridger WA	(Class_I)
224	!	X	=	16.735,	-17.443,	2808.0,	0.0!	!END!	Bridger WA	(Class_I)
225	!	X	=	18.048,	-17.439,	2924.0,	0.0!	!END!	Bridger WA	(Class_I)
226	!	X	=	19.360,	-17.435,	2859.0,	0.0!	!END!	Bridger WA	(Class_I)
227	!	X	=	20.673,	-17.431,	2804.0,	0.0!	!END!	Bridger WA	(Class_I)
228	!	X	=	21.985,	-17.427,	2899.0,	0.0!	!END!	Bridger WA	(Class_I)
229	!	X	=	23.298,	-17.422,	2925.0,	0.0!	!END!	Bridger WA	(Class_I)
230	!	X	=	24.610,	-17.417,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
231	!	X	=	25.923,	-17.412,	2978.0,	0.0!	!END!	Bridger WA	(Class_I)
232	!	X	=	27.235,	-17.406,	3045.0,	0.0!	!END!	Bridger WA	(Class_I)
233	!	X	=	28.548,	-17.400,	3044.0,	0.0!	!END!	Bridger WA	(Class_I)
234	!	X	=	29.860,	-17.394,	3039.0,	0.0!	!END!	Bridger WA	(Class_I)
235	!	X	=	31.173,	-17.388,	3205.0,	0.0!	!END!	Bridger WA	(Class_I)
236	!	X	=	32.486,	-17.381,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
237	!	X	=	33.798,	-17.375,	3386.0,	0.0!	!END!	Bridger WA	(Class_I)
238	!	X	=	35.111,	-17.367,	3415.0,	0.0!	!END!	Bridger WA	(Class_I)
239	!	X	=	36.423,	-17.360,	3656.0,	0.0!	!END!	Bridger WA	(Class_I)
240	!	X	=	14.106,	-15.658,	2659.0,	0.0!	!END!	Bridger WA	(Class_I)
241	!	X	=	15.418,	-15.655,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
242	!	X	=	16.730,	-15.652,	2915.0,	0.0!	!END!	Bridger WA	(Class_I)
243	!	X	=	18.042,	-15.648,	2929.0,	0.0!	!END!	Bridger WA	(Class_I)
244	!	X	=	19.355,	-15.644,	2974.0,	0.0!	!END!	Bridger WA	(Class_I)
245	!	X	=	20.667,	-15.640,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
246	!	X	=	21.979,	-15.635,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
247	!	X	=	23.291,	-15.631,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
248	!	X	=	24.603,	-15.626,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
249	!	X	=	25.915,	-15.620,	3026.0,	0.0!	!END!	Bridger WA	(Class_I)
250	!	X	=	27.228,	-15.615,	3113.0,	0.0!	!END!	Bridger WA	(Class_I)
251	!	X	=	28.540,	-15.609,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
252	!	X	=	29.852,	-15.603,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
253	!	X	=	31.164,	-15.597,	3107.0,	0.0!	!END!	Bridger WA	(Class_I)
254	!	X	=	32.476,	-15.590,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
255	!	X	=	33.788,	-15.583,	3279.0,	0.0!	!END!	Bridger WA	(Class_I)
256	!	X	=	35.101,	-15.576,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
257	!	X	=	12.790,	-13.869,	2848.0,	0.0!	!END!	Bridger WA	(Class_I)
258	!	X	=	14.102,	-13.867,	2792.0,	0.0!	!END!	Bridger WA	(Class_I)
259	!	X	=	15.414,	-13.863,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
260	!	X	=	16.726,	-13.860,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
261	!	X	=	18.037,	-13.857,	2969.0,	0.0!	!END!	Bridger WA	(Class_I)
262	!	X	=	19.349,	-13.853,	3033.0,	0.0!	!END!	Bridger WA	(Class_I)
263	!	X	=	20.661,	-13.848,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
264	!	X	=	21.973,	-13.844,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
265	!	X	=	23.285,	-13.839,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
266	!	X	=	24.596,	-13.834,	3066.0,	0.0!	!END!	Bridger WA	(Class_I)
267	!	X	=	25.908,	-13.829,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
268	!	X	=	27.220,	-13.824,	3272.0,	0.0!	!END!	Bridger WA	(Class_I)
269	!	X	=	28.532,	-13.818,	3190.0,	0.0!	!END!	Bridger WA	(Class_I)
270	!	X	=	29.843,	-13.812,	3184.0,	0.0!	!END!	Bridger WA	(Class_I)
271	!	X	=	31.155,	-13.805,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
272	!	X	=	32.467,	-13.799,	3216.0,	0.0!	!END!	Bridger WA	(Class_I)
273	!	X	=	33.779,	-13.792,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
274	!	X	=	35.091,	-13.785,	3443.0,	0.0!	!END!	Bridger WA	(Class_I)
275	!	X	=	11.475,	-12.081,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
276	!	X	=	12.786,	-12.078,	2917.0,	0.0!	!END!	Bridger WA	(Class_I)
277	!	X	=	14.098,	-12.075,	2906.0,	0.0!	!END!	Bridger WA	(Class_I)
278	!	X	=	15.409,	-12.072,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
279	!	X	=	16.721,	-12.069,	2940.0,	0.0!	!END!	Bridger WA	(Class_I)
280	!	X	=	18.032,	-12.065,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
281	!	X	=	19.344,	-12.061,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
282	!	X	=	20.655,	-12.057,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
283	!	X	=	21.966,	-12.053,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
284	!	X	=	23.278,	-12.048,	3028.0,	0.0!	!END!	Bridger WA	(Class_I)
285	!	X	=	24.589,	-12.043,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
286	!	X	=	25.901,	-12.038,	3171.0,	0.0!	!END!	Bridger WA	(Class_I)
287	!	X	=	27.212,	-12.032,	3324.0,	0.0!	!END!	Bridger WA	(Class_I)
288	!	X	=	28.524,	-12.026,	3402.0,	0.0!	!END!	Bridger WA	(Class_I)
289	!	X	=	29.835,	-12.020,	3275.0,	0.0!	!END!	Bridger WA	(Class_I)
290	!	X	=	31.146,	-12.014,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
291	!	X	=	32.458,	-12.007,	3536.0,	0.0!	!END!	Bridger WA	(Class_I)
292	!	X	=	33.769,	-12.000,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)

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293 ! X = 10.161, -10.291, 2568.0, 0.0! !END! Bridger WA (Class_I)
294 ! X = 11.472, -10.289, 2743.0, 0.0! !END! Bridger WA (Class_I)
295 ! X = 12.783, -10.287, 2804.0, 0.0! !END! Bridger WA (Class_I)
296 ! X = 14.094, -10.284, 2987.0, 0.0! !END! Bridger WA (Class_I)
297 ! X = 15.405, -10.281, 2987.0, 0.0! !END! Bridger WA (Class_I)
298 ! X = 16.716, -10.277, 3041.0, 0.0! !END! Bridger WA (Class_I)
299 ! X = 18.027, -10.274, 3048.0, 0.0! !END! Bridger WA (Class_I)
300 ! X = 19.338, -10.270, 3231.0, 0.0! !END! Bridger WA (Class_I)
301 ! X = 20.649, -10.266, 3246.0, 0.0! !END! Bridger WA (Class_I)
302 ! X = 21.960, -10.261, 3427.0, 0.0! !END! Bridger WA (Class_I)
303 ! X = 23.271, -10.257, 3115.0, 0.0! !END! Bridger WA (Class_I)
304 ! X = 24.582, -10.252, 3201.0, 0.0! !END! Bridger WA (Class_I)
305 ! X = 25.893, -10.246, 3270.0, 0.0! !END! Bridger WA (Class_I)
306 ! X = 27.204, -10.241, 3297.0, 0.0! !END! Bridger WA (Class_I)
307 ! X = 28.515, -10.235, 3530.0, 0.0! !END! Bridger WA (Class_I)
308 ! X = 29.827, -10.229, 3482.0, 0.0! !END! Bridger WA (Class_I)
309 ! X = 8.847, -8.502, 2927.0, 0.0! !END! Bridger WA (Class_I)
310 ! X = 10.158, -8.500, 2823.0, 0.0! !END! Bridger WA (Class_I)
311 ! X = 11.469, -8.498, 2864.0, 0.0! !END! Bridger WA (Class_I)
312 ! X = 12.779, -8.495, 2968.0, 0.0! !END! Bridger WA (Class_I)
313 ! X = 14.090, -8.493, 3002.0, 0.0! !END! Bridger WA (Class_I)
314 ! X = 15.401, -8.490, 3016.0, 0.0! !END! Bridger WA (Class_I)
315 ! X = 16.711, -8.486, 3097.0, 0.0! !END! Bridger WA (Class_I)
316 ! X = 18.022, -8.483, 3170.0, 0.0! !END! Bridger WA (Class_I)
317 ! X = 19.333, -8.479, 3138.0, 0.0! !END! Bridger WA (Class_I)
318 ! X = 20.643, -8.475, 3414.0, 0.0! !END! Bridger WA (Class_I)
319 ! X = 21.954, -8.470, 3262.0, 0.0! !END! Bridger WA (Class_I)
320 ! X = 23.265, -8.465, 3161.0, 0.0! !END! Bridger WA (Class_I)
321 ! X = 24.575, -8.460, 3464.0, 0.0! !END! Bridger WA (Class_I)
322 ! X = 25.886, -8.455, 3304.0, 0.0! !END! Bridger WA (Class_I)
323 ! X = 27.197, -8.450, 3657.0, 0.0! !END! Bridger WA (Class_I)
324 ! X = 10.155, -6.709, 3037.0, 0.0! !END! Bridger WA (Class_I)
325 ! X = 11.465, -6.707, 2820.0, 0.0! !END! Bridger WA (Class_I)
326 ! X = 12.776, -6.704, 3040.0, 0.0! !END! Bridger WA (Class_I)
327 ! X = 14.086, -6.701, 3049.0, 0.0! !END! Bridger WA (Class_I)
328 ! X = 15.396, -6.698, 3134.0, 0.0! !END! Bridger WA (Class_I)
329 ! X = 16.706, -6.695, 3246.0, 0.0! !END! Bridger WA (Class_I)
330 ! X = 18.017, -6.691, 3232.0, 0.0! !END! Bridger WA (Class_I)
331 ! X = 19.327, -6.687, 3256.0, 0.0! !END! Bridger WA (Class_I)
332 ! X = 20.637, -6.683, 3305.0, 0.0! !END! Bridger WA (Class_I)
333 ! X = 21.948, -6.679, 3433.0, 0.0! !END! Bridger WA (Class_I)
334 ! X = 23.258, -6.674, 3187.0, 0.0! !END! Bridger WA (Class_I)
335 ! X = 24.568, -6.669, 3241.0, 0.0! !END! Bridger WA (Class_I)
336 ! X = 25.879, -6.664, 3426.0, 0.0! !END! Bridger WA (Class_I)
337 ! X = 8.842, -4.920, 3048.0, 0.0! !END! Bridger WA (Class_I)
338 ! X = 10.152, -4.918, 3114.0, 0.0! !END! Bridger WA (Class_I)
339 ! X = 11.462, -4.915, 3044.0, 0.0! !END! Bridger WA (Class_I)
340 ! X = 12.772, -4.913, 3003.0, 0.0! !END! Bridger WA (Class_I)
341 ! X = 14.082, -4.910, 3100.0, 0.0! !END! Bridger WA (Class_I)
342 ! X = 15.392, -4.907, 3243.0, 0.0! !END! Bridger WA (Class_I)
343 ! X = 16.702, -4.904, 3414.0, 0.0! !END! Bridger WA (Class_I)
344 ! X = 18.012, -4.900, 3349.0, 0.0! !END! Bridger WA (Class_I)
345 ! X = 19.322, -4.896, 3371.0, 0.0! !END! Bridger WA (Class_I)
346 ! X = 20.632, -4.892, 3359.0, 0.0! !END! Bridger WA (Class_I)
347 ! X = 21.941, -4.888, 3500.0, 0.0! !END! Bridger WA (Class_I)
348 ! X = 23.251, -4.883, 3353.0, 0.0! !END! Bridger WA (Class_I)
349 ! X = 3.601, -3.134, 2530.0, 0.0! !END! Bridger WA (Class_I)
350 ! X = 4.911, -3.133, 2540.0, 0.0! !END! Bridger WA (Class_I)
351 ! X = 6.220, -3.132, 2723.0, 0.0! !END! Bridger WA (Class_I)
352 ! X = 7.530, -3.130, 3109.0, 0.0! !END! Bridger WA (Class_I)
353 ! X = 8.840, -3.128, 3146.0, 0.0! !END! Bridger WA (Class_I)
354 ! X = 10.149, -3.126, 3170.0, 0.0! !END! Bridger WA (Class_I)
355 ! X = 11.459, -3.124, 3177.0, 0.0! !END! Bridger WA (Class_I)
356 ! X = 12.768, -3.122, 3119.0, 0.0! !END! Bridger WA (Class_I)
357 ! X = 14.078, -3.119, 3048.0, 0.0! !END! Bridger WA (Class_I)
358 ! X = 15.387, -3.116, 3111.0, 0.0! !END! Bridger WA (Class_I)
359 ! X = 16.697, -3.112, 3207.0, 0.0! !END! Bridger WA (Class_I)
360 ! X = 18.007, -3.109, 3247.0, 0.0! !END! Bridger WA (Class_I)
361 ! X = -5.564, -1.341, 2553.0, 0.0! !END! Bridger WA (Class_I)
362 ! X = -4.255, -1.342, 2599.0, 0.0! !END! Bridger WA (Class_I)
363 ! X = -2.946, -1.343, 2380.0, 0.0! !END! Bridger WA (Class_I)
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364	!	X	=	-1.636,	-1.343,	2621.0,	0.0!	!END!	Bridger WA	(Class_I)
365	!	X	=	-0.327,	-1.343,	2852.0,	0.0!	!END!	Bridger WA	(Class_I)
366	!	X	=	0.982,	-1.343,	2826.0,	0.0!	!END!	Bridger WA	(Class_I)
367	!	X	=	2.291,	-1.343,	2451.0,	0.0!	!END!	Bridger WA	(Class_I)
368	!	X	=	3.600,	-1.342,	2471.0,	0.0!	!END!	Bridger WA	(Class_I)
369	!	X	=	4.909,	-1.341,	2753.0,	0.0!	!END!	Bridger WA	(Class_I)
370	!	X	=	6.219,	-1.340,	2804.0,	0.0!	!END!	Bridger WA	(Class_I)
371	!	X	=	7.528,	-1.339,	2743.0,	0.0!	!END!	Bridger WA	(Class_I)
372	!	X	=	8.837,	-1.337,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
373	!	X	=	10.146,	-1.335,	3103.0,	0.0!	!END!	Bridger WA	(Class_I)
374	!	X	=	11.455,	-1.333,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
375	!	X	=	12.765,	-1.330,	3288.0,	0.0!	!END!	Bridger WA	(Class_I)
376	!	X	=	14.074,	-1.328,	3232.0,	0.0!	!END!	Bridger WA	(Class_I)
377	!	X	=	15.383,	-1.325,	3169.0,	0.0!	!END!	Bridger WA	(Class_I)
378	!	X	=	16.692,	-1.321,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
379	!	X	=	18.001,	-1.318,	3643.0,	0.0!	!END!	Bridger WA	(Class_I)
380	!	X	=	19.311,	-1.314,	3595.0,	0.0!	!END!	Bridger WA	(Class_I)
381	!	X	=	-5.563,	0.450,	2786.0,	0.0!	!END!	Bridger WA	(Class_I)
382	!	X	=	-4.254,	0.449,	2804.0,	0.0!	!END!	Bridger WA	(Class_I)
383	!	X	=	-2.945,	0.448,	2550.0,	0.0!	!END!	Bridger WA	(Class_I)
384	!	X	=	-1.636,	0.448,	2524.0,	0.0!	!END!	Bridger WA	(Class_I)
385	!	X	=	-0.327,	0.448,	3043.0,	0.0!	!END!	Bridger WA	(Class_I)
386	!	X	=	0.982,	0.448,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
387	!	X	=	2.290,	0.448,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
388	!	X	=	3.599,	0.449,	2854.0,	0.0!	!END!	Bridger WA	(Class_I)
389	!	X	=	4.908,	0.450,	2872.0,	0.0!	!END!	Bridger WA	(Class_I)
390	!	X	=	6.217,	0.451,	2957.0,	0.0!	!END!	Bridger WA	(Class_I)
391	!	X	=	7.526,	0.452,	3041.0,	0.0!	!END!	Bridger WA	(Class_I)
392	!	X	=	8.835,	0.454,	2743.0,	0.0!	!END!	Bridger WA	(Class_I)
393	!	X	=	10.143,	0.456,	3103.0,	0.0!	!END!	Bridger WA	(Class_I)
394	!	X	=	11.452,	0.458,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
395	!	X	=	12.761,	0.461,	3306.0,	0.0!	!END!	Bridger WA	(Class_I)
396	!	X	=	14.070,	0.464,	3406.0,	0.0!	!END!	Bridger WA	(Class_I)
397	!	X	=	15.379,	0.467,	3326.0,	0.0!	!END!	Bridger WA	(Class_I)
398	!	X	=	16.687,	0.470,	3402.0,	0.0!	!END!	Bridger WA	(Class_I)
399	!	X	=	17.996,	0.474,	3649.0,	0.0!	!END!	Bridger WA	(Class_I)
400	!	X	=	-5.561,	2.241,	2864.0,	0.0!	!END!	Bridger WA	(Class_I)
401	!	X	=	-4.252,	2.240,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
402	!	X	=	-2.944,	2.240,	2645.0,	0.0!	!END!	Bridger WA	(Class_I)
403	!	X	=	-1.636,	2.239,	2768.0,	0.0!	!END!	Bridger WA	(Class_I)
404	!	X	=	-0.327,	2.239,	3021.0,	0.0!	!END!	Bridger WA	(Class_I)
405	!	X	=	0.981,	2.239,	2864.0,	0.0!	!END!	Bridger WA	(Class_I)
406	!	X	=	2.290,	2.239,	3059.0,	0.0!	!END!	Bridger WA	(Class_I)
407	!	X	=	3.598,	2.240,	2820.0,	0.0!	!END!	Bridger WA	(Class_I)
408	!	X	=	4.907,	2.241,	3089.0,	0.0!	!END!	Bridger WA	(Class_I)
409	!	X	=	6.215,	2.242,	3131.0,	0.0!	!END!	Bridger WA	(Class_I)
410	!	X	=	7.524,	2.243,	3171.0,	0.0!	!END!	Bridger WA	(Class_I)
411	!	X	=	8.832,	2.245,	2947.0,	0.0!	!END!	Bridger WA	(Class_I)
412	!	X	=	10.140,	2.247,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
413	!	X	=	11.449,	2.249,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
414	!	X	=	12.757,	2.252,	3351.0,	0.0!	!END!	Bridger WA	(Class_I)
415	!	X	=	14.066,	2.255,	3401.0,	0.0!	!END!	Bridger WA	(Class_I)
416	!	X	=	15.374,	2.258,	3536.0,	0.0!	!END!	Bridger WA	(Class_I)
417	!	X	=	16.683,	2.261,	3232.0,	0.0!	!END!	Bridger WA	(Class_I)
418	!	X	=	17.991,	2.265,	3493.0,	0.0!	!END!	Bridger WA	(Class_I)
419	!	X	=	19.300,	2.269,	3822.0,	0.0!	!END!	Bridger WA	(Class_I)
420	!	X	=	-6.867,	4.034,	2560.0,	0.0!	!END!	Bridger WA	(Class_I)
421	!	X	=	-5.559,	4.033,	2887.0,	0.0!	!END!	Bridger WA	(Class_I)
422	!	X	=	-4.251,	4.032,	2918.0,	0.0!	!END!	Bridger WA	(Class_I)
423	!	X	=	-2.943,	4.031,	2886.0,	0.0!	!END!	Bridger WA	(Class_I)
424	!	X	=	-1.635,	4.030,	2938.0,	0.0!	!END!	Bridger WA	(Class_I)
425	!	X	=	-0.327,	4.030,	2883.0,	0.0!	!END!	Bridger WA	(Class_I)
426	!	X	=	0.981,	4.030,	3036.0,	0.0!	!END!	Bridger WA	(Class_I)
427	!	X	=	2.289,	4.031,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
428	!	X	=	3.597,	4.031,	3017.0,	0.0!	!END!	Bridger WA	(Class_I)
429	!	X	=	4.905,	4.032,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
430	!	X	=	6.213,	4.033,	3227.0,	0.0!	!END!	Bridger WA	(Class_I)
431	!	X	=	7.521,	4.035,	3235.0,	0.0!	!END!	Bridger WA	(Class_I)
432	!	X	=	8.830,	4.036,	3176.0,	0.0!	!END!	Bridger WA	(Class_I)
433	!	X	=	10.138,	4.038,	3117.0,	0.0!	!END!	Bridger WA	(Class_I)
434	!	X	=	11.446,	4.041,	3178.0,	0.0!	!END!	Bridger WA	(Class_I)

435	!	X	=	12.754,	4.043,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
436	!	X	=	14.062,	4.046,	3346.0,	0.0!	!END!	Bridger WA	(Class_I)
437	!	X	=	15.370,	4.049,	3596.0,	0.0!	!END!	Bridger WA	(Class_I)
438	!	X	=	16.678,	4.052,	3505.0,	0.0!	!END!	Bridger WA	(Class_I)
439	!	X	=	17.986,	4.056,	3685.0,	0.0!	!END!	Bridger WA	(Class_I)
440	!	X	=	-8.173,	5.827,	2669.0,	0.0!	!END!	Bridger WA	(Class_I)
441	!	X	=	-6.865,	5.825,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
442	!	X	=	-5.558,	5.824,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
443	!	X	=	-4.250,	5.823,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
444	!	X	=	-2.942,	5.822,	3033.0,	0.0!	!END!	Bridger WA	(Class_I)
445	!	X	=	-1.635,	5.821,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
446	!	X	=	-0.327,	5.821,	3004.0,	0.0!	!END!	Bridger WA	(Class_I)
447	!	X	=	0.981,	5.821,	2990.0,	0.0!	!END!	Bridger WA	(Class_I)
