Appendix B: Model Files

- **Emission and Model Parameter Tables**
- **AERMOD Input Files (contained on compact disc only)**
- **AERMOD Output Files (contained on compact disc only)**
- **AERMAP Files (contained on compact disc only)**
- **BPIP Files (contained on compact disc only)**
- **Potential to Emit Calculations**

Emission and Model Parameter Tables
Tables B-1 through B-11

Table B-1: Facility Point Sources

Source ID	Point Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s)	Annual Emission Rate (g/s)	Release Height (m)	Stack Exit Temperature (K)	Stack Exit Velocity (m/s)	Stack Diameter (m)
110STK01	Feed System Baghouse	695281.2	4235601.2	1689.1	4.20E-04	4.20E-04	10.67	Ambient	15.77	1.22
120DCS01	SAG Mill Dust Scrubber	695224.5	4235598.9	1689.8	2.49E-04	2.49E-04	10.67	Ambient	12.94	0.30
730GHS01	Vanadium Precip Stack	695095.0	4235594.8	1688.6	1.26E-04	1.26E-04	32.31	380	14.55	0.20
730GHS02	Vanadium Packaging Stack	695095.0	4235603.2	1688.7	6.09E-03	6.09E-03	32.31	394	18.19	0.41
1000SG01	Standby Generator	695238.3	4235587.5	1689.8	1.43E-02	1.95E-03	10.67	753	74.99	0.25
1000SG02	Standby Generator	695238.3	4235589.5	1689.8	1.43E-02	1.95E-03	10.67	753	74.99	0.25
910PPL01	Fire Water Pump	695119.2	4235629.3	1689.4	7.67E-04	1.05E-04	10.67	828	44.30	0.13
920STK01	Boiler Stack	695236.7	4235614.8	1689.4	2.36E-02	2.36E-02	30.48	508	0.98	1.22