448	!	X	=	2.288,	5.822,	2986.0,	0.0!	!END!	Bridger WA	(Class_I)
449	!	X	=	3.596,	5.822,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
450	!	X	=	4.904,	5.823,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
451	!	X	=	6.212,	5.824,	3217.0,	0.0!	!END!	Bridger WA	(Class_I)
452	!	X	=	7.519,	5.826,	3475.0,	0.0!	!END!	Bridger WA	(Class_I)
453	!	X	=	8.827,	5.827,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
454	!	X	=	10.135,	5.829,	3285.0,	0.0!	!END!	Bridger WA	(Class_I)
455	!	X	=	11.442,	5.832,	3402.0,	0.0!	!END!	Bridger WA	(Class_I)
456	!	X	=	12.750,	5.834,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
457	!	X	=	14.058,	5.837,	3431.0,	0.0!	!END!	Bridger WA	(Class_I)
458	!	X	=	15.366,	5.840,	3499.0,	0.0!	!END!	Bridger WA	(Class_I)
459	!	X	=	16.673,	5.843,	3641.0,	0.0!	!END!	Bridger WA	(Class_I)
460	!	X	=	-10.785,	7.622,	2729.0,	0.0!	!END!	Bridger WA	(Class_I)
461	!	X	=	-9.478,	7.619,	2562.0,	0.0!	!END!	Bridger WA	(Class_I)
462	!	X	=	-6.863,	7.616,	2791.0,	0.0!	!END!	Bridger WA	(Class_I)
463	!	X	=	-5.556,	7.615,	3002.0,	0.0!	!END!	Bridger WA	(Class_I)
464	!	X	=	-4.249,	7.614,	3214.0,	0.0!	!END!	Bridger WA	(Class_I)
465	!	X	=	-2.941,	7.613,	3196.0,	0.0!	!END!	Bridger WA	(Class_I)
466	!	X	=	-1.634,	7.613,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
467	!	X	=	-0.327,	7.612,	3133.0,	0.0!	!END!	Bridger WA	(Class_I)
468	!	X	=	0.980,	7.612,	3177.0,	0.0!	!END!	Bridger WA	(Class_I)
469	!	X	=	2.288,	7.613,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
470	!	X	=	3.595,	7.613,	2986.0,	0.0!	!END!	Bridger WA	(Class_I)
471	!	X	=	4.902,	7.614,	3159.0,	0.0!	!END!	Bridger WA	(Class_I)
472	!	X	=	6.210,	7.615,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
473	!	X	=	7.517,	7.617,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
474	!	X	=	8.824,	7.618,	3349.0,	0.0!	!END!	Bridger WA	(Class_I)
475	!	X	=	10.132,	7.620,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
476	!	X	=	11.439,	7.623,	3613.0,	0.0!	!END!	Bridger WA	(Class_I)
477	!	X	=	12.746,	7.625,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
478	!	X	=	14.054,	7.628,	3828.0,	0.0!	!END!	Bridger WA	(Class_I)
479	!	X	=	-10.782,	9.413,	2877.0,	0.0!	!END!	Bridger WA	(Class_I)
480	!	X	=	-9.475,	9.411,	2864.0,	0.0!	!END!	Bridger WA	(Class_I)
481	!	X	=	-8.168,	9.409,	2861.0,	0.0!	!END!	Bridger WA	(Class_I)
482	!	X	=	-6.862,	9.407,	2764.0,	0.0!	!END!	Bridger WA	(Class_I)
483	!	X	=	-5.555,	9.406,	2584.0,	0.0!	!END!	Bridger WA	(Class_I)
484	!	X	=	-4.248,	9.405,	2701.0,	0.0!	!END!	Bridger WA	(Class_I)
485	!	X	=	-2.941,	9.404,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
486	!	X	=	-1.634,	9.404,	3115.0,	0.0!	!END!	Bridger WA	(Class_I)
487	!	X	=	-0.327,	9.403,	3239.0,	0.0!	!END!	Bridger WA	(Class_I)
488	!	X	=	0.980,	9.403,	3233.0,	0.0!	!END!	Bridger WA	(Class_I)
489	!	X	=	2.287,	9.404,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
490	!	X	=	3.594,	9.404,	3163.0,	0.0!	!END!	Bridger WA	(Class_I)
491	!	X	=	4.901,	9.405,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
492	!	X	=	6.208,	9.406,	3461.0,	0.0!	!END!	Bridger WA	(Class_I)
493	!	X	=	7.515,	9.408,	3313.0,	0.0!	!END!	Bridger WA	(Class_I)
494	!	X	=	8.822,	9.410,	3473.0,	0.0!	!END!	Bridger WA	(Class_I)
495	!	X	=	10.129,	9.412,	3535.0,	0.0!	!END!	Bridger WA	(Class_I)
496	!	X	=	11.436,	9.414,	3452.0,	0.0!	!END!	Bridger WA	(Class_I)
497	!	X	=	12.743,	9.416,	3315.0,	0.0!	!END!	Bridger WA	(Class_I)
498	!	X	=	-10.779,	11.204,	2621.0,	0.0!	!END!	Bridger WA	(Class_I)
499	!	X	=	-9.473,	11.202,	2682.0,	0.0!	!END!	Bridger WA	(Class_I)
500	!	X	=	-8.166,	11.200,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
501	!	X	=	-6.860,	11.198,	3195.0,	0.0!	!END!	Bridger WA	(Class_I)
502	!	X	=	-5.553,	11.197,	3268.0,	0.0!	!END!	Bridger WA	(Class_I)
503	!	X	=	-4.246,	11.196,	2995.0,	0.0!	!END!	Bridger WA	(Class_I)
504	!	X	=	-2.940,	11.195,	3115.0,	0.0!	!END!	Bridger WA	(Class_I)
505	!	X	=	-1.633,	11.195,	2954.0,	0.0!	!END!	Bridger WA	(Class_I)

506	!	X	=	-0.327,	11.194,	3163.0,	0.0!	!END!	Bridger WA	(Class_I)
507	!	X	=	0.980,	11.194,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
508	!	X	=	2.287,	11.195,	3414.0,	0.0!	!END!	Bridger WA	(Class_I)
509	!	X	=	3.593,	11.195,	3282.0,	0.0!	!END!	Bridger WA	(Class_I)
510	!	X	=	4.900,	11.196,	3352.0,	0.0!	!END!	Bridger WA	(Class_I)
511	!	X	=	6.206,	11.197,	3200.0,	0.0!	!END!	Bridger WA	(Class_I)
512	!	X	=	7.513,	11.199,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
513	!	X	=	8.819,	11.201,	3332.0,	0.0!	!END!	Bridger WA	(Class_I)
514	!	X	=	10.126,	11.203,	3488.0,	0.0!	!END!	Bridger WA	(Class_I)
515	!	X	=	11.433,	11.205,	3605.0,	0.0!	!END!	Bridger WA	(Class_I)
516	!	X	=	12.739,	11.207,	3571.0,	0.0!	!END!	Bridger WA	(Class_I)
517	!	X	=	-10.776,	12.995,	2740.0,	0.0!	!END!	Bridger WA	(Class_I)
518	!	X	=	-9.470,	12.993,	3028.0,	0.0!	!END!	Bridger WA	(Class_I)
519	!	X	=	-8.164,	12.991,	3047.0,	0.0!	!END!	Bridger WA	(Class_I)
520	!	X	=	-6.858,	12.989,	2926.0,	0.0!	!END!	Bridger WA	(Class_I)
521	!	X	=	-5.551,	12.988,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
522	!	X	=	-4.245,	12.987,	3259.0,	0.0!	!END!	Bridger WA	(Class_I)
523	!	X	=	-2.939,	12.986,	2745.0,	0.0!	!END!	Bridger WA	(Class_I)
524	!	X	=	-1.633,	12.986,	3374.0,	0.0!	!END!	Bridger WA	(Class_I)
525	!	X	=	-0.327,	12.985,	3391.0,	0.0!	!END!	Bridger WA	(Class_I)
526	!	X	=	0.980,	12.985,	3400.0,	0.0!	!END!	Bridger WA	(Class_I)
527	!	X	=	2.286,	12.986,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
528	!	X	=	3.592,	12.986,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
529	!	X	=	4.898,	12.987,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
530	!	X	=	6.205,	12.988,	3036.0,	0.0!	!END!	Bridger WA	(Class_I)
531	!	X	=	7.511,	12.990,	3672.0,	0.0!	!END!	Bridger WA	(Class_I)
532	!	X	=	8.817,	12.992,	3559.0,	0.0!	!END!	Bridger WA	(Class_I)
533	!	X	=	10.123,	12.994,	3584.0,	0.0!	!END!	Bridger WA	(Class_I)
534	!	X	=	11.429,	12.996,	3883.0,	0.0!	!END!	Bridger WA	(Class_I)
535	!	X	=	-10.773,	14.786,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
536	!	X	=	-9.467,	14.784,	2815.0,	0.0!	!END!	Bridger WA	(Class_I)
537	!	X	=	-8.162,	14.782,	2986.0,	0.0!	!END!	Bridger WA	(Class_I)
538	!	X	=	-6.856,	14.780,	3277.0,	0.0!	!END!	Bridger WA	(Class_I)
539	!	X	=	-5.550,	14.779,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
540	!	X	=	-4.244,	14.778,	3152.0,	0.0!	!END!	Bridger WA	(Class_I)
541	!	X	=	-2.938,	14.777,	3249.0,	0.0!	!END!	Bridger WA	(Class_I)
542	!	X	=	-1.632,	14.777,	3233.0,	0.0!	!END!	Bridger WA	(Class_I)
543	!	X	=	-0.326,	14.776,	3297.0,	0.0!	!END!	Bridger WA	(Class_I)
544	!	X	=	0.979,	14.776,	3242.0,	0.0!	!END!	Bridger WA	(Class_I)
545	!	X	=	2.285,	14.777,	3265.0,	0.0!	!END!	Bridger WA	(Class_I)
546	!	X	=	3.591,	14.777,	3099.0,	0.0!	!END!	Bridger WA	(Class_I)
547	!	X	=	4.897,	14.778,	2621.0,	0.0!	!END!	Bridger WA	(Class_I)
548	!	X	=	6.203,	14.779,	2942.0,	0.0!	!END!	Bridger WA	(Class_I)
549	!	X	=	7.509,	14.781,	3513.0,	0.0!	!END!	Bridger WA	(Class_I)
550	!	X	=	8.814,	14.783,	3307.0,	0.0!	!END!	Bridger WA	(Class_I)
551	!	X	=	10.120,	14.785,	3464.0,	0.0!	!END!	Bridger WA	(Class_I)
552	!	X	=	-9.465,	16.575,	2816.0,	0.0!	!END!	Bridger WA	(Class_I)
553	!	X	=	-8.159,	16.573,	3189.0,	0.0!	!END!	Bridger WA	(Class_I)
554	!	X	=	-6.854,	16.571,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
555	!	X	=	-5.548,	16.570,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
556	!	X	=	-4.243,	16.569,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
557	!	X	=	-2.937,	16.568,	3381.0,	0.0!	!END!	Bridger WA	(Class_I)
558	!	X	=	-1.632,	16.568,	3536.0,	0.0!	!END!	Bridger WA	(Class_I)
559	!	X	=	-0.326,	16.567,	3475.0,	0.0!	!END!	Bridger WA	(Class_I)
560	!	X	=	0.979,	16.567,	3260.0,	0.0!	!END!	Bridger WA	(Class_I)
561	!	X	=	2.285,	16.568,	2864.0,	0.0!	!END!	Bridger WA	(Class_I)
562	!	X	=	3.590,	16.568,	2540.0,	0.0!	!END!	Bridger WA	(Class_I)
563	!	X	=	4.896,	16.569,	2733.0,	0.0!	!END!	Bridger WA	(Class_I)
564	!	X	=	6.201,	16.570,	3422.0,	0.0!	!END!	Bridger WA	(Class_I)
565	!	X	=	7.506,	16.572,	3444.0,	0.0!	!END!	Bridger WA	(Class_I)
566	!	X	=	8.812,	16.574,	3698.0,	0.0!	!END!	Bridger WA	(Class_I)
567	!	X	=	10.117,	16.576,	3759.0,	0.0!	!END!	Bridger WA	(Class_I)
568	!	X	=	-9.462,	18.365,	3162.0,	0.0!	!END!	Bridger WA	(Class_I)
569	!	X	=	-8.157,	18.364,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
570	!	X	=	-6.852,	18.362,	3365.0,	0.0!	!END!	Bridger WA	(Class_I)
571	!	X	=	-5.547,	18.361,	3327.0,	0.0!	!END!	Bridger WA	(Class_I)
572	!	X	=	-4.242,	18.360,	2970.0,	0.0!	!END!	Bridger WA	(Class_I)
573	!	X	=	-2.936,	18.359,	3257.0,	0.0!	!END!	Bridger WA	(Class_I)
574	!	X	=	-1.631,	18.359,	3470.0,	0.0!	!END!	Bridger WA	(Class_I)
575	!	X	=	-0.326,	18.358,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
576	!	X	=	0.979,	18.358,	3302.0,	0.0!	!END!	Bridger WA	(Class_I)

577	!	X	=	2.284,	18.359,	2825.0,	0.0!	!END!	Bridger WA	(Class_I)
578	!	X	=	3.589,	18.359,	2617.0,	0.0!	!END!	Bridger WA	(Class_I)
579	!	X	=	4.894,	18.360,	3206.0,	0.0!	!END!	Bridger WA	(Class_I)
580	!	X	=	6.199,	18.361,	3414.0,	0.0!	!END!	Bridger WA	(Class_I)
581	!	X	=	7.504,	18.363,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
582	!	X	=	8.809,	18.365,	3402.0,	0.0!	!END!	Bridger WA	(Class_I)
583	!	X	=	-9.459,	20.156,	2967.0,	0.0!	!END!	Bridger WA	(Class_I)
584	!	X	=	-8.155,	20.155,	2961.0,	0.0!	!END!	Bridger WA	(Class_I)
585	!	X	=	-6.850,	20.153,	3396.0,	0.0!	!END!	Bridger WA	(Class_I)
586	!	X	=	-5.545,	20.152,	3402.0,	0.0!	!END!	Bridger WA	(Class_I)
587	!	X	=	-4.240,	20.151,	2820.0,	0.0!	!END!	Bridger WA	(Class_I)
588	!	X	=	-2.936,	20.150,	3048.0,	0.0!	!END!	Bridger WA	(Class_I)
589	!	X	=	-1.631,	20.149,	3369.0,	0.0!	!END!	Bridger WA	(Class_I)
590	!	X	=	-0.326,	20.149,	2600.0,	0.0!	!END!	Bridger WA	(Class_I)
591	!	X	=	0.979,	20.149,	2494.0,	0.0!	!END!	Bridger WA	(Class_I)
592	!	X	=	2.283,	20.150,	2829.0,	0.0!	!END!	Bridger WA	(Class_I)
593	!	X	=	3.588,	20.150,	3281.0,	0.0!	!END!	Bridger WA	(Class_I)
594	!	X	=	4.893,	20.151,	3390.0,	0.0!	!END!	Bridger WA	(Class_I)
595	!	X	=	6.197,	20.152,	3154.0,	0.0!	!END!	Bridger WA	(Class_I)
596	!	X	=	7.502,	20.154,	3597.0,	0.0!	!END!	Bridger WA	(Class_I)
597	!	X	=	8.807,	20.155,	3829.0,	0.0!	!END!	Bridger WA	(Class_I)
598	!	X	=	-9.457,	21.947,	2983.0,	0.0!	!END!	Bridger WA	(Class_I)
599	!	X	=	-8.152,	21.945,	3348.0,	0.0!	!END!	Bridger WA	(Class_I)
600	!	X	=	-6.848,	21.944,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
601	!	X	=	-5.543,	21.943,	3237.0,	0.0!	!END!	Bridger WA	(Class_I)
602	!	X	=	-4.239,	21.942,	2762.0,	0.0!	!END!	Bridger WA	(Class_I)
603	!	X	=	-2.935,	21.941,	2901.0,	0.0!	!END!	Bridger WA	(Class_I)
604	!	X	=	-1.630,	21.940,	2575.0,	0.0!	!END!	Bridger WA	(Class_I)
605	!	X	=	-0.326,	21.940,	2743.0,	0.0!	!END!	Bridger WA	(Class_I)
606	!	X	=	0.978,	21.940,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
607	!	X	=	2.283,	21.941,	3414.0,	0.0!	!END!	Bridger WA	(Class_I)
608	!	X	=	3.587,	21.941,	3389.0,	0.0!	!END!	Bridger WA	(Class_I)
609	!	X	=	4.891,	21.942,	3597.0,	0.0!	!END!	Bridger WA	(Class_I)
610	!	X	=	6.196,	21.943,	3535.0,	0.0!	!END!	Bridger WA	(Class_I)
611	!	X	=	7.500,	21.945,	3614.0,	0.0!	!END!	Bridger WA	(Class_I)
612	!	X	=	8.804,	21.946,	3596.0,	0.0!	!END!	Bridger WA	(Class_I)
613	!	X	=	-9.454,	23.738,	3224.0,	0.0!	!END!	Bridger WA	(Class_I)
614	!	X	=	-8.150,	23.736,	3444.0,	0.0!	!END!	Bridger WA	(Class_I)
615	!	X	=	-6.846,	23.735,	3305.0,	0.0!	!END!	Bridger WA	(Class_I)
616	!	X	=	-5.542,	23.734,	3297.0,	0.0!	!END!	Bridger WA	(Class_I)
617	!	X	=	-4.238,	23.733,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
618	!	X	=	-2.934,	23.732,	2672.0,	0.0!	!END!	Bridger WA	(Class_I)
619	!	X	=	-1.630,	23.731,	2399.0,	0.0!	!END!	Bridger WA	(Class_I)
620	!	X	=	-0.326,	23.731,	3201.0,	0.0!	!END!	Bridger WA	(Class_I)
621	!	X	=	0.978,	23.731,	3094.0,	0.0!	!END!	Bridger WA	(Class_I)
622	!	X	=	2.282,	23.732,	2987.0,	0.0!	!END!	Bridger WA	(Class_I)
623	!	X	=	3.586,	23.732,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
624	!	X	=	4.890,	23.733,	3350.0,	0.0!	!END!	Bridger WA	(Class_I)
625	!	X	=	6.194,	23.734,	3557.0,	0.0!	!END!	Bridger WA	(Class_I)
626	!	X	=	7.498,	23.736,	3728.0,	0.0!	!END!	Bridger WA	(Class_I)
627	!	X	=	8.802,	23.737,	3683.0,	0.0!	!END!	Bridger WA	(Class_I)
628	!	X	=	-9.451,	25.529,	2864.0,	0.0!	!END!	Bridger WA	(Class_I)
629	!	X	=	-8.148,	25.527,	3007.0,	0.0!	!END!	Bridger WA	(Class_I)
630	!	X	=	-6.844,	25.526,	3231.0,	0.0!	!END!	Bridger WA	(Class_I)
631	!	X	=	-5.540,	25.524,	3108.0,	0.0!	!END!	Bridger WA	(Class_I)
632	!	X	=	-4.237,	25.523,	2865.0,	0.0!	!END!	Bridger WA	(Class_I)
633	!	X	=	-2.933,	25.523,	2395.0,	0.0!	!END!	Bridger WA	(Class_I)
634	!	X	=	-1.630,	25.522,	2659.0,	0.0!	!END!	Bridger WA	(Class_I)
635	!	X	=	-0.326,	25.522,	2742.0,	0.0!	!END!	Bridger WA	(Class_I)
636	!	X	=	0.978,	25.522,	3299.0,	0.0!	!END!	Bridger WA	(Class_I)
637	!	X	=	2.281,	25.522,	3467.0,	0.0!	!END!	Bridger WA	(Class_I)
638	!	X	=	3.585,	25.523,	3516.0,	0.0!	!END!	Bridger WA	(Class_I)
639	!	X	=	4.889,	25.524,	3555.0,	0.0!	!END!	Bridger WA	(Class_I)
640	!	X	=	6.192,	25.525,	3597.0,	0.0!	!END!	Bridger WA	(Class_I)
641	!	X	=	7.496,	25.526,	3515.0,	0.0!	!END!	Bridger WA	(Class_I)
642	!	X	=	8.799,	25.528,	3821.0,	0.0!	!END!	Bridger WA	(Class_I)
643	!	X	=	-5.539,	27.315,	2848.0,	0.0!	!END!	Bridger WA	(Class_I)
644	!	X	=	-2.932,	27.313,	2641.0,	0.0!	!END!	Bridger WA	(Class_I)
645	!	X	=	-1.629,	27.313,	3042.0,	0.0!	!END!	Bridger WA	(Class_I)
646	!	X	=	-0.326,	27.313,	2609.0,	0.0!	!END!	Bridger WA	(Class_I)
647	!	X	=	0.977,	27.313,	2639.0,	0.0!	!END!	Bridger WA	(Class_I)

648	!	X	=	2.281,	27.313,	3109.0,	0.0!	!END!	Bridger WA	(Class_I)
649	!	X	=	3.584,	27.314,	3116.0,	0.0!	!END!	Bridger WA	(Class_I)
650	!	X	=	4.887,	27.315,	3284.0,	0.0!	!END!	Bridger WA	(Class_I)
651	!	X	=	6.190,	27.316,	3246.0,	0.0!	!END!	Bridger WA	(Class_I)
652	!	X	=	7.494,	27.317,	3416.0,	0.0!	!END!	Bridger WA	(Class_I)
653	!	X	=	8.797,	27.319,	3635.0,	0.0!	!END!	Bridger WA	(Class_I)
654	!	X	=	-2.931,	29.104,	2637.0,	0.0!	!END!	Bridger WA	(Class_I)
655	!	X	=	-1.629,	29.104,	3264.0,	0.0!	!END!	Bridger WA	(Class_I)
656	!	X	=	-0.326,	29.104,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
657	!	X	=	0.977,	29.104,	3536.0,	0.0!	!END!	Bridger WA	(Class_I)
658	!	X	=	2.280,	29.104,	3381.0,	0.0!	!END!	Bridger WA	(Class_I)
659	!	X	=	3.583,	29.105,	3120.0,	0.0!	!END!	Bridger WA	(Class_I)
660	!	X	=	4.886,	29.106,	3383.0,	0.0!	!END!	Bridger WA	(Class_I)
661	!	X	=	6.189,	29.107,	3451.0,	0.0!	!END!	Bridger WA	(Class_I)
662	!	X	=	7.491,	29.108,	3711.0,	0.0!	!END!	Bridger WA	(Class_I)
663	!	X	=	-1.628,	30.895,	3189.0,	0.0!	!END!	Bridger WA	(Class_I)
664	!	X	=	-0.326,	30.894,	3445.0,	0.0!	!END!	Bridger WA	(Class_I)
665	!	X	=	0.977,	30.895,	3536.0,	0.0!	!END!	Bridger WA	(Class_I)
666	!	X	=	2.279,	30.895,	3537.0,	0.0!	!END!	Bridger WA	(Class_I)
667	!	X	=	3.582,	30.895,	3269.0,	0.0!	!END!	Bridger WA	(Class_I)
668	!	X	=	4.884,	30.896,	3353.0,	0.0!	!END!	Bridger WA	(Class_I)
669	!	X	=	6.187,	30.897,	3606.0,	0.0!	!END!	Bridger WA	(Class_I)
670	!	X	=	7.489,	30.899,	3754.0,	0.0!	!END!	Bridger WA	(Class_I)
671	!	X	=	-1.628,	32.685,	3089.0,	0.0!	!END!	Bridger WA	(Class_I)
672	!	X	=	-0.326,	32.685,	3108.0,	0.0!	!END!	Bridger WA	(Class_I)
673	!	X	=	0.977,	32.685,	2907.0,	0.0!	!END!	Bridger WA	(Class_I)
674	!	X	=	2.279,	32.686,	2922.0,	0.0!	!END!	Bridger WA	(Class_I)
675	!	X	=	3.581,	32.686,	3007.0,	0.0!	!END!	Bridger WA	(Class_I)
676	!	X	=	4.883,	32.687,	3307.0,	0.0!	!END!	Bridger WA	(Class_I)
677	!	X	=	6.185,	32.688,	3404.0,	0.0!	!END!	Bridger WA	(Class_I)
678	!	X	=	7.487,	32.690,	3649.0,	0.0!	!END!	Bridger WA	(Class_I)
679	!	X	=	-1.627,	34.476,	2996.0,	0.0!	!END!	Bridger WA	(Class_I)
680	!	X	=	-0.325,	34.476,	3170.0,	0.0!	!END!	Bridger WA	(Class_I)
681	!	X	=	0.976,	34.476,	3292.0,	0.0!	!END!	Bridger WA	(Class_I)
682	!	X	=	2.278,	34.476,	3399.0,	0.0!	!END!	Bridger WA	(Class_I)
683	!	X	=	-0.325,	36.267,	3388.0,	0.0!	!END!	Bridger WA	(Class_I)
684	!	X	=	0.976,	36.267,	3481.0,	0.0!	!END!	Bridger WA	(Class_I)
685	!	X	=	24.561,	-4.878,	3355.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
686	!	X	=	25.871,	-4.873,	3403.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
687	!	X	=	19.316,	-3.105,	3658.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
688	!	X	=	20.626,	-3.101,	3414.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
689	!	X	=	21.935,	-3.096,	3401.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
690	!	X	=	23.245,	-3.092,	3225.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
691	!	X	=	24.554,	-3.087,	3278.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
692	!	X	=	20.620,	-1.310,	3471.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
693	!	X	=	23.238,	-1.300,	3375.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
694	!	X	=	25.857,	-1.290,	3017.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
695	!	X	=	19.305,	0.477,	3597.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
696	!	X	=	20.614,	0.482,	3516.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
697	!	X	=	20.608,	2.273,	3428.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
698	!	X	=	23.225,	2.282,	3109.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
699	!	X	=	25.842,	2.292,	2939.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
700	!	X	=	19.294,	4.060,	3475.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
701	!	X	=	20.602,	4.064,	3600.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
702	!	X	=	17.981,	5.847,	3761.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
703	!	X	=	19.289,	5.851,	3863.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
704	!	X	=	20.596,	5.855,	3489.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
705	!	X	=	23.212,	5.864,	3414.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
706	!	X	=	25.827,	5.874,	3597.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
707	!	X	=	15.361,	7.631,	3922.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
708	!	X	=	16.668,	7.634,	3597.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
709	!	X	=	17.976,	7.638,	3427.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
710	!	X	=	14.050,	9.419,	3880.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
711	!	X	=	15.357,	9.422,	3824.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
712	!	X	=	17.971,	9.429,	3353.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
713	!	X	=	20.585,	9.437,	3389.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
714	!	X	=	23.198,	9.446,	3214.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
715	!	X	=	25.812,	9.456,	2939.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
716	!	X	=	14.046,	11.210,	3686.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
717	!	X	=	12.736,	12.998,	3556.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
718	!	X	=	14.042,	13.001,	3901.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)

719	!	X	=	15.348,	13.004,	3716.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
720	!	X	=	17.960,	13.011,	3578.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
721	!	X	=	20.573,	13.019,	3658.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
722	!	X	=	23.185,	13.028,	3784.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
723	!	X	=	25.798,	13.038,	3490.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
724	!	X	=	11.426,	14.787,	3874.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
725	!	X	=	12.732,	14.789,	3605.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
726	!	X	=	11.423,	16.578,	3719.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
727	!	X	=	12.728,	16.580,	3359.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
728	!	X	=	15.339,	16.586,	3302.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
729	!	X	=	17.950,	16.593,	3384.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
730	!	X	=	20.561,	16.601,	3206.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
731	!	X	=	23.172,	16.610,	3302.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
732	!	X	=	25.783,	16.620,	3450.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
733	!	X	=	10.114,	18.367,	3876.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
734	!	X	=	11.420,	18.369,	3730.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
735	!	X	=	10.112,	20.157,	3787.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
736	!	X	=	12.721,	20.162,	3421.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
737	!	X	=	15.330,	20.168,	3318.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
738	!	X	=	17.940,	20.175,	3156.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
739	!	X	=	20.549,	20.183,	3246.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
740	!	X	=	23.159,	20.192,	2934.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
741	!	X	=	25.768,	20.202,	2994.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
742	!	X	=	10.109,	21.948,	3453.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
743	!	X	=	10.106,	23.739,	3637.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
744	!	X	=	12.714,	23.744,	3353.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
745	!	X	=	15.322,	23.750,	2987.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
746	!	X	=	17.930,	23.757,	3047.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
747	!	X	=	20.538,	23.765,	3231.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
748	!	X	=	23.146,	23.774,	3438.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
749	!	X	=	25.753,	23.784,	3048.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
750	!	X	=	10.103,	25.530,	3816.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
751	!	X	=	10.100,	27.321,	3959.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
752	!	X	=	12.707,	27.326,	3551.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
753	!	X	=	15.313,	27.332,	3596.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
754	!	X	=	17.919,	27.338,	3169.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
755	!	X	=	20.526,	27.346,	3133.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
756	!	X	=	23.132,	27.356,	3148.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
757	!	X	=	25.739,	27.366,	3080.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
758	!	X	=	8.794,	29.110,	3962.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
759	!	X	=	10.097,	29.112,	3719.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
760	!	X	=	8.792,	30.901,	3752.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
761	!	X	=	10.094,	30.903,	3691.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
762	!	X	=	12.699,	30.907,	3353.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
763	!	X	=	15.304,	30.913,	3160.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
764	!	X	=	17.909,	30.920,	3227.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
765	!	X	=	20.514,	30.928,	3026.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
766	!	X	=	23.119,	30.937,	2735.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
767	!	X	=	25.724,	30.947,	2168.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
768	!	X	=	8.789,	32.691,	3502.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
769	!	X	=	3.580,	34.477,	3252.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
770	!	X	=	4.882,	34.478,	3434.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
771	!	X	=	6.183,	34.479,	3657.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
772	!	X	=	7.485,	34.480,	3725.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
773	!	X	=	8.787,	34.482,	3681.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
774	!	X	=	10.088,	34.484,	3332.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
775	!	X	=	12.692,	34.489,	3389.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
776	!	X	=	15.295,	34.495,	2904.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
777	!	X	=	17.899,	34.502,	3268.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
778	!	X	=	20.502,	34.510,	3292.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
779	!	X	=	23.106,	34.519,	2655.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
780	!	X	=	25.709,	34.529,	2537.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
781	!	X	=	2.277,	36.267,	3250.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
782	!	X	=	3.579,	36.268,	3095.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
783	!	X	=	3.578,	38.058,	3109.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
784	!	X	=	4.879,	38.059,	3067.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
785	!	X	=	7.481,	38.062,	3527.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
786	!	X	=	10.083,	38.066,	3401.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
787	!	X	=	12.685,	38.070,	2853.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
788	!	X	=	15.287,	38.076,	2900.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
789	!	X	=	17.889,	38.083,	3048.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)

790	!	X	=	20.491,	38.091,	2611.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
791	!	X	=	23.093,	38.100,	2438.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
792	!	X	=	3.577,	39.849,	3204.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
793	!	X	=	3.576,	41.640,	3155.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
794	!	X	=	4.876,	41.641,	2977.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
795	!	X	=	7.476,	41.643,	3048.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
796	!	X	=	10.077,	41.647,	3050.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
797	!	X	=	12.677,	41.652,	3226.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
798	!	X	=	15.278,	41.657,	3048.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
799	!	X	=	2.275,	43.430,	3317.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
800	!	X	=	3.575,	43.430,	3061.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
801	!	X	=	4.875,	43.431,	3100.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
802	!	X	=	7.472,	45.225,	2818.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
803	!	X	=	10.071,	45.228,	2477.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
804	!	X	=	12.670,	45.233,	2815.0,	0.0!	!END!	Fitzpatrick WA	(Class_I)
805	!	X	=	-73.012,	52.810,	1943.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
806	!	X	=	-72.991,	54.600,	1950.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
807	!	X	=	-72.970,	56.391,	1950.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
808	!	X	=	-85.917,	58.346,	2802.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
809	!	X	=	-72.949,	58.181,	1950.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
810	!	X	=	-71.652,	58.166,	1966.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
811	!	X	=	-87.188,	60.155,	2683.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
812	!	X	=	-85.892,	60.137,	2584.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
813	!	X	=	-84.596,	60.119,	2812.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
814	!	X	=	-83.299,	60.102,	2815.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
815	!	X	=	-79.410,	60.051,	2000.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
816	!	X	=	-78.113,	60.034,	1951.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
817	!	X	=	-76.817,	60.018,	1935.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
818	!	X	=	-72.928,	59.971,	1953.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
819	!	X	=	-71.631,	59.956,	1968.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
820	!	X	=	-70.335,	59.942,	2005.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
821	!	X	=	-88.459,	61.963,	2850.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
822	!	X	=	-87.163,	61.945,	2626.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
823	!	X	=	-85.867,	61.927,	2743.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
824	!	X	=	-83.275,	61.892,	2637.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
825	!	X	=	-81.979,	61.875,	2548.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
826	!	X	=	-80.683,	61.858,	2587.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
827	!	X	=	-79.387,	61.841,	2271.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
828	!	X	=	-76.795,	61.809,	1956.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
829	!	X	=	-75.499,	61.793,	1946.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
830	!	X	=	-72.907,	61.762,	1958.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
831	!	X	=	-71.611,	61.747,	1970.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
832	!	X	=	-70.315,	61.732,	2012.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
833	!	X	=	-69.019,	61.718,	2011.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
834	!	X	=	-67.723,	61.703,	2011.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
835	!	X	=	-66.426,	61.689,	2012.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
836	!	X	=	-65.130,	61.676,	2072.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
837	!	X	=	-85.843,	63.717,	3007.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
838	!	X	=	-80.660,	63.648,	2487.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
839	!	X	=	-75.477,	63.583,	1982.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
840	!	X	=	-74.182,	63.567,	1950.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
841	!	X	=	-71.590,	63.537,	1970.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
842	!	X	=	-70.294,	63.522,	2093.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
843	!	X	=	-67.703,	63.494,	2012.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
844	!	X	=	-65.112,	63.466,	2060.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
845	!	X	=	-63.816,	63.453,	2072.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
846	!	X	=	-62.520,	63.439,	2118.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
847	!	X	=	-61.224,	63.427,	2074.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
848	!	X	=	-74.160,	65.358,	2011.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
849	!	X	=	-72.865,	65.342,	1987.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
850	!	X	=	-71.570,	65.327,	1971.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
851	!	X	=	-61.207,	65.217,	2171.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
852	!	X	=	-85.793,	67.298,	3160.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
853	!	X	=	-80.613,	67.229,	2700.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
854	!	X	=	-75.434,	67.164,	2072.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
855	!	X	=	-70.254,	67.103,	1979.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
856	!	X	=	-65.074,	67.047,	2064.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
857	!	X	=	-63.779,	67.033,	2098.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
858	!	X	=	-62.484,	67.020,	2131.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
859	!	X	=	-61.189,	67.007,	2195.0,	0.0!	!END!	Grand_Teton NP	(Class_I)
860	!	X	=	-65.055,	68.837,	2065.0,	0.0!	!END!	Grand_Teton NP	(Class_I)

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861 ! X = -63.761, 68.824, 2126.0, 0.0! !END! Grand_Teton NP (Class_I)
862 ! X = -65.037, 70.627, 2069.0, 0.0! !END! Grand_Teton NP (Class_I)
863 ! X = -65.018, 72.417, 2072.0, 0.0! !END! Grand_Teton NP (Class_I)
864 ! X = -63.724, 72.404, 2115.0, 0.0! !END! Grand_Teton NP (Class_I)
865 ! X = -80.521, 74.389, 2786.0, 0.0! !END! Grand_Teton NP (Class_I)
866 ! X = -75.347, 74.325, 2861.0, 0.0! !END! Grand_Teton NP (Class_I)
867 ! X = -70.173, 74.264, 2063.0, 0.0! !END! Grand_Teton NP (Class_I)
868 ! X = -64.999, 74.208, 2072.0, 0.0! !END! Grand_Teton NP (Class_I)
869 ! X = -63.706, 74.194, 2093.0, 0.0! !END! Grand_Teton NP (Class_I)
870 ! X = -62.412, 74.181, 2124.0, 0.0! !END! Grand_Teton NP (Class_I)
871 ! X = -62.394, 75.971, 2080.0, 0.0! !END! Grand_Teton NP (Class_I)
872 ! X = -61.101, 75.959, 2072.0, 0.0! !END! Grand_Teton NP (Class_I)
873 ! X = -59.808, 75.946, 2179.0, 0.0! !END! Grand_Teton NP (Class_I)
874 ! X = -59.791, 77.736, 2064.0, 0.0! !END! Grand_Teton NP (Class_I)
875 ! X = -58.498, 77.724, 2082.0, 0.0! !END! Grand_Teton NP (Class_I)
876 ! X = -58.481, 79.514, 2061.0, 0.0! !END! Grand_Teton NP (Class_I)
877 ! X = -57.189, 79.502, 2096.0, 0.0! !END! Grand_Teton NP (Class_I)
878 ! X = -55.897, 79.490, 2133.0, 0.0! !END! Grand_Teton NP (Class_I)
879 ! X = -54.604, 79.479, 2133.0, 0.0! !END! Grand_Teton NP (Class_I)
880 ! X = -53.312, 79.468, 2144.0, 0.0! !END! Grand_Teton NP (Class_I)
881 ! X = -52.019, 79.457, 2167.0, 0.0! !END! Grand_Teton NP (Class_I)
882 ! X = -50.727, 79.446, 2195.0, 0.0! !END! Grand_Teton NP (Class_I)
883 ! X = -49.435, 79.435, 2252.0, 0.0! !END! Grand_Teton NP (Class_I)
884 ! X = -80.428, 81.550, 2804.0, 0.0! !END! Grand_Teton NP (Class_I)
885 ! X = -75.260, 81.485, 2497.0, 0.0! !END! Grand_Teton NP (Class_I)
886 ! X = -70.092, 81.425, 2108.0, 0.0! !END! Grand_Teton NP (Class_I)
887 ! X = -64.924, 81.368, 2089.0, 0.0! !END! Grand_Teton NP (Class_I)
888 ! X = -59.756, 81.317, 2042.0, 0.0! !END! Grand_Teton NP (Class_I)
889 ! X = -54.588, 81.269, 2110.0, 0.0! !END! Grand_Teton NP (Class_I)
890 ! X = -52.004, 81.247, 2133.0, 0.0! !END! Grand_Teton NP (Class_I)
891 ! X = -49.420, 81.226, 2194.0, 0.0! !END! Grand_Teton NP (Class_I)
892 ! X = -49.406, 83.016, 2125.0, 0.0! !END! Grand_Teton NP (Class_I)
893 ! X = -51.974, 84.827, 2073.0, 0.0! !END! Grand_Teton NP (Class_I)
894 ! X = -49.392, 84.806, 2070.0, 0.0! !END! Grand_Teton NP (Class_I)
895 ! X = -51.959, 86.617, 2195.0, 0.0! !END! Grand_Teton NP (Class_I)
896 ! X = -80.335, 88.710, 3002.0, 0.0! !END! Grand_Teton NP (Class_I)
897 ! X = -75.173, 88.646, 2596.0, 0.0! !END! Grand_Teton NP (Class_I)
898 ! X = -70.011, 88.585, 2064.0, 0.0! !END! Grand_Teton NP (Class_I)
899 ! X = -64.849, 88.529, 2072.0, 0.0! !END! Grand_Teton NP (Class_I)
900 ! X = -59.687, 88.477, 2077.0, 0.0! !END! Grand_Teton NP (Class_I)
901 ! X = -54.525, 88.430, 2071.0, 0.0! !END! Grand_Teton NP (Class_I)
902 ! X = -51.944, 88.407, 2089.0, 0.0! !END! Grand_Teton NP (Class_I)
903 ! X = -51.929, 90.198, 2195.0, 0.0! !END! Grand_Teton NP (Class_I)
904 ! X = -51.914, 91.988, 2122.0, 0.0! !END! Grand_Teton NP (Class_I)
905 ! X = -51.899, 93.778, 2133.0, 0.0! !END! Grand_Teton NP (Class_I)
906 ! X = -80.242, 95.870, 2711.0, 0.0! !END! Grand_Teton NP (Class_I)
907 ! X = -75.086, 95.806, 3231.0, 0.0! !END! Grand_Teton NP (Class_I)
908 ! X = -69.931, 95.745, 2064.0, 0.0! !END! Grand_Teton NP (Class_I)
909 ! X = -64.775, 95.689, 2073.0, 0.0! !END! Grand_Teton NP (Class_I)
910 ! X = -80.150, 103.030, 2733.0, 0.0! !END! Grand_Teton NP (Class_I)
911 ! X = -75.000, 102.966, 2353.0, 0.0! !END! Grand_Teton NP (Class_I)
912 ! X = -69.850, 102.905, 2064.0, 0.0! !END! Grand_Teton NP (Class_I)
913 ! X = -77.485, 110.157, 2635.0, 0.0! !END! Grand_Teton NP (Class_I)
914 ! X = -5.426, 154.420, 2510.0, 0.0! !END! North_Absaroka WA (Class_I)
915 ! X = -1.596, 154.417, 2640.0, 0.0! !END! North_Absaroka WA (Class_I)
916 ! X = 3.511, 154.418, 2366.0, 0.0! !END! North_Absaroka WA (Class_I)
917 ! X = 8.618, 154.423, 2011.0, 0.0! !END! North_Absaroka WA (Class_I)
918 ! X = 13.725, 154.433, 2072.0, 0.0! !END! North_Absaroka WA (Class_I)
919 ! X = 18.832, 154.446, 2404.0, 0.0! !END! North_Absaroka WA (Class_I)
920 ! X = 18.821, 158.026, 2453.0, 0.0! !END! North_Absaroka WA (Class_I)
921 ! X = -27.108, 159.846, 2623.0, 0.0! !END! North_Absaroka WA (Class_I)
922 ! X = -22.005, 159.826, 2499.0, 0.0! !END! North_Absaroka WA (Class_I)
923 ! X = -16.902, 159.810, 2941.0, 0.0! !END! North_Absaroka WA (Class_I)
924 ! X = -11.800, 159.798, 2589.0, 0.0! !END! North_Absaroka WA Class_I)
925 ! X = -6.697, 159.790, 2449.0, 0.0! !END! North_Absaroka WA (Class_I)
926 ! X = -1.595, 159.787, 3026.0, 0.0! !END! North_Absaroka WA (Class_I)
927 ! X = 3.508, 159.787, 2834.0, 0.0! !END! North_Absaroka WA (Class_I)
928 ! X = 8.611, 159.792, 2227.0, 0.0! !END! North_Absaroka WA (Class_I)
929 ! X = 12.438, 159.799, 2249.0, 0.0! !END! North_Absaroka WA (Class_I)
930 ! X = 22.643, 159.828, 2579.0, 0.0! !END! North_Absaroka WA (Class_I)
931 ! X = -16.883, 166.968, 2729.0, 0.0! !END! North_Absaroka WA (Class_I)
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932  ! X =  -11.786,  166.956,  2865.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
933  ! X =  -6.689,  166.949,  2507.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
934  ! X =  -1.593,  166.945,  2804.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
935  ! X =  3.504,  166.946,  3149.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
936  ! X =  8.601,  166.951,  2865.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
937  ! X =  13.697,  166.960,  3401.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
938  ! X =  18.794,  166.974,  2865.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
939  ! X =  22.616,  166.987,  3653.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
940  ! X =  22.610,  168.776,  3072.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
941  ! X =  26.423,  170.581,  2722.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
942  ! X =  22.597,  172.355,  2462.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
943  ! X =  31.508,  172.395,  2840.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
944  ! X =  -1.591,  174.104,  2704.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
945  ! X =  26.393,  177.739,  2237.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
946  ! X =  30.208,  177.757,  2373.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
947  ! X =  -1.589,  181.262,  2903.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
948  ! X =  3.496,  181.263,  2987.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
949  ! X =  8.581,  181.268,  2650.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
950  ! X =  13.665,  181.277,  2316.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
951  ! X =  -6.666,  188.423,  2438.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
952  ! X =  -1.587,  188.420,  2707.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
953  ! X =  3.492,  188.421,  2427.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
954  ! X =  8.570,  188.426,  2452.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
955  ! X =  -6.658,  195.581,  3230.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
956  ! X =  -1.585,  195.578,  2723.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
957  ! X =  3.488,  195.579,  2472.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
958  ! X =  8.560,  195.584,  2624.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
959  ! X =  -6.650,  202.739,  2682.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
960  ! X =  -11.707,  208.115,  2834.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
961  ! X =  -6.644,  208.108,  3179.0,  0.0!  !END!  North_Absaroka WA  (Class_I)
962  ! X =  -19.715,  77.480,  3203.0,  0.0!  !END!  Teton WA  (Class_I)
963  ! X =  -21.002,  79.274,  3220.0,  0.0!  !END!  Teton WA  (Class_I)
964  ! X =  -19.709,  79.270,  2989.0,  0.0!  !END!  Teton WA  (Class_I)
965  ! X =  -18.417,  79.266,  3129.0,  0.0!  !END!  Teton WA  (Class_I)
966  ! X =  -22.288,  81.069,  3238.0,  0.0!  !END!  Teton WA  (Class_I)
967  ! X =  -20.996,  81.064,  3210.0,  0.0!  !END!  Teton WA  (Class_I)
968  ! X =  -18.412,  81.056,  2740.0,  0.0!  !END!  Teton WA  (Class_I)
969  ! X =  -17.120,  81.053,  2758.0,  0.0!  !END!  Teton WA  (Class_I)
970  ! X =  -15.828,  81.049,  2846.0,  0.0!  !END!  Teton WA  (Class_I)
971  ! X =  -14.536,  81.046,  2894.0,  0.0!  !END!  Teton WA  (Class_I)
972  ! X =  -13.244,  81.043,  2910.0,  0.0!  !END!  Teton WA  (Class_I)
973  ! X =  -11.951,  81.040,  2993.0,  0.0!  !END!  Teton WA  (Class_I)
974  ! X =  -10.659,  81.038,  3170.0,  0.0!  !END!  Teton WA  (Class_I)
975  ! X =  -8.075,  81.034,  3252.0,  0.0!  !END!  Teton WA  (Class_I)
976  ! X =  -26.156,  82.874,  3125.0,  0.0!  !END!  Teton WA  (Class_I)
977  ! X =  -24.865,  82.869,  3046.0,  0.0!  !END!  Teton WA  (Class_I)
978  ! X =  -23.573,  82.864,  2970.0,  0.0!  !END!  Teton WA  (Class_I)
979  ! X =  -22.281,  82.859,  3089.0,  0.0!  !END!  Teton WA  (Class_I)
980  ! X =  -10.656,  82.828,  3109.0,  0.0!  !END!  Teton WA  (Class_I)
981  ! X =  -9.365,  82.826,  3048.0,  0.0!  !END!  Teton WA  (Class_I)
982  ! X =  -8.073,  82.824,  2926.0,  0.0!  !END!  Teton WA  (Class_I)
983  ! X =  -6.781,  82.823,  3114.0,  0.0!  !END!  Teton WA  (Class_I)
984  ! X =  -31.314,  84.688,  2327.0,  0.0!  !END!  Teton WA  (Class_I)
985  ! X =  -30.023,  84.682,  2632.0,  0.0!  !END!  Teton WA  (Class_I)
986  ! X =  -28.731,  84.676,  2611.0,  0.0!  !END!  Teton WA  (Class_I)
987  ! X =  -27.440,  84.670,  2834.0,  0.0!  !END!  Teton WA  (Class_I)
988  ! X =  -26.149,  84.665,  2804.0,  0.0!  !END!  Teton WA  (Class_I)
989  ! X =  -6.779,  84.613,  2987.0,  0.0!  !END!  Teton WA  (Class_I)
990  ! X =  -5.488,  84.612,  3200.0,  0.0!  !END!  Teton WA  (Class_I)
991  ! X =  -4.197,  84.611,  3413.0,  0.0!  !END!  Teton WA  (Class_I)
992  ! X =  -32.596,  86.485,  2372.0,  0.0!  !END!  Teton WA  (Class_I)
993  ! X =  -31.305,  86.479,  2195.0,  0.0!  !END!  Teton WA  (Class_I)
994  ! X =  -32.586,  88.276,  2318.0,  0.0!  !END!  Teton WA  (Class_I)
995  ! X =  -31.296,  88.269,  2290.0,  0.0!  !END!  Teton WA  (Class_I)
996  ! X =  -26.134,  88.245,  2899.0,  0.0!  !END!  Teton WA  (Class_I)
997  ! X =  -20.972,  88.225,  2452.0,  0.0!  !END!  Teton WA  (Class_I)
998  ! X =  -15.809,  88.210,  2835.0,  0.0!  !END!  Teton WA  (Class_I)
999  ! X =  -10.647,  88.199,  2836.0,  0.0!  !END!  Teton WA  (Class_I)
1000  ! X =  -5.485,  88.192,  3082.0,  0.0!  !END!  Teton WA  (Class_I)
1001  ! X =  -2.904,  88.191,  3232.0,  0.0!  !END!  Teton WA  (Class_I)
1002  ! X =  -48.059,  90.166,  2363.0,  0.0!  !END!  Teton WA  (Class_I)
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1003	!	X	=	-46.769,	90.157,	2316.0,	0.0!	!END!	Teton WA	(Class_I)
1004	!	X	=	-45.479,	90.147,	2316.0,	0.0!	!END!	Teton WA	(Class_I)
1005	!	X	=	-44.189,	90.138,	2485.0,	0.0!	!END!	Teton WA	(Class_I)
1006	!	X	=	-42.898,	90.129,	2499.0,	0.0!	!END!	Teton WA	(Class_I)
1007	!	X	=	-41.608,	90.120,	2508.0,	0.0!	!END!	Teton WA	(Class_I)
1008	!	X	=	-40.318,	90.111,	2513.0,	0.0!	!END!	Teton WA	(Class_I)
1009	!	X	=	-39.028,	90.103,	2483.0,	0.0!	!END!	Teton WA	(Class_I)
1010	!	X	=	-37.738,	90.095,	2316.0,	0.0!	!END!	Teton WA	(Class_I)
1011	!	X	=	-36.448,	90.087,	2499.0,	0.0!	!END!	Teton WA	(Class_I)
1012	!	X	=	-35.157,	90.080,	2472.0,	0.0!	!END!	Teton WA	(Class_I)
1013	!	X	=	-33.867,	90.073,	2390.0,	0.0!	!END!	Teton WA	(Class_I)
1014	!	X	=	-32.577,	90.066,	2291.0,	0.0!	!END!	Teton WA	(Class_I)
1015	!	X	=	-48.045,	91.956,	2398.0,	0.0!	!END!	Teton WA	(Class_I)
1016	!	X	=	-48.031,	93.747,	2441.0,	0.0!	!END!	Teton WA	(Class_I)
1017	!	X	=	-62.197,	95.663,	2188.0,	0.0!	!END!	Teton WA	(Class_I)
1018	!	X	=	-59.619,	95.638,	2316.0,	0.0!	!END!	Teton WA	(Class_I)
1019	!	X	=	-57.041,	95.613,	2263.0,	0.0!	!END!	Teton WA	(Class_I)
1020	!	X	=	-54.462,	95.590,	2438.0,	0.0!	!END!	Teton WA	(Class_I)
1021	!	X	=	-51.884,	95.568,	2346.0,	0.0!	!END!	Teton WA	(Class_I)
1022	!	X	=	-50.595,	95.557,	2202.0,	0.0!	!END!	Teton WA	(Class_I)
1023	!	X	=	-48.017,	95.537,	2504.0,	0.0!	!END!	Teton WA	(Class_I)
1024	!	X	=	-46.728,	95.527,	2610.0,	0.0!	!END!	Teton WA	(Class_I)
1025	!	X	=	-41.572,	95.490,	2569.0,	0.0!	!END!	Teton WA	(Class_I)
1026	!	X	=	-36.416,	95.458,	2559.0,	0.0!	!END!	Teton WA	(Class_I)
1027	!	X	=	-31.260,	95.429,	2371.0,	0.0!	!END!	Teton WA	(Class_I)
1028	!	X	=	-26.104,	95.406,	2926.0,	0.0!	!END!	Teton WA	(Class_I)
1029	!	X	=	-20.947,	95.386,	3052.0,	0.0!	!END!	Teton WA	(Class_I)
1030	!	X	=	-15.791,	95.371,	3026.0,	0.0!	!END!	Teton WA	(Class_I)
1031	!	X	=	-10.635,	95.360,	2987.0,	0.0!	!END!	Teton WA	(Class_I)
1032	!	X	=	-5.479,	95.353,	3121.0,	0.0!	!END!	Teton WA	(Class_I)
1033	!	X	=	-50.581,	97.347,	2409.0,	0.0!	!END!	Teton WA	(Class_I)
1034	!	X	=	-49.292,	97.337,	2342.0,	0.0!	!END!	Teton WA	(Class_I)
1035	!	X	=	-48.003,	97.327,	2211.0,	0.0!	!END!	Teton WA	(Class_I)
1036	!	X	=	-62.161,	99.243,	2290.0,	0.0!	!END!	Teton WA	(Class_I)
1037	!	X	=	-2.899,	98.931,	3290.0,	0.0!	!END!	Teton WA	(Class_I)
1038	!	X	=	-64.700,	102.849,	2127.0,	0.0!	!END!	Teton WA	(Class_I)
1039	!	X	=	-62.125,	102.823,	2291.0,	0.0!	!END!	Teton WA	(Class_I)
1040	!	X	=	-56.975,	102.773,	2348.0,	0.0!	!END!	Teton WA	(Class_I)
1041	!	X	=	-51.824,	102.728,	2680.0,	0.0!	!END!	Teton WA	(Class_I)
1042	!	X	=	-46.674,	102.687,	2437.0,	0.0!	!END!	Teton WA	(Class_I)
1043	!	X	=	-41.524,	102.650,	2606.0,	0.0!	!END!	Teton WA	(Class_I)
1044	!	X	=	-36.374,	102.618,	2497.0,	0.0!	!END!	Teton WA	(Class_I)
1045	!	X	=	-31.224,	102.590,	2543.0,	0.0!	!END!	Teton WA	(Class_I)
1046	!	X	=	-26.073,	102.566,	3049.0,	0.0!	!END!	Teton WA	(Class_I)
1047	!	X	=	-20.923,	102.546,	3136.0,	0.0!	!END!	Teton WA	(Class_I)
1048	!	X	=	-15.773,	102.531,	2517.0,	0.0!	!END!	Teton WA	(Class_I)
1049	!	X	=	-10.623,	102.520,	3210.0,	0.0!	!END!	Teton WA	(Class_I)
1050	!	X	=	-5.472,	102.513,	2975.0,	0.0!	!END!	Teton WA	(Class_I)
1051	!	X	=	-0.322,	106.091,	3257.0,	0.0!	!END!	Teton WA	(Class_I)
1052	!	X	=	3.539,	106.092,	3107.0,	0.0!	!END!	Teton WA	(Class_I)
1053	!	X	=	-65.911,	110.023,	2458.0,	0.0!	!END!	Teton WA	(Class_I)
1054	!	X	=	-62.053,	109.983,	2758.0,	0.0!	!END!	Teton WA	(Class_I)
1055	!	X	=	-56.909,	109.933,	2449.0,	0.0!	!END!	Teton WA	(Class_I)
1056	!	X	=	-51.764,	109.888,	2431.0,	0.0!	!END!	Teton WA	(Class_I)
1057	!	X	=	-46.620,	109.847,	2715.0,	0.0!	!END!	Teton WA	(Class_I)
1058	!	X	=	-41.476,	109.810,	2956.0,	0.0!	!END!	Teton WA	(Class_I)
1059	!	X	=	-36.332,	109.778,	2497.0,	0.0!	!END!	Teton WA	(Class_I)
1060	!	X	=	-31.188,	109.750,	2926.0,	0.0!	!END!	Teton WA	(Class_I)
1061	!	X	=	-26.043,	109.726,	2596.0,	0.0!	!END!	Teton WA	(Class_I)
1062	!	X	=	-20.899,	109.706,	2435.0,	0.0!	!END!	Teton WA	(Class_I)
1063	!	X	=	-15.755,	109.691,	2938.0,	0.0!	!END!	Teton WA	(Class_I)
1064	!	X	=	-10.610,	109.680,	2973.0,	0.0!	!END!	Teton WA	(Class_I)
1065	!	X	=	-5.466,	109.674,	3064.0,	0.0!	!END!	Teton WA	(Class_I)
1066	!	X	=	-0.322,	109.671,	2768.0,	0.0!	!END!	Teton WA	(Class_I)
1067	!	X	=	3.537,	109.672,	3100.0,	0.0!	!END!	Teton WA	(Class_I)
1068	!	X	=	-14.452,	116.848,	2622.0,	0.0!	!END!	Teton WA	(Class_I)
1069	!	X	=	-10.598,	116.840,	2801.0,	0.0!	!END!	Teton WA	(Class_I)
1070	!	X	=	-5.460,	116.833,	2621.0,	0.0!	!END!	Teton WA	(Class_I)
1071	!	X	=	-0.321,	116.831,	3352.0,	0.0!	!END!	Teton WA	(Class_I)
1072	!	X	=	-14.435,	124.008,	3020.0,	0.0!	!END!	Teton WA	(Class_I)
1073	!	X	=	-10.586,	124.000,	2836.0,	0.0!	!END!	Teton WA	(Class_I)

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! X =  -5.453,  123.993,  3234.0,  0.0! !END! Teton WA (Class_I)
! X =  -0.321,  123.991,  3040.0,  0.0! !END! Teton WA (Class_I)
! X =  -4.168,  127.572,  2841.0,  0.0! !END! Teton WA (Class_I)
! X = -14.418,  131.167,  2741.0,  0.0! !END! Teton WA (Class_I)
! X = -10.573,  131.159,  2804.0,  0.0! !END! Teton WA (Class_I)
! X =   4.205,   72.974,  2859.0,  0.0! !END! Washakie WA (Class_I)
! X =   6.145,   72.976,  3200.0,  0.0! !END! Washakie WA (Class_I)
! X =  23.610,   73.017,  2832.0,  0.0! !END! Washakie WA (Class_I)
! X =  25.551,   73.025,  2865.0,  0.0! !END! Washakie WA (Class_I)
! X =  31.373,   73.052,  3292.0,  0.0! !END! Washakie WA (Class_I)
! X =  33.313,   73.062,  2865.0,  0.0! !END! Washakie WA (Class_I)
! X =  35.254,   73.073,  2682.0,  0.0! !END! Washakie WA (Class_I)
! X =  37.194,   73.084,  2987.0,  0.0! !END! Washakie WA (Class_I)
! X =  39.135,   73.096,  3211.0,  0.0! !END! Washakie WA (Class_I)
! X =  46.897,   73.150,  2980.0,  0.0! !END! Washakie WA (Class_I)
! X =  48.838,   73.164,  3292.0,  0.0! !END! Washakie WA (Class_I)
! X =   4.203,   75.660,  3203.0,  0.0! !END! Washakie WA (Class_I)
! X =   6.143,   75.661,  3237.0,  0.0! !END! Washakie WA (Class_I)
! X =  10.022,   75.666,  2758.0,  0.0! !END! Washakie WA (Class_I)
! X =  13.902,   75.674,  3028.0,  0.0! !END! Washakie WA (Class_I)
! X =  21.661,   75.696,  2649.0,  0.0! !END! Washakie WA (Class_I)
! X =  23.600,   75.703,  3048.0,  0.0! !END! Washakie WA (Class_I)
! X =  25.540,   75.711,  3023.0,  0.0! !END! Washakie WA (Class_I)
! X =  27.480,   75.719,  2821.0,  0.0! !END! Washakie WA (Class_I)
! X =  29.419,   75.728,  2621.0,  0.0! !END! Washakie WA (Class_I)
! X =  31.359,   75.737,  2955.0,  0.0! !END! Washakie WA (Class_I)
! X =  39.118,   75.781,  3237.0,  0.0! !END! Washakie WA (Class_I)
! X =  41.058,   75.794,  3170.0,  0.0! !END! Washakie WA (Class_I)
! X =  44.937,   75.821,  3170.0,  0.0! !END! Washakie WA (Class_I)
! X =  46.877,   75.835,  3536.0,  0.0! !END! Washakie WA (Class_I)
! X =  48.817,   75.850,  3267.0,  0.0! !END! Washakie WA (Class_I)
! X =   2.262,   78.344,  3242.0,  0.0! !END! Washakie WA (Class_I)
! X =   4.201,   78.345,  3533.0,  0.0! !END! Washakie WA (Class_I)
! X =   6.140,   78.347,  3102.0,  0.0! !END! Washakie WA (Class_I)
! X =   8.079,   78.349,  2889.0,  0.0! !END! Washakie WA (Class_I)
! X =  10.018,   78.352,  2672.0,  0.0! !END! Washakie WA (Class_I)
! X =  11.957,   78.355,  3055.0,  0.0! !END! Washakie WA (Class_I)
! X =  13.896,   78.359,  3220.0,  0.0! !END! Washakie WA (Class_I)
! X =  15.834,   78.364,  3353.0,  0.0! !END! Washakie WA (Class_I)
! X =  23.590,   78.388,  2795.0,  0.0! !END! Washakie WA (Class_I)
! X =  27.468,   78.404,  3231.0,  0.0! !END! Washakie WA (Class_I)
! X =  31.346,   78.423,  2772.0,  0.0! !END! Washakie WA (Class_I)
! X =  35.223,   78.443,  3029.0,  0.0! !END! Washakie WA (Class_I)
! X =  39.101,   78.467,  3072.0,  0.0! !END! Washakie WA (Class_I)
! X =  41.040,   78.479,  3366.0,  0.0! !END! Washakie WA (Class_I)
! X =  42.979,   78.492,  3367.0,  0.0! !END! Washakie WA (Class_I)
! X =  44.918,   78.506,  3316.0,  0.0! !END! Washakie WA (Class_I)
! X =  46.857,   78.520,  3410.0,  0.0! !END! Washakie WA (Class_I)
! X =  48.796,   78.535,  3437.0,  0.0! !END! Washakie WA (Class_I)
! X =  50.734,   78.551,  3414.0,  0.0! !END! Washakie WA (Class_I)
! X =  52.673,   78.567,  3414.0,  0.0! !END! Washakie WA (Class_I)
! X =   2.261,   81.029,  3049.0,  0.0! !END! Washakie WA (Class_I)
! X =  15.828,   81.049,  2955.0,  0.0! !END! Washakie WA (Class_I)
! X =  21.642,   81.067,  2881.0,  0.0! !END! Washakie WA (Class_I)
! X =  23.580,   81.074,  2638.0,  0.0! !END! Washakie WA (Class_I)
! X =  42.960,   81.178,  3060.0,  0.0! !END! Washakie WA (Class_I)
! X =  44.898,   81.191,  2966.0,  0.0! !END! Washakie WA (Class_I)
! X =  52.650,   81.252,  3170.0,  0.0! !END! Washakie WA (Class_I)
! X =  -3.552,   83.715,  3186.0,  0.0! !END! Washakie WA (Class_I)
! X =  -1.614,   83.715,  3109.0,  0.0! !END! Washakie WA (Class_I)
! X =   0.323,   83.714,  2930.0,  0.0! !END! Washakie WA (Class_I)
! X =   2.260,   83.715,  2986.0,  0.0! !END! Washakie WA (Class_I)
! X =   4.197,   83.716,  3475.0,  0.0! !END! Washakie WA (Class_I)
! X =   8.072,   83.720,  3170.0,  0.0! !END! Washakie WA (Class_I)
! X =  11.946,   83.726,  3536.0,  0.0! !END! Washakie WA (Class_I)
! X =  15.821,   83.735,  2712.0,  0.0! !END! Washakie WA (Class_I)
! X =  17.758,   83.740,  2665.0,  0.0! !END! Washakie WA (Class_I)
! X =  19.695,   83.746,  2546.0,  0.0! !END! Washakie WA (Class_I)
! X =  21.632,   83.752,  2891.0,  0.0! !END! Washakie WA (Class_I)
! X =  23.570,   83.759,  3192.0,  0.0! !END! Washakie WA (Class_I)
! X =  27.444,   83.775,  2746.0,  0.0! !END! Washakie WA (Class_I)
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1145	!	X	=	31.319,	83.793,	3505.0,	0.0!	!END!	Washakie WA (Class_I)
1146	!	X	=	35.193,	83.814,	3329.0,	0.0!	!END!	Washakie WA (Class_I)
1147	!	X	=	39.067,	83.837,	3048.0,	0.0!	!END!	Washakie WA (Class_I)
1148	!	X	=	46.816,	83.891,	2626.0,	0.0!	!END!	Washakie WA (Class_I)
1149	!	X	=	50.690,	83.921,	2817.0,	0.0!	!END!	Washakie WA (Class_I)
1150	!	X	=	52.628,	83.938,	3137.0,	0.0!	!END!	Washakie WA (Class_I)
1151	!	X	=	54.565,	83.954,	2948.0,	0.0!	!END!	Washakie WA (Class_I)
1152	!	X	=	56.502,	83.972,	3038.0,	0.0!	!END!	Washakie WA (Class_I)
1153	!	X	=	0.323,	89.085,	3109.0,	0.0!	!END!	Washakie WA (Class_I)
1154	!	X	=	4.194,	89.086,	3029.0,	0.0!	!END!	Washakie WA (Class_I)
1155	!	X	=	8.065,	89.090,	2977.0,	0.0!	!END!	Washakie WA (Class_I)
1156	!	X	=	11.936,	89.096,	2976.0,	0.0!	!END!	Washakie WA (Class_I)
1157	!	X	=	15.807,	89.105,	3170.0,	0.0!	!END!	Washakie WA (Class_I)
1158	!	X	=	19.678,	89.116,	3228.0,	0.0!	!END!	Washakie WA (Class_I)
1159	!	X	=	23.549,	89.130,	2994.0,	0.0!	!END!	Washakie WA (Class_I)
1160	!	X	=	27.420,	89.146,	3194.0,	0.0!	!END!	Washakie WA (Class_I)
1161	!	X	=	31.291,	89.164,	3344.0,	0.0!	!END!	Washakie WA (Class_I)
1162	!	X	=	50.647,	89.292,	2682.0,	0.0!	!END!	Washakie WA (Class_I)
1163	!	X	=	54.518,	89.325,	2743.0,	0.0!	!END!	Washakie WA (Class_I)
1164	!	X	=	-3.545,	94.456,	3166.0,	0.0!	!END!	Washakie WA (Class_I)
1165	!	X	=	0.322,	94.455,	2547.0,	0.0!	!END!	Washakie WA (Class_I)
1166	!	X	=	4.190,	94.457,	2459.0,	0.0!	!END!	Washakie WA (Class_I)
1167	!	X	=	8.058,	94.461,	2682.0,	0.0!	!END!	Washakie WA (Class_I)
1168	!	X	=	11.926,	94.467,	3414.0,	0.0!	!END!	Washakie WA (Class_I)
1169	!	X	=	15.793,	94.476,	3395.0,	0.0!	!END!	Washakie WA (Class_I)
1170	!	X	=	19.661,	94.487,	3040.0,	0.0!	!END!	Washakie WA (Class_I)
1171	!	X	=	23.529,	94.500,	3143.0,	0.0!	!END!	Washakie WA (Class_I)
1172	!	X	=	27.397,	94.516,	3527.0,	0.0!	!END!	Washakie WA (Class_I)
1173	!	X	=	31.264,	94.534,	3260.0,	0.0!	!END!	Washakie WA (Class_I)
1174	!	X	=	35.132,	94.555,	3059.0,	0.0!	!END!	Washakie WA (Class_I)
1175	!	X	=	0.322,	99.826,	2795.0,	0.0!	!END!	Washakie WA (Class_I)
1176	!	X	=	4.186,	99.827,	2997.0,	0.0!	!END!	Washakie WA (Class_I)
1177	!	X	=	8.051,	99.831,	2478.0,	0.0!	!END!	Washakie WA (Class_I)
1178	!	X	=	11.915,	99.837,	3244.0,	0.0!	!END!	Washakie WA (Class_I)
1179	!	X	=	15.780,	99.846,	3402.0,	0.0!	!END!	Washakie WA (Class_I)
1180	!	X	=	19.644,	99.857,	3450.0,	0.0!	!END!	Washakie WA (Class_I)
1181	!	X	=	23.508,	99.870,	2948.0,	0.0!	!END!	Washakie WA (Class_I)
1182	!	X	=	27.373,	99.886,	3366.0,	0.0!	!END!	Washakie WA (Class_I)
1183	!	X	=	31.237,	99.905,	2734.0,	0.0!	!END!	Washakie WA (Class_I)
1184	!	X	=	0.322,	102.511,	3053.0,	0.0!	!END!	Washakie WA (Class_I)
1185	!	X	=	4.185,	102.512,	2788.0,	0.0!	!END!	Washakie WA (Class_I)
1186	!	X	=	8.044,	105.201,	2830.0,	0.0!	!END!	Washakie WA (Class_I)
1187	!	X	=	11.905,	105.207,	2300.0,	0.0!	!END!	Washakie WA (Class_I)
1188	!	X	=	15.766,	105.216,	2574.0,	0.0!	!END!	Washakie WA (Class_I)
1189	!	X	=	19.627,	105.227,	3435.0,	0.0!	!END!	Washakie WA (Class_I)
1190	!	X	=	23.488,	105.241,	3210.0,	0.0!	!END!	Washakie WA (Class_I)
1191	!	X	=	27.349,	105.257,	2932.0,	0.0!	!END!	Washakie WA (Class_I)
1192	!	X	=	31.210,	105.275,	2926.0,	0.0!	!END!	Washakie WA (Class_I)
1193	!	X	=	8.037,	110.571,	3559.0,	0.0!	!END!	Washakie WA (Class_I)
1194	!	X	=	11.895,	110.578,	2197.0,	0.0!	!END!	Washakie WA (Class_I)
1195	!	X	=	15.752,	110.586,	3324.0,	0.0!	!END!	Washakie WA (Class_I)
1196	!	X	=	19.610,	110.597,	3230.0,	0.0!	!END!	Washakie WA (Class_I)
1197	!	X	=	23.468,	110.611,	3108.0,	0.0!	!END!	Washakie WA (Class_I)
1198	!	X	=	27.325,	110.627,	2682.0,	0.0!	!END!	Washakie WA (Class_I)
1199	!	X	=	31.183,	110.645,	2812.0,	0.0!	!END!	Washakie WA (Class_I)
1200	!	X	=	4.176,	115.937,	3119.0,	0.0!	!END!	Washakie WA (Class_I)
1201	!	X	=	8.030,	115.941,	2743.0,	0.0!	!END!	Washakie WA (Class_I)
1202	!	X	=	11.884,	115.948,	2067.0,	0.0!	!END!	Washakie WA (Class_I)
1203	!	X	=	15.739,	115.956,	2642.0,	0.0!	!END!	Washakie WA (Class_I)
1204	!	X	=	19.593,	115.967,	2857.0,	0.0!	!END!	Washakie WA (Class_I)
1205	!	X	=	23.447,	115.981,	2905.0,	0.0!	!END!	Washakie WA (Class_I)
1206	!	X	=	27.302,	115.996,	2971.0,	0.0!	!END!	Washakie WA (Class_I)
1207	!	X	=	31.156,	116.015,	3018.0,	0.0!	!END!	Washakie WA (Class_I)
1208	!	X	=	35.010,	116.035,	2418.0,	0.0!	!END!	Washakie WA (Class_I)
1209	!	X	=	4.172,	121.307,	2945.0,	0.0!	!END!	Washakie WA (Class_I)
1210	!	X	=	8.023,	121.311,	3352.0,	0.0!	!END!	Washakie WA (Class_I)
1211	!	X	=	11.874,	121.317,	2685.0,	0.0!	!END!	Washakie WA (Class_I)
1212	!	X	=	19.576,	121.337,	2384.0,	0.0!	!END!	Washakie WA (Class_I)
1213	!	X	=	23.427,	121.350,	2892.0,	0.0!	!END!	Washakie WA (Class_I)
1214	!	X	=	27.278,	121.366,	3630.0,	0.0!	!END!	Washakie WA (Class_I)
1215	!	X	=	31.129,	121.384,	3207.0,	0.0!	!END!	Washakie WA (Class_I)

1216	!	X	=	0.321,	126.676,	2898.0,	0.0!	!END!	Washakie WA	(Class_I)
1217	!	X	=	4.168,	126.677,	2560.0,	0.0!	!END!	Washakie WA	(Class_I)
1218	!	X	=	8.016,	126.681,	2438.0,	0.0!	!END!	Washakie WA	(Class_I)
1219	!	X	=	11.864,	126.687,	2506.0,	0.0!	!END!	Washakie WA	(Class_I)
1220	!	X	=	15.711,	126.696,	2877.0,	0.0!	!END!	Washakie WA	(Class_I)
1221	!	X	=	-7.368,	132.050,	2926.0,	0.0!	!END!	Washakie WA	(Class_I)
1222	!	X	=	-3.524,	132.046,	3037.0,	0.0!	!END!	Washakie WA	(Class_I)
1223	!	X	=	0.320,	132.045,	2622.0,	0.0!	!END!	Washakie WA	(Class_I)
1224	!	X	=	4.165,	132.047,	2563.0,	0.0!	!END!	Washakie WA	(Class_I)
1225	!	X	=	8.009,	132.050,	3481.0,	0.0!	!END!	Washakie WA	(Class_I)
1226	!	X	=	11.853,	132.057,	2987.0,	0.0!	!END!	Washakie WA	(Class_I)
1227	!	X	=	15.698,	132.065,	2898.0,	0.0!	!END!	Washakie WA	(Class_I)
1228	!	X	=	-16.964,	137.438,	2713.0,	0.0!	!END!	Washakie WA	(Class_I)
1229	!	X	=	-15.044,	137.433,	2750.0,	0.0!	!END!	Washakie WA	(Class_I)
1230	!	X	=	-11.203,	137.425,	2838.0,	0.0!	!END!	Washakie WA	(Class_I)
1231	!	X	=	-7.362,	137.419,	2613.0,	0.0!	!END!	Washakie WA	(Class_I)
1232	!	X	=	-3.521,	137.416,	2777.0,	0.0!	!END!	Washakie WA	(Class_I)
1233	!	X	=	0.320,	137.415,	3175.0,	0.0!	!END!	Washakie WA	(Class_I)
1234	!	X	=	4.161,	137.416,	2873.0,	0.0!	!END!	Washakie WA	(Class_I)
1235	!	X	=	8.002,	137.420,	2425.0,	0.0!	!END!	Washakie WA	(Class_I)
1236	!	X	=	11.843,	137.426,	2807.0,	0.0!	!END!	Washakie WA	(Class_I)
1237	!	X	=	-16.957,	140.123,	2702.0,	0.0!	!END!	Washakie WA	(Class_I)
1238	!	X	=	-15.031,	142.802,	2410.0,	0.0!	!END!	Washakie WA	(Class_I)
1239	!	X	=	-11.193,	142.794,	2585.0,	0.0!	!END!	Washakie WA	(Class_I)
1240	!	X	=	-7.355,	142.788,	2926.0,	0.0!	!END!	Washakie WA	(Class_I)
1241	!	X	=	-3.518,	142.785,	2865.0,	0.0!	!END!	Washakie WA	(Class_I)
1242	!	X	=	4.157,	142.785,	3042.0,	0.0!	!END!	Washakie WA	(Class_I)
1243	!	X	=	7.995,	142.789,	2316.0,	0.0!	!END!	Washakie WA	(Class_I)
1244	!	X	=	11.833,	142.795,	2522.0,	0.0!	!END!	Washakie WA	(Class_I)
1245	!	X	=	15.670,	142.804,	3216.0,	0.0!	!END!	Washakie WA	(Class_I)
1246	!	X	=	19.508,	142.815,	3362.0,	0.0!	!END!	Washakie WA	(Class_I)
1247	!	X	=	23.345,	142.828,	2727.0,	0.0!	!END!	Washakie WA	(Class_I)
1248	!	X	=	-16.942,	145.492,	2520.0,	0.0!	!END!	Washakie WA	(Class_I)
1249	!	X	=	-15.017,	148.172,	2983.0,	0.0!	!END!	Washakie WA	(Class_I)
1250	!	X	=	-11.183,	148.163,	2339.0,	0.0!	!END!	Washakie WA	(Class_I)
1251	!	X	=	-7.349,	148.158,	2865.0,	0.0!	!END!	Washakie WA	(Class_I)
1252	!	X	=	-3.515,	148.154,	2072.0,	0.0!	!END!	Washakie WA	(Class_I)
1253	!	X	=	0.320,	148.153,	2357.0,	0.0!	!END!	Washakie WA	(Class_I)
1254	!	X	=	-11.173,	153.533,	2621.0,	0.0!	!END!	Washakie WA	(Class_I)
1255	!	X	=	-99.231,	117.629,	1915.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1256	!	X	=	-94.093,	117.548,	1951.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1257	!	X	=	-88.955,	117.472,	1979.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1258	!	X	=	-83.817,	117.400,	2134.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1259	!	X	=	-78.680,	117.333,	2194.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1260	!	X	=	-73.542,	117.269,	2301.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1261	!	X	=	-68.403,	117.210,	2164.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1262	!	X	=	-63.265,	117.155,	2525.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1263	!	X	=	-58.127,	117.105,	2542.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1264	!	X	=	-52.989,	117.059,	2316.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1265	!	X	=	-47.851,	117.017,	2819.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1266	!	X	=	-42.713,	116.979,	2731.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1267	!	X	=	-37.574,	116.945,	2561.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1268	!	X	=	-32.436,	116.916,	2782.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1269	!	X	=	-27.298,	116.891,	2875.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1270	!	X	=	-22.159,	116.871,	2418.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1271	!	X	=	-17.021,	116.855,	2812.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1272	!	X	=	-99.116,	124.788,	2012.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1273	!	X	=	-93.984,	124.707,	1951.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1274	!	X	=	-88.852,	124.631,	2240.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1275	!	X	=	-83.720,	124.559,	2224.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1276	!	X	=	-78.588,	124.492,	2524.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1277	!	X	=	-73.456,	124.428,	2523.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1278	!	X	=	-68.324,	124.369,	2423.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1279	!	X	=	-63.192,	124.315,	2377.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1280	!	X	=	-58.060,	124.264,	2466.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1281	!	X	=	-52.928,	124.218,	2224.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1282	!	X	=	-47.795,	124.176,	2369.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1283	!	X	=	-42.663,	124.138,	2499.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1284	!	X	=	-37.531,	124.105,	2579.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1285	!	X	=	-32.398,	124.076,	2691.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1286	!	X	=	-27.266,	124.051,	2573.0,	0.0!	!END!	Yellowstone NP	(Class_I)

1287	!	X	=	-22.134,	124.030,	2775.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1288	!	X	=	-17.001,	124.014,	3292.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1289	!	X	=	-99.001,	131.946,	2347.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1290	!	X	=	-93.875,	131.866,	2238.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1291	!	X	=	-88.749,	131.790,	2391.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1292	!	X	=	-83.623,	131.718,	2417.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1293	!	X	=	-78.497,	131.651,	2683.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1294	!	X	=	-73.371,	131.587,	2689.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1295	!	X	=	-68.245,	131.528,	2605.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1296	!	X	=	-63.119,	131.474,	2377.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1297	!	X	=	-57.992,	131.423,	2883.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1298	!	X	=	-52.866,	131.377,	2271.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1299	!	X	=	-47.740,	131.335,	2383.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1300	!	X	=	-42.613,	131.298,	2385.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1301	!	X	=	-37.487,	131.264,	2401.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1302	!	X	=	-32.361,	131.235,	2641.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1303	!	X	=	-27.234,	131.210,	2375.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1304	!	X	=	-22.108,	131.190,	2649.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1305	!	X	=	-16.981,	131.174,	2551.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1306	!	X	=	-98.886,	139.105,	2415.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1307	!	X	=	-93.766,	139.024,	2499.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1308	!	X	=	-88.646,	138.948,	2571.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1309	!	X	=	-83.526,	138.877,	2584.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1310	!	X	=	-78.406,	138.809,	2563.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1311	!	X	=	-73.286,	138.746,	2426.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1312	!	X	=	-68.165,	138.687,	2510.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1313	!	X	=	-63.045,	138.633,	2408.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1314	!	X	=	-57.925,	138.582,	2445.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1315	!	X	=	-52.805,	138.536,	2440.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1316	!	X	=	-47.684,	138.494,	2686.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1317	!	X	=	-42.564,	138.457,	2359.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1318	!	X	=	-37.444,	138.424,	2406.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1319	!	X	=	-32.323,	138.394,	2393.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1320	!	X	=	-27.203,	138.370,	2438.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1321	!	X	=	-22.082,	138.349,	3031.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1322	!	X	=	-98.771,	146.263,	2530.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1323	!	X	=	-93.657,	146.183,	2560.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1324	!	X	=	-88.543,	146.107,	2615.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1325	!	X	=	-83.429,	146.035,	2621.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1326	!	X	=	-78.314,	145.968,	2367.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1327	!	X	=	-73.200,	145.905,	2558.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1328	!	X	=	-68.086,	145.846,	2511.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1329	!	X	=	-62.972,	145.791,	2492.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1330	!	X	=	-57.858,	145.741,	2356.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1331	!	X	=	-52.743,	145.695,	2387.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1332	!	X	=	-47.629,	145.653,	2377.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1333	!	X	=	-42.514,	145.616,	2356.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1334	!	X	=	-37.400,	145.583,	2356.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1335	!	X	=	-32.285,	145.554,	2443.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1336	!	X	=	-27.171,	145.529,	2987.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1337	!	X	=	-22.056,	145.508,	2737.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1338	!	X	=	-98.655,	153.421,	2438.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1339	!	X	=	-93.547,	153.341,	2652.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1340	!	X	=	-88.439,	153.265,	2438.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1341	!	X	=	-83.331,	153.193,	2449.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1342	!	X	=	-78.223,	153.126,	2384.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1343	!	X	=	-73.115,	153.063,	2534.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1344	!	X	=	-68.007,	153.004,	2499.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1345	!	X	=	-62.898,	152.950,	2560.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1346	!	X	=	-57.790,	152.900,	2370.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1347	!	X	=	-52.682,	152.854,	2422.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1348	!	X	=	-47.573,	152.812,	2356.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1349	!	X	=	-42.465,	152.775,	2356.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1350	!	X	=	-37.356,	152.741,	2363.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1351	!	X	=	-32.248,	152.712,	2499.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1352	!	X	=	-27.139,	152.688,	2609.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1353	!	X	=	-22.031,	152.667,	2655.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1354	!	X	=	-16.922,	152.651,	2438.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1355	!	X	=	-98.540,	160.579,	2323.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1356	!	X	=	-93.438,	160.499,	2591.0,	0.0!	!END!	Yellowstone NP	(Class_I)
1357	!	X	=	-88.336,	160.423,	2509.0,	0.0!	!END!	Yellowstone NP	(Class_I)

1500	!	X	=	-28.441,	40.159,	2500.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1501	!	X	=	-28.509,	38.515,	2621.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1502	!	X	=	-28.535,	41.971,	2540.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1503	!	X	=	-29.291,	43.681,	2453.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1504	!	X	=	-29.866,	35.051,	3048.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1505	!	X	=	-30.000,	36.000,	2865.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1506	!	X	=	-30.000,	40.000,	2769.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1507	!	X	=	-30.000,	44.000,	2459.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1508	!	X	=	-30.835,	33.726,	3048.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1509	!	X	=	-30.853,	44.735,	2376.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1510	!	X	=	-32.217,	46.196,	2363.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1511	!	X	=	-32.504,	33.052,	3008.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1512	!	X	=	-33.725,	24.485,	2996.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1513	!	X	=	-33.729,	47.280,	2420.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1514	!	X	=	-34.000,	36.000,	2917.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1515	!	X	=	-34.000,	40.000,	2692.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1516	!	X	=	-34.000,	44.000,	2893.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1517	!	X	=	-34.431,	32.637,	3202.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1518	!	X	=	-34.456,	47.898,	2560.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1519	!	X	=	-34.844,	24.621,	2991.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1520	!	X	=	-34.896,	49.721,	2446.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1521	!	X	=	-35.259,	25.691,	3353.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1522	!	X	=	-35.334,	31.022,	3164.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1523	!	X	=	-36.006,	27.535,	3271.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1524	!	X	=	-36.133,	50.840,	2456.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1525	!	X	=	-36.448,	29.464,	3292.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1526	!	X	=	-36.682,	25.351,	2608.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1527	!	X	=	-36.804,	52.632,	2440.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1528	!	X	=	-38.000,	28.000,	2604.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1529	!	X	=	-38.000,	32.000,	3392.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1530	!	X	=	-38.000,	36.000,	3060.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1531	!	X	=	-38.000,	40.000,	2743.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1532	!	X	=	-38.000,	44.000,	3004.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1533	!	X	=	-38.000,	48.000,	2765.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1534	!	X	=	-38.000,	52.000,	2489.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1535	!	X	=	-38.143,	26.701,	2560.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1536	!	X	=	-38.497,	53.643,	2319.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1537	!	X	=	-39.547,	28.071,	2412.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1538	!	X	=	-40.140,	54.775,	2464.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1539	!	X	=	-41.297,	29.035,	2621.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1540	!	X	=	-41.566,	56.161,	2377.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1541	!	X	=	-42.000,	32.000,	3024.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1542	!	X	=	-42.000,	36.000,	3064.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1543	!	X	=	-42.000,	40.000,	3140.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1544	!	X	=	-42.000,	44.000,	2865.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1545	!	X	=	-42.000,	48.000,	2893.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1546	!	X	=	-42.000,	52.000,	2650.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1547	!	X	=	-42.000,	56.000,	2436.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1548	!	X	=	-43.051,	56.862,	2378.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1549	!	X	=	-43.107,	29.881,	2377.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1550	!	X	=	-44.180,	56.989,	2447.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1551	!	X	=	-44.878,	30.752,	2562.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1552	!	X	=	-45.228,	57.940,	2321.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1553	!	X	=	-46.000,	32.000,	2682.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1554	!	X	=	-46.000,	36.000,	3007.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1555	!	X	=	-46.000,	40.000,	2970.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1556	!	X	=	-46.000,	44.000,	3170.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1557	!	X	=	-46.000,	48.000,	3049.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1558	!	X	=	-46.000,	52.000,	2353.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1559	!	X	=	-46.000,	56.000,	2542.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1560	!	X	=	-46.491,	31.918,	2567.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1561	!	X	=	-47.137,	57.669,	2282.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1562	!	X	=	-47.570,	55.900,	2195.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1563	!	X	=	-47.682,	54.557,	2289.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1564	!	X	=	-48.178,	32.980,	2256.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1565	!	X	=	-48.560,	56.231,	2377.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1566	!	X	=	-49.755,	34.106,	2429.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1567	!	X	=	-49.857,	57.675,	2379.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1568	!	X	=	-50.000,	36.000,	2621.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1569	!	X	=	-50.000,	40.000,	3133.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)
1570	!	X	=	-50.000,	44.000,	2886.0,	0.0!	!END!	Gros_Ventre WA	(Class_II)

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1571  !  X  =  -50.000,  48.000,  2960.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1572  !  X  =  -50.000,  52.000,  3119.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1573  !  X  =  -50.000,  56.000,  2530.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1574  !  X  =  -51.061,  34.888,  2194.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1575  !  X  =  -51.646,  58.567,  2439.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1576  !  X  =  -51.876,  33.096,  2560.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1577  !  X  =  -52.628,  31.305,  2309.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1578  !  X  =  -53.248,  59.669,  2374.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1579  !  X  =  -54.000,  32.000,  2308.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1580  !  X  =  -54.000,  36.000,  3109.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1581  !  X  =  -54.000,  40.000,  2560.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1582  !  X  =  -54.000,  44.000,  2839.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1583  !  X  =  -54.000,  48.000,  3080.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1584  !  X  =  -54.000,  52.000,  3292.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1585  !  X  =  -54.000,  56.000,  2685.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1586  !  X  =  -54.000,  60.000,  2471.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1587  !  X  =  -54.322,  30.344,  2316.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1588  !  X  =  -54.820,  60.788,  2388.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1589  !  X  =  -56.188,  29.674,  2103.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1590  !  X  =  -56.329,  61.867,  2337.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1591  !  X  =  -57.641,  28.362,  2377.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1592  !  X  =  -58.000,  50.291,  2423.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1593  !  X  =  -58.000,  32.000,  2567.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1594  !  X  =  -58.000,  36.000,  2951.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1595  !  X  =  -58.000,  40.000,  3170.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1596  !  X  =  -58.000,  44.000,  3018.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1597  !  X  =  -58.000,  48.000,  2500.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1598  !  X  =  -58.000,  52.000,  2515.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1599  !  X  =  -58.000,  56.000,  3048.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1600  !  X  =  -58.000,  60.000,  2544.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1601  !  X  =  -58.290,  62.196,  2245.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1602  !  X  =  -58.536,  52.147,  2433.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1603  !  X  =  -59.223,  27.164,  2164.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1604  !  X  =  -59.599,  51.009,  2514.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1605  !  X  =  -60.059,  53.184,  2363.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1606  !  X  =  -60.223,  62.454,  2182.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1607  !  X  =  -60.615,  50.473,  2865.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1608  !  X  =  -60.880,  26.127,  2134.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1609  !  X  =  -61.309,  54.270,  2428.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1610  !  X  =  -61.318,  56.270,  2316.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1611  !  X  =  -62.000,  28.000,  2346.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1612  !  X  =  -62.000,  32.000,  2596.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1613  !  X  =  -62.000,  36.000,  2438.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1614  !  X  =  -62.000,  40.000,  3109.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1615  !  X  =  -62.000,  44.000,  2623.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1616  !  X  =  -62.000,  48.000,  3024.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1617  !  X  =  -62.000,  60.000,  2294.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1618  !  X  =  -62.131,  49.204,  2896.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1619  !  X  =  -62.260,  57.364,  2187.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1620  !  X  =  -62.276,  62.038,  2121.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1621  !  X  =  -62.805,  25.594,  2051.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1622  !  X  =  -62.861,  58.656,  2134.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1623  !  X  =  -62.875,  60.656,  2119.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1624  !  X  =  -63.502,  47.776,  2816.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1625  !  X  =  -64.702,  26.215,  2190.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1626  !  X  =  -65.168,  46.747,  2699.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1627  !  X  =  -65.421,  40.338,  2475.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1628  !  X  =  -66.000,  28.000,  2201.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1629  !  X  =  -66.000,  32.000,  2438.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1630  !  X  =  -66.000,  36.000,  2349.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1631  !  X  =  -66.000,  40.000,  2499.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1632  !  X  =  -66.000,  44.000,  2904.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1633  !  X  =  -66.000,  48.000,  2565.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1634  !  X  =  -66.176,  27.349,  2020.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1635  !  X  =  -66.237,  38.981,  2562.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1636  !  X  =  -66.749,  29.263,  2195.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1637  !  X  =  -66.895,  41.640,  2316.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1638  !  X  =  -66.907,  47.507,  2591.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1639  !  X  =  -67.158,  31.221,  2093.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1640  !  X  =  -67.760,  33.127,  2134.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
1641  !  X  =  -68.089,  38.629,  2464.0,  0.0!  !END!  Gros_Ventre WA  (Class_II)
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1642  !  X  =  -68.355,   48.755,   2073.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1643  !  X  =  -68.613,   34.907,   2190.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1644  !  X  =  -68.658,   42.580,   2194.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1645  !  X  =  -68.802,   36.813,   2344.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1646  !  X  =  -70.000,   44.000,   2316.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1647  !  X  =  -70.000,   48.000,   2406.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1648  !  X  =  -70.046,   49.326,   2012.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1649  !  X  =  -70.525,   43.269,   2088.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1650  !  X  =  -71.834,   49.174,   1967.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1651  !  X  =  -71.969,   44.581,   2012.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1652  !  X  =  -72.801,   48.191,   1991.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1653  !  X  =  -72.818,   46.194,   2284.0,   0.0!  !END!  Gros_Ventre WA  (Class_II)
1654  !  X  =  62.150,   -44.514,   3658.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1655  !  X  =  61.392,   -31.128,   3146.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1656  !  X  =  46.817,   -22.751,   3170.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1657  !  X  =  56.903,   -23.936,   3118.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1658  !  X  =  54.941,   -30.625,   2865.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1659  !  X  =  58.878,   -26.563,   2719.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1660  !  X  =  59.383,   -26.388,   2684.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1661  !  X  =  60.448,   -27.709,   2867.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1662  !  X  =  50.941,   -30.687,   3195.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1663  !  X  =  59.003,   -34.562,   3068.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1664  !  X  =  59.065,   -38.561,   3109.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1665  !  X  =  58.467,   -24.786,   2943.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1666  !  X  =  60.365,   -29.444,   3170.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1667  !  X  =  57.117,   -21.948,   3006.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1668  !  X  =  56.606,   -20.084,   3088.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1669  !  X  =  61.518,   -44.243,   3658.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1670  !  X  =  46.879,   -26.750,   3406.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1671  !  X  =  42.817,   -22.813,   3393.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1672  !  X  =  54.816,   -22.626,   3292.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1673  !  X  =  50.816,   -22.688,   3403.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1674  !  X  =  55.003,   -34.624,   3353.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1675  !  X  =  55.066,   -38.624,   3324.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1676  !  X  =  54.878,   -26.625,   3224.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1677  !  X  =  58.940,   -30.562,   3354.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1678  !  X  =  50.879,   -26.688,   3571.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1679  !  X  =  69.860,   -44.648,   3169.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1680  !  X  =  69.630,   -47.785,   2988.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1681  !  X  =  70.598,   -46.145,   2969.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1682  !  X  =  68.016,   -48.343,   3059.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1683  !  X  =  67.189,   -46.436,   3108.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1684  !  X  =  63.002,   -34.499,   2918.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1685  !  X  =  64.263,   -33.291,   2940.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1686  !  X  =  66.561,   -34.815,   2682.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1687  !  X  =  66.734,   -36.785,   2872.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1688  !  X  =  68.085,   -37.818,   2777.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1689  !  X  =  67.064,   -38.437,   2866.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1690  !  X  =  65.948,   -32.945,   2899.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1691  !  X  =  63.065,   -38.499,   3066.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1692  !  X  =  68.762,   -39.579,   3084.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1693  !  X  =  69.016,   -41.313,   3146.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1694  !  X  =  63.184,   -31.750,   2996.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1695  !  X  =  66.040,   -48.122,   3360.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1696  !  X  =  64.684,   -47.049,   3474.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1697  !  X  =  63.431,   -45.771,   3555.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1698  !  X  =  63.127,   -42.498,   3289.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1699  !  X  =  67.127,   -42.436,   3291.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1700  !  X  =  68.987,   -43.257,   3352.0,   0.0!  !END!  Popo_Agie WA  (Class_II)
1701  !  X  =  49.811,   -1.585,   2621.0,   0.0!  !END!  Wind_River RA  (Class_II)
1702  !  X  =  30.569,   -7.002,   3171.0,   0.0!  !END!  Wind_River RA  (Class_II)
1703  !  X  =  52.588,   -11.666,   2502.0,   0.0!  !END!  Wind_River RA  (Class_II)
1704  !  X  =  49.829,   -3.584,   2551.0,   0.0!  !END!  Wind_River RA  (Class_II)
1705  !  X  =  46.505,   -2.753,   2926.0,   0.0!  !END!  Wind_River RA  (Class_II)
1706  !  X  =  46.567,   -6.753,   2931.0,   0.0!  !END!  Wind_River RA  (Class_II)
1707  !  X  =  46.692,   -14.752,   3196.0,   0.0!  !END!  Wind_River RA  (Class_II)
1708  !  X  =  46.754,   -18.751,   3014.0,   0.0!  !END!  Wind_River RA  (Class_II)
1709  !  X  =  42.568,   -6.815,   2857.0,   0.0!  !END!  Wind_River RA  (Class_II)
1710  !  X  =  38.506,   -2.878,   3238.0,   0.0!  !END!  Wind_River RA  (Class_II)
1711  !  X  =  38.630,   -10.877,   3005.0,   0.0!  !END!  Wind_River RA  (Class_II)
1712  !  X  =  38.693,   -14.877,   3215.0,   0.0!  !END!  Wind_River RA  (Class_II)
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1713  !  X  =   42.630,   -10.815,   3165.0,    0.0!  !END!  Wind_River RA  (Class_II)
1714  !  X  =   52.768,   -13.658,   2695.0,    0.0!  !END!  Wind_River RA  (Class_II)
1715  !  X  =   50.691,   -14.689,   2865.0,    0.0!  !END!  Wind_River RA  (Class_II)
1716  !  X  =   52.946,   -15.650,   2863.0,    0.0!  !END!  Wind_River RA  (Class_II)
1717  !  X  =   50.567,   -6.690,   2743.0,    0.0!  !END!  Wind_River RA  (Class_II)
1718  !  X  =   52.410,   -9.674,   2743.0,    0.0!  !END!  Wind_River RA  (Class_II)
1719  !  X  =   51.277,   -4.285,   2674.0,    0.0!  !END!  Wind_River RA  (Class_II)
1720  !  X  =   52.052,   -5.690,   2771.0,    0.0!  !END!  Wind_River RA  (Class_II)
1721  !  X  =   50.629,   -10.690,   2864.0,    0.0!  !END!  Wind_River RA  (Class_II)
1722  !  X  =   53.125,   -17.642,   3048.0,    0.0!  !END!  Wind_River RA  (Class_II)
1723  !  X  =   50.754,   -18.689,   3235.0,    0.0!  !END!  Wind_River RA  (Class_II)
1724  !  X  =   52.231,   -7.681,   2957.0,    0.0!  !END!  Wind_River RA  (Class_II)
1725  !  X  =   55.631,   -19.244,   3064.0,    0.0!  !END!  Wind_River RA  (Class_II)
1726  !  X  =   30.507,   -3.003,   3214.0,    0.0!  !END!  Wind_River RA  (Class_II)
1727  !  X  =   46.629,   -10.752,   3448.0,    0.0!  !END!  Wind_River RA  (Class_II)
1728  !  X  =   38.568,   -6.878,   3361.0,    0.0!  !END!  Wind_River RA  (Class_II)
1729  !  X  =   38.755,   -18.876,   3353.0,    0.0!  !END!  Wind_River RA  (Class_II)
1730  !  X  =   34.631,   -10.940,   3414.0,    0.0!  !END!  Wind_River RA  (Class_II)
1731  !  X  =   42.755,   -18.814,   3298.0,    0.0!  !END!  Wind_River RA  (Class_II)
1732  !  X  =   42.692,   -14.814,   3520.0,    0.0!  !END!  Wind_River RA  (Class_II)
1733  !  X  =   42.505,   -2.816,   3310.0,    0.0!  !END!  Wind_River RA  (Class_II)
1734  !  X  =   34.506,   -2.941,   3597.0,    0.0!  !END!  Wind_River RA  (Class_II)
1735  !  X  =   34.568,   -6.940,   3774.0,    0.0!  !END!  Wind_River RA  (Class_II)
1736  !  X  =   53.631,   -19.270,   3386.0,    0.0!  !END!  Wind_River RA  (Class_II)
1737  !  X  =   30.132,   20.994,   3031.0,    0.0!  !END!  Wind_River RA  (Class_II)
1738  !  X  =   30.194,   16.995,   3153.0,    0.0!  !END!  Wind_River RA  (Class_II)
1739  !  X  =   30.257,   12.995,   3230.0,    0.0!  !END!  Wind_River RA  (Class_II)
1740  !  X  =   30.237,   22.037,   3013.0,    0.0!  !END!  Wind_River RA  (Class_II)
1741  !  X  =   30.382,   4.996,   2579.0,    0.0!  !END!  Wind_River RA  (Class_II)
1742  !  X  =   30.444,   0.997,   2987.0,    0.0!  !END!  Wind_River RA  (Class_II)
1743  !  X  =   29.349,   23.829,   2614.0,    0.0!  !END!  Wind_River RA  (Class_II)
1744  !  X  =   28.462,   25.622,   3039.0,    0.0!  !END!  Wind_River RA  (Class_II)
1745  !  X  =   27.574,   27.414,   2926.0,    0.0!  !END!  Wind_River RA  (Class_II)
1746  !  X  =   38.318,   9.120,   2078.0,    0.0!  !END!  Wind_River RA  (Class_II)
1747  !  X  =   34.381,   5.059,   2455.0,    0.0!  !END!  Wind_River RA  (Class_II)
1748  !  X  =   39.806,   8.805,   2636.0,    0.0!  !END!  Wind_River RA  (Class_II)
1749  !  X  =   39.715,   10.802,   2299.0,    0.0!  !END!  Wind_River RA  (Class_II)
1750  !  X  =   46.442,   1.246,   2950.0,    0.0!  !END!  Wind_River RA  (Class_II)
1751  !  X  =   45.426,   4.143,   2969.0,    0.0!  !END!  Wind_River RA  (Class_II)
1752  !  X  =   31.420,   20.425,   2744.0,    0.0!  !END!  Wind_River RA  (Class_II)
1753  !  X  =   38.256,   13.120,   2969.0,    0.0!  !END!  Wind_River RA  (Class_II)
1754  !  X  =   38.568,   13.935,   2876.0,    0.0!  !END!  Wind_River RA  (Class_II)
1755  !  X  =   38.381,   5.121,   2930.0,    0.0!  !END!  Wind_River RA  (Class_II)
1756  !  X  =   36.684,   14.426,   2824.0,    0.0!  !END!  Wind_River RA  (Class_II)
1757  !  X  =   35.285,   15.854,   2804.0,    0.0!  !END!  Wind_River RA  (Class_II)
1758  !  X  =   39.899,   6.807,   2926.0,    0.0!  !END!  Wind_River RA  (Class_II)
1759  !  X  =   34.319,   9.058,   2964.0,    0.0!  !END!  Wind_River RA  (Class_II)
1760  !  X  =   34.444,   1.059,   3113.0,    0.0!  !END!  Wind_River RA  (Class_II)
1761  !  X  =   34.194,   17.057,   2951.0,    0.0!  !END!  Wind_River RA  (Class_II)
1762  !  X  =   33.884,   17.282,   2997.0,    0.0!  !END!  Wind_River RA  (Class_II)
1763  !  X  =   32.610,   18.818,   3109.0,    0.0!  !END!  Wind_River RA  (Class_II)
1764  !  X  =   34.256,   13.058,   3081.0,    0.0!  !END!  Wind_River RA  (Class_II)
1765  !  X  =   39.990,   4.809,   3064.0,    0.0!  !END!  Wind_River RA  (Class_II)
1766  !  X  =   43.425,   4.171,   2991.0,    0.0!  !END!  Wind_River RA  (Class_II)
1767  !  X  =   42.443,   1.184,   3199.0,    0.0!  !END!  Wind_River RA  (Class_II)
1768  !  X  =   39.623,   12.800,   2855.0,    0.0!  !END!  Wind_River RA  (Class_II)
1769  !  X  =   49.773,   2.415,   2743.0,    0.0!  !END!  Wind_River RA  (Class_II)
1770  !  X  =   49.425,   4.087,   2654.0,    0.0!  !END!  Wind_River RA  (Class_II)
1771  !  X  =   47.425,   4.115,   2833.0,    0.0!  !END!  Wind_River RA  (Class_II)
1772  !  X  =   49.792,   0.415,   2926.0,    0.0!  !END!  Wind_River RA  (Class_II)
1773  !  X  =   30.319,   8.996,   3414.0,    0.0!  !END!  Wind_River RA  (Class_II)
1774  !  X  =   38.443,   1.121,   3355.0,    0.0!  !END!  Wind_River RA  (Class_II)
1775  !  X  =   41.425,   4.198,   3292.0,    0.0!  !END!  Wind_River RA  (Class_II)
1776  !  X  =   49.981,   -35.296,   3201.0,    0.0!  !END!  Deep  (Lake)
1777  !  X  =   49.943,   -33.146,   3126.6,    0.0!  !END!  Black_Joe  (Lake)
1778  !  X  =   10.328,   -1.505,   3066.3,    0.0!  !END!  Hobbs  (Lake)
1779  !  X  =   50.799,   -38.784,   3486.9,    0.0!  !END!  Upper_Frozen  (Lake)
1780  !  X  =   5.783,   30.399,   3535.7,    0.0!  !END!  Lazy_Boy  (Lake)
1781  !  X  =   11.354,   35.301,   2948.9,    0.0!  !END!  Ross  (Lake)
1782  !  X  =   64.059,   -45.502,   3432.7,    0.0!  !END!  Lower_Saddlebag  (Lake)
1783  !  X  =   80.40,   59.98,   2692.3,    0.0!  !END!  Phlox Mountain (BIA Site)
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! X = 195.97 , 162.73 , 2714.3 , 0.0! !END! Cloudpeak WA (Class II)
! X = 192.77 , 164.62 , 2796.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 191.16 , 164.21 , 2953.9 , 0.0! !END! Cloudpeak WA (Class II)
! X = 189.79 , 166.8 , 2855.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 190.61 , 167.7 , 2742.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 188.93 , 168.51 , 2770.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 186.46 , 170.03 , 3105.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 184.87 , 168.89 , 3209.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 181.67 , 167.11 , 2839.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 181.02 , 166.38 , 2749.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 182.09 , 165.07 , 2830.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 183.06 , 163.75 , 2832.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 183.12 , 163.03 , 2811.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 179.74 , 162.36 , 2496.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 177.97 , 162.17 , 2535.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 177.89 , 160.39 , 2862.7 , 0.0! !END! Cloudpeak WA (Class II)
! X = 179.55 , 160.47 , 2736.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 181.91 , 159 , 2939.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 183.16 , 160.64 , 2784.5 , 0.0! !END! Cloudpeak WA (Class II)
! X = 184.38 , 160.77 , 2834.3 , 0.0! !END! Cloudpeak WA (Class II)
! X = 186.23 , 159.74 , 2864.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 185.93 , 157.73 , 2859.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 183.39 , 156.53 , 3045.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 184.7 , 154.66 , 3083.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 186.34 , 152.91 , 3171.4 , 0.0! !END! Cloudpeak WA (Class II)
! X = 183.81 , 151.36 , 2984.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 184.89 , 149.55 , 2806.1 , 0.0! !END! Cloudpeak WA (Class II)
! X = 187.67 , 149.76 , 2923.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 188.96 , 148.61 , 3101.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 189.09 , 147.61 , 3013.7 , 0.0! !END! Cloudpeak WA (Class II)
! X = 187.4 , 145.7 , 2807.7 , 0.0! !END! Cloudpeak WA (Class II)
! X = 188.42 , 144.21 , 2623.7 , 0.0! !END! Cloudpeak WA (Class II)
! X = 187.93 , 143.31 , 2626.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 191.33 , 142.76 , 2824.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 193.79 , 141.74 , 3044.9 , 0.0! !END! Cloudpeak WA (Class II)
! X = 195.48 , 140.43 , 3047.5 , 0.0! !END! Cloudpeak WA (Class II)
! X = 197.04 , 136.73 , 3104.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 198.19 , 134.28 , 2987.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 200.02 , 134.69 , 2804.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 201.06 , 131.76 , 2952.7 , 0.0! !END! Cloudpeak WA (Class II)
! X = 200.58 , 130.81 , 2921.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 202.95 , 128.68 , 2930.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 203.86 , 127.36 , 2786.1 , 0.0! !END! Cloudpeak WA (Class II)
! X = 206.78 , 128.57 , 3030.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 208.46 , 128.04 , 3143.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 211.58 , 127.43 , 3346.0 , 0.0! !END! Cloudpeak WA (Class II)
! X = 213.07 , 128.23 , 3281.9 , 0.0! !END! Cloudpeak WA (Class II)
! X = 213.66 , 129.79 , 3016.9 , 0.0! !END! Cloudpeak WA (Class II)
! X = 215.3 , 131.21 , 2763.7 , 0.0! !END! Cloudpeak WA (Class II)
! X = 216.88 , 132.96 , 2605.1 , 0.0! !END! Cloudpeak WA (Class II)
! X = 216.97 , 134.51 , 2539.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 215.55 , 136.77 , 2498.4 , 0.0! !END! Cloudpeak WA (Class II)
! X = 214.08 , 138.47 , 2574.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 214.88 , 140.37 , 2533.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 213.84 , 143.02 , 2680.9 , 0.0! !END! Cloudpeak WA (Class II)
! X = 212.39 , 143.28 , 2803.9 , 0.0! !END! Cloudpeak WA (Class II)
! X = 211.78 , 146.44 , 3154.3 , 0.0! !END! Cloudpeak WA (Class II)
! X = 212.43 , 147.78 , 3056.3 , 0.0! !END! Cloudpeak WA (Class II)
! X = 210.09 , 148.36 , 3017.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 207.88 , 147.27 , 3055.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 209.29 , 149.73 , 2926.3 , 0.0! !END! Cloudpeak WA (Class II)
! X = 210.67 , 153.98 , 2682.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 210.38 , 154.75 , 2760.2 , 0.0! !END! Cloudpeak WA (Class II)
! X = 205.03 , 155.11 , 2986.4 , 0.0! !END! Cloudpeak WA (Class II)
! X = 208.97 , 159.18 , 2768.8 , 0.0! !END! Cloudpeak WA (Class II)
! X = 208.40 , 160.33 , 2803.9 , 0.0! !END! Cloudpeak WA (Class II)
! X = 208.97 , 162.9 , 2487.1 , 0.0! !END! Cloudpeak WA (Class II)
! X = 207.18 , 163.32 , 2638.3 , 0.0! !END! Cloudpeak WA (Class II)
! X = 205.45 , 163.9 , 2437.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 204.85 , 160.11 , 2728.6 , 0.0! !END! Cloudpeak WA (Class II)
! X = 202.54 , 161.69 , 2658.7 , 0.0! !END! Cloudpeak WA (Class II)
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1855 ! X = 199.52 , 159.25 , 2750.1 , 0.0! !END! Cloudpeak WA (Class II)
1856 ! X = 198.47 , 158.79 , 2836.7 , 0.0! !END! Cloudpeak WA (Class II)
1857 ! X = 197.61 , 160.72 , 2707.3 , 0.0! !END! Cloudpeak WA (Class II)
1858 ! X = 194.02 , 163.17 , 2858.5 , 0.0! !END! Cloudpeak WA (Class II)
1859 ! X = 204.47 , 128.73 , 2878.2 , 0.0! !END! Cloudpeak WA (Class II)
1860 ! X = 208.47 , 128.79 , 3230.9 , 0.0! !END! Cloudpeak WA (Class II)
1861 ! X = 212.47 , 128.85 , 3084.5 , 0.0! !END! Cloudpeak WA (Class II)
1862 ! X = 204.41 , 132.73 , 3359.0 , 0.0! !END! Cloudpeak WA (Class II)
1863 ! X = 208.41 , 132.79 , 3530.1 , 0.0! !END! Cloudpeak WA (Class II)
1864 ! X = 212.41 , 132.85 , 2872.0 , 0.0! !END! Cloudpeak WA (Class II)
1865 ! X = 216.41 , 132.92 , 2657.3 , 0.0! !END! Cloudpeak WA (Class II)
1866 ! X = 200.35 , 136.67 , 2925.1 , 0.0! !END! Cloudpeak WA (Class II)
1867 ! X = 204.35 , 136.73 , 3042.5 , 0.0! !END! Cloudpeak WA (Class II)
1868 ! X = 208.35 , 136.79 , 3569.8 , 0.0! !END! Cloudpeak WA (Class II)
1869 ! X = 212.35 , 136.85 , 2991.2 , 0.0! !END! Cloudpeak WA (Class II)
1870 ! X = 196.28 , 140.6 , 3073.7 , 0.0! !END! Cloudpeak WA (Class II)
1871 ! X = 200.28 , 140.67 , 3289.6 , 0.0! !END! Cloudpeak WA (Class II)
1872 ! X = 204.28 , 140.73 , 3598.8 , 0.0! !END! Cloudpeak WA (Class II)
1873 ! X = 208.28 , 140.79 , 3136.0 , 0.0! !END! Cloudpeak WA (Class II)
1874 ! X = 212.28 , 140.85 , 2805.2 , 0.0! !END! Cloudpeak WA (Class II)
1875 ! X = 192.22 , 144.54 , 2831.3 , 0.0! !END! Cloudpeak WA (Class II)
1876 ! X = 196.22 , 144.6 , 3212.5 , 0.0! !END! Cloudpeak WA (Class II)
1877 ! X = 200.22 , 144.66 , 3390.6 , 0.0! !END! Cloudpeak WA (Class II)
1878 ! X = 204.22 , 144.73 , 3839.1 , 0.0! !END! Cloudpeak WA (Class II)
1879 ! X = 208.22 , 144.79 , 3357.4 , 0.0! !END! Cloudpeak WA (Class II)
1880 ! X = 212.22 , 144.85 , 2997.1 , 0.0! !END! Cloudpeak WA (Class II)
1881 ! X = 188.16 , 148.48 , 3017.3 , 0.0! !END! Cloudpeak WA (Class II)
1882 ! X = 192.16 , 148.54 , 2980.0 , 0.0! !END! Cloudpeak WA (Class II)
1883 ! X = 196.16 , 148.6 , 3056.8 , 0.0! !END! Cloudpeak WA (Class II)
1884 ! X = 200.16 , 148.66 , 3407.5 , 0.0! !END! Cloudpeak WA (Class II)
1885 ! X = 204.16 , 148.73 , 3757.9 , 0.0! !END! Cloudpeak WA (Class II)
1886 ! X = 208.16 , 148.79 , 2987.1 , 0.0! !END! Cloudpeak WA (Class II)
1887 ! X = 188.1 , 152.48 , 3109.8 , 0.0! !END! Cloudpeak WA (Class II)
1888 ! X = 192.1 , 152.54 , 3236.4 , 0.0! !END! Cloudpeak WA (Class II)
1889 ! X = 196.1 , 152.6 , 2933.8 , 0.0! !END! Cloudpeak WA (Class II)
1890 ! X = 200.1 , 152.66 , 3516.7 , 0.0! !END! Cloudpeak WA (Class II)
1891 ! X = 204.1 , 152.73 , 2859.0 , 0.0! !END! Cloudpeak WA (Class II)
1892 ! X = 208.1 , 152.79 , 2898.1 , 0.0! !END! Cloudpeak WA (Class II)
1893 ! X = 184.04 , 156.41 , 3048.8 , 0.0! !END! Cloudpeak WA (Class II)
1894 ! X = 188.04 , 156.48 , 2926.1 , 0.0! !END! Cloudpeak WA (Class II)
1895 ! X = 192.04 , 156.54 , 3235.7 , 0.0! !END! Cloudpeak WA (Class II)
1896 ! X = 196.03 , 156.6 , 2788.5 , 0.0! !END! Cloudpeak WA (Class II)
1897 ! X = 200.03 , 156.66 , 2943.7 , 0.0! !END! Cloudpeak WA (Class II)
1898 ! X = 204.03 , 156.73 , 3028.8 , 0.0! !END! Cloudpeak WA (Class II)
1899 ! X = 208.03 , 156.79 , 2807.3 , 0.0! !END! Cloudpeak WA (Class II)
1900 ! X = 187.97 , 160.48 , 3021.1 , 0.0! !END! Cloudpeak WA (Class II)
1901 ! X = 191.97 , 160.54 , 3048.0 , 0.0! !END! Cloudpeak WA (Class II)
1902 ! X = 195.97 , 160.6 , 2628.0 , 0.0! !END! Cloudpeak WA (Class II)
1903 ! X = 199.97 , 160.66 , 2830.7 , 0.0! !END! Cloudpeak WA (Class II)
1904 ! X = 203.97 , 160.73 , 2681.2 , 0.0! !END! Cloudpeak WA (Class II)
1905 ! X = 207.97 , 160.79 , 2736.9 , 0.0! !END! Cloudpeak WA (Class II)
1906 ! X = 183.91 , 164.41 , 2894.1 , 0.0! !END! Cloudpeak WA (Class II)
1907 ! X = 187.91 , 164.47 , 2986.2 , 0.0! !END! Cloudpeak WA (Class II)
1908 ! X = 183.85 , 168.41 , 2961.2 , 0.0! !END! Cloudpeak WA (Class II)
1909 ! X = 187.85 , 168.47 , 2835.9 , 0.0! !END! Cloudpeak WA (Class II)
1910 ! X = 123.75 , 58.6 , 1347.4 ,0.0! !END! Wind River Canyon (Class II)
1911 ! X = 123.91 , 55.53 , 1649.6 , 0.0! !END! Wind River Canyon (Class II)
1912 ! X = 124.37 , 54.49 , 1697.7 , 0.0! !END! Wind River Canyon (Class II)
1913 ! X = 122.88 , 53.32 , 1778.9 , 0.0! !END! Wind River Canyon (Class II)
1914 ! X = 125.09 , 54.23 , 1706.0 , 0.0! !END! Wind River Canyon (Class II)
1915 ! X = 126.02 , 52.21 , 1776.6 , 0.0! !END! Wind River Canyon (Class II)
1916 ! X = 124.24 , 50.4 , 1932.4 ,0.0! !END! Wind River Canyon (Class II)
1917 ! X = 124.48 , 47.44 , 2073.0 , 0.0! !END! Wind River Canyon (Class II)
1918 ! X = 126.2 , 49.85 , 1897.3 , 0.0! !END! Wind River Canyon (Class II)
1919 ! X = 126.21 , 47.25 , 2022.7 , 0.0! !END! Wind River Canyon (Class II)
1920 ! X = 125.59 , 45.1 , 2259.7 ,0.0! !END! Wind River Canyon (Class II)
1921 ! X = 123.56 , 44.84 , 2105.5 , 0.0! !END! Wind River Canyon (Class II)
1922 ! X = 124.84 , 41.62 , 1707.6 , 0.0! !END! Wind River Canyon (Class II)
1923 ! X = 127.04 , 39.87 , 1440.3 , 0.0! !END! Wind River Canyon (Class II)
1924 ! X = 129.49 , 40.93 , 1672.2 , 0.0! !END! Wind River Canyon (Class II)
1925 ! X = 131.74 , 42.78 , 1889.2 , 0.0! !END! Wind River Canyon (Class II)
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1926 ! X = 132.13 , 44.37 , 2151.2 , 0.0! !END! Wind River Canyon (Class II)
1927 ! X = 130.33 , 45.17 , 1964.1 , 0.0! !END! Wind River Canyon (Class II)
1928 ! X = 129.94 , 48.92 , 2052.0 , 0.0! !END! Wind River Canyon (Class II)
1929 ! X = 128.53 , 51.54 , 1940.4 , 0.0! !END! Wind River Canyon (Class II)
1930 ! X = 127.83 , 52.6 , 1882.5 , 0.0! !END! Wind River Canyon (Class II)
1931 ! X = 126.2 , 54.99 , 1683.5 , 0.0! !END! Wind River Canyon (Class II)
1932 ! X = 124.84 , 55.65 , 1482.5 , 0.0! !END! Wind River Canyon (Class II)
1933 ! X = 130.26 , 47.59 , 1898.9 , 0.0! !END! Wind River Canyon (Class II)
1934 ! X = 127.34 , 43.43 , 1435.5 , 0.0! !END! Wind River Canyon (Class II)
1935 ! X = 69.99 , 61.78 , 2376.0 , 0.0! !END! Owl Creek Mntns (Class II)
1936 ! X = 68.97 , 60.64 , 2313.2 , 0.0! !END! Owl Creek Mntns (Class II)
1937 ! X = 69.91 , 64.36 , 2135.4 , 0.0! !END! Owl Creek Mntns (Class II)
1938 ! X = 75.47 , 63.28 , 2293.5 , 0.0! !END! Owl Creek Mntns (Class II)
1939 ! X = 79.36 , 64.68 , 2093.2 , 0.0! !END! Owl Creek Mntns (Class II)
1940 ! X = 83.39 , 65.36 , 2020.2 , 0.0! !END! Owl Creek Mntns (Class II)
1941 ! X = 87.52 , 64.72 , 2054.2 , 0.0! !END! Owl Creek Mntns (Class II)
1942 ! X = 91.34 , 62.91 , 2036.8 , 0.0! !END! Owl Creek Mntns (Class II)
1943 ! X = 96.31 , 58.86 , 1983.3 , 0.0! !END! Owl Creek Mntns (Class II)
1944 ! X = 93.41 , 61.02 , 2074.2 , 0.0! !END! Owl Creek Mntns (Class II)
1945 ! X = 97.41 , 57.67 , 1972.4 , 0.0! !END! Owl Creek Mntns (Class II)
1946 ! X = 100.59 , 56.81 , 1888.8 , 0.0! !END! Owl Creek Mntns (Class II)
1947 ! X = 101.2 , 55.19 , 1886.7 , 0.0! !END! Owl Creek Mntns (Class II)
1948 ! X = 102.02 , 53.37 , 1837.2 , 0.0! !END! Owl Creek Mntns (Class II)
1949 ! X = 103.65 , 52.86 , 1809.0 , 0.0! !END! Owl Creek Mntns (Class II)
1950 ! X = 104.66 , 51.96 , 1807.1 , 0.0! !END! Owl Creek Mntns (Class II)
1951 ! X = 105.86 , 47.1 , 1890.1 , 0.0! !END! Owl Creek Mntns (Class II)
1952 ! X = 104.57 , 49.66 , 1890.2 , 0.0! !END! Owl Creek Mntns (Class II)
1953 ! X = 104.19 , 44.83 , 1830.1 , 0.0! !END! Owl Creek Mntns (Class II)
1954 ! X = 101.41 , 44.04 , 1817.2 , 0.0! !END! Owl Creek Mntns (Class II)
1955 ! X = 98.97 , 45.75 , 1909.3 , 0.0! !END! Owl Creek Mntns (Class II)
1956 ! X = 97.68 , 48.56 , 1972.5 , 0.0! !END! Owl Creek Mntns (Class II)
1957 ! X = 95.7 , 50.23 , 2066.9 , 0.0! !END! Owl Creek Mntns (Class II)
1958 ! X = 92.76 , 51.48 , 2022.2 , 0.0! !END! Owl Creek Mntns (Class II)
1959 ! X = 90.27 , 50.9 , 2093.7 , 0.0! !END! Owl Creek Mntns (Class II)
1960 ! X = 87.21 , 52.56 , 2068.3 , 0.0! !END! Owl Creek Mntns (Class II)
1961 ! X = 86.18 , 51.67 , 2064.6 , 0.0! !END! Owl Creek Mntns (Class II)
1962 ! X = 83.5 , 52.87 , 2071.9 , 0.0! !END! Owl Creek Mntns (Class II)
1963 ! X = 81.48 , 54.42 , 2179.5 , 0.0! !END! Owl Creek Mntns (Class II)
1964 ! X = 78.97 , 55.14 , 2096.7 , 0.0! !END! Owl Creek Mntns (Class II)
1965 ! X = 75.29 , 58.41 , 2179.8 , 0.0! !END! Owl Creek Mntns (Class II)
1966 ! X = 76.9 , 56.69 , 2169.0 , 0.0! !END! Owl Creek Mntns (Class II)
1967 ! X = 72.95 , 64.41 , 2255.7 , 0.0! !END! Owl Creek Mntns (Class II)
1968 ! X = 99.73 , 47.08 , 2093.3 , 0.0! !END! Owl Creek Mntns (Class II)
1969 ! X = 103.73 , 47.15 , 2187.0 , 0.0! !END! Owl Creek Mntns (Class II)
1970 ! X = 99.67 , 51.08 , 2073.1 , 0.0! !END! Owl Creek Mntns (Class II)
1971 ! X = 103.67 , 51.15 , 1890.1 , 0.0! !END! Owl Creek Mntns (Class II)
1972 ! X = 83.61 , 54.83 , 2258.1 , 0.0! !END! Owl Creek Mntns (Class II)
1973 ! X = 87.61 , 54.9 , 2498.0 , 0.0! !END! Owl Creek Mntns (Class II)
1974 ! X = 91.61 , 54.96 , 2482.9 , 0.0! !END! Owl Creek Mntns (Class II)
1975 ! X = 95.61 , 55.02 , 2208.2 , 0.0! !END! Owl Creek Mntns (Class II)
1976 ! X = 99.61 , 55.08 , 2146.1 , 0.0! !END! Owl Creek Mntns (Class II)
1977 ! X = 71.55 , 58.65 , 2141.3 , 0.0! !END! Owl Creek Mntns (Class II)
1978 ! X = 79.55 , 58.77 , 2846.4 , 0.0! !END! Owl Creek Mntns (Class II)
1979 ! X = 83.55 , 58.83 , 2559.9 , 0.0! !END! Owl Creek Mntns (Class II)
1980 ! X = 87.55 , 58.9 , 2562.9 , 0.0! !END! Owl Creek Mntns (Class II)
1981 ! X = 91.55 , 58.96 , 2346.6 , 0.0! !END! Owl Creek Mntns (Class II)
1982 ! X = 71.49 , 62.64 , 2560.0 , 0.0! !END! Owl Creek Mntns (Class II)
1983 ! X = 79.49 , 62.77 , 2456.0 , 0.0! !END! Owl Creek Mntns (Class II)
1984 ! X = 83.49 , 62.83 , 2459.7 , 0.0! !END! Owl Creek Mntns (Class II)
1985 ! X = 87.48 , 62.89 , 2333.4 , 0.0! !END! Owl Creek Mntns (Class II)
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a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.