Table B-2: Main Road Area Sources

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate ($g/s-m^2$)	Annual Emission Rate ($g/s-m^2$)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
PMAIN1	Paved Haul Road 1	695814.1	4237167.5	1652.5	1.11E-05	1.11E-05	2	45.72	7.92	122	3	362.1
UPMAIN1	Unpaved Haul Road 1	695789.6	4237128.0	1652.7	4.69E-05	4.69E-05	2	79.20	7.92	122	3	627.3
UPMAIN2	Unpaved Haul Road 2	695747.9	4237060.1	1653.6	4.69E-05	4.69E-05	2	79.20	7.92	122	3	627.3
UPMAIN3	Unpaved Haul Road 3	695705.4	4236992.5	1656.3	4.69E-05	4.69E-05	2	79.20	7.92	122	3	627.3
UPMAIN4	Unpaved Haul Road 4	695662.8	4236922.2	1658.8	4.69E-05	4.69E-05	2	28.50	7.92	106	3	225.7
UPMAIN5	Unpaved Haul Road 5	695655.3	4236892.5	1659.2	4.69E-05	4.69E-05	2	79.20	7.92	93	3	627.3
UPMAIN6	Unpaved Haul Road 6	695650.8	4236813.0	1658.9	3.94E-05	3.94E-05	2	79.20	7.92	93	3	627.3
UPMAIN7	Unpaved Haul Road 7	695646.7	4236733.4	1658.1	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN8	Unpaved Haul Road 8	695643.6	4236653.8	1658.3	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN9	Unpaved Haul Road 9	695640.4	4236574.1	1659.8	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN10	Unpaved Haul Road 10	695637.6	4236494.5	1662.6	3.94E-05	3.94E-05	2	79.20	7.92	93	3	627.3
UPMAIN11	Unpaved Haul Road 11	695633.7	4236414.9	1663.1	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN12	Unpaved Haul Road 12	695630.8	4236335.0	1667.0	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN13	Unpaved Haul Road 13	695627.8	4236255.4	1670.9	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN14	Unpaved Haul Road 14	695625.3	4236175.8	1673.6	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN15	Unpaved Haul Road 15	695622.4	4236096.2	1677.2	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN16	Unpaved Haul Road 16	695619.2	4236016.7	1676.5	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN17	Unpaved Haul Road 17	695616.9	4235937.1	1678.8	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN18	Unpaved Haul Road 18	695613.9	4235857.5	1681.2	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN19	Unpaved Haul Road 19	695611.4	4235777.8	1683.3	3.94E-05	3.94E-05	2	79.20	7.92	92	3	627.3
UPMAIN20	Unpaved Haul Road 20	695608.0	4235698.4	1685.0	3.91E-05	3.91E-05	2	79.20	7.92	92	3	627.3
UPMAIN21	Unpaved Haul Road 21	695605.4	4235619.0	1687.1	3.39E-05	3.39E-05	2	79.20	7.92	93	3	627.3
UPMAIN22	Unpaved Haul Road 22	695601.4	4235539.4	1688.9	3.39E-05	3.39E-05	2	46.70	7.92	110	3	369.9
UPMAIN23	Unpaved Haul Road 23	695584.7	4235495.1	1690.3	3.39E-05	3.39E-05	2	43.90	7.92	133	3	347.7
UPMAIN24	Unpaved Haul Road 24	695553.9	4235462.5	1691.8	3.39E-05	3.39E-05	2	41.60	7.92	156	3	329.5
UPMAIN25	Unpaved Haul Road 25	695515.5	4235444.9	1692.9	3.39E-05	3.39E-05	2	40.40	7.92	175	3	320.0
UPMAIN26	Unpaved Haul Road 26	695474.7	4235441.6	1693.3	2.84E-05	2.84E-05	2	79.20	7.92	-179	3	627.3
UPMAIN27	Unpaved Haul Road 27	695395.1	4235443.8	1693.4	2.84E-05	2.84E-05	2	79.20	7.92	-178	3	627.3
UPMAIN28	Unpaved Haul Road 28	695315.3	4235447.0	1693.3	2.84E-05	2.84E-05	2	79.20	7.92	-179	3	627.3
UPMAIN29	Unpaved Haul Road 29	695235.6	4235448.9	1693.8	2.61E-07	2.61E-07	2	79.20	7.92	-177	3	627.3
UPMAIN30	Unpaved Haul Road 30	695155.8	4235452.3	1693.2	2.61E-07	2.61E-07	2	79.20	7.92	-178	3	627.3
UPMAIN31	Unpaved Haul Road 31	695076.1	4235455.4	1691.9	2.61E-07	2.61E-07	2	31.10	7.92	-172	3	246.3
UPMAIN32	Unpaved Haul Road 32	695044.8	4235459.6	1691.4	2.61E-07	2.61E-07	2	30.20	7.92	-147	3	239.2
UPMAIN33	Unpaved Haul Road 33	695019.1	4235476.7	1690.7	2.61E-07	2.61E-07	2	31.30	7.92	-121	3	247.9
UPMAIN34	Unpaved Haul Road 34	695003.1	4235504.0	1689.9	2.61E-07	2.61E-07	2	37.00	7.92	-96	3	293.0
UPMAIN35	Unpaved Haul Road 35	694999.7	4235541.7	1688.8	2.61E-07	2.61E-07	2	79.20	7.92	-88	3	627.3
UPMAIN36	Unpaved Haul Road 36	694995.1	4235621.6	1685.0	2.61E-07	2.61E-07	2	75.00	7.92	3	3	594.0
UPMAIN37	Unpaved Haul Road 37	695657.6	4236794.1	1658.5	7.56E-06	7.56E-06	2	79.20	7.92	45	3	627.3
UPMAIN38	Unpaved Haul Road 38	695713.5	4236737.9	1657.9	7.56E-06	7.56E-06	2	79.20	7.92	45	3	627.3
UPMAIN39	Unpaved Haul Road 39	695607.6	4235700.3	1685.0	2.61E-07	2.61E-07	2	79.20	7.92	-178	3	627.3
UPMAIN40	Unpaved Haul Road 40	695527.7	4235702.8	1685.6	2.61E-07	2.61E-07	2	79.20	7.92	-178	3	627.3
UPMAIN41	Unpaved Haul Road 41	695448.1	4235705.4	1685.9	2.61E-07	2.61E-07	2	45.00	7.92	-178	3	356.4
UPMAIN42	Unpaved Haul Road 42	695396.0	4235704.5	1685.9	2.61E-07	2.61E-07	2	31.70	7.92	140	3	251.1
UPMAIN43	Unpaved Haul Road 43	695605.2	4235639.6	1686.5	5.22E-06	5.22E-06	2	79.20	7.92	-178	3	627.3
UPMAIN44	Unpaved Haul Road 44	695525.4	4235642.0	1687.3	5.22E-06	5.22E-06	2	79.20	7.92	-178	3	627.3
UPMAIN45	Unpaved Haul Road 45	695404.5	4235480.5	1692.2	5.48E-06	5.48E-06	2	65.60	7.92	36	3	519.6
UPMAIN46	Unpaved Haul Road 46	695422.2	4235483.3	1692.0	5.22E-06	5.22E-06	2	70.70	7.92	-88	3	559.9
UPMAIN47	Unpaved Haul Road 47	695241.0	4235455.9	1693.5	2.82E-05	2.82E-05	2	79.20	7.92	-153	3	627.3
UPMAIN48	Unpaved Haul Road 48	695170.7	4235492.3	1692.3	2.82E-05	2.82E-05	2	79.20	7.92	-153	3	627.3

Table B-3: Emissions per Unpaved Main Road Area Source

Source ID	Area Source Description	Vehicles Per Day Per Source	VMT per Source	Ratio of Source VMT to Total VMT	Source Emissions (lb/day)	Source Emissions (lb/yr)
UPMAIN1	Unpaved Haul Road 1	180	17.7165354	0.04340613	5.60911032	2047.32527
UPMAIN2	Unpaved Haul Road 2	180	17.7165354	0.04340613	5.60911032	2047.32527
UPMAIN3	Unpaved Haul Road 3	180	17.7165354	0.04340613	5.60911032	2047.32527
UPMAIN4	Unpaved Haul Road 4	180	6.37526843	0.01561963	2.01842985	736.726896
UPMAIN5	Unpaved Haul Road 5	180	17.7165354	0.04340613	5.60911032	2047.32527
UPMAIN6	Unpaved Haul Road 6	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN7	Unpaved Haul Road 7	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN8	Unpaved Haul Road 8	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN9	Unpaved Haul Road 9	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN10	Unpaved Haul Road 10	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN11	Unpaved Haul Road 11	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN12	Unpaved Haul Road 12	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN13	Unpaved Haul Road 13	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN14	Unpaved Haul Road 14	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN15	Unpaved Haul Road 15	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN16	Unpaved Haul Road 16	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN17	Unpaved Haul Road 17	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN18	Unpaved Haul Road 18	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN19	Unpaved Haul Road 19	151	14.8622047	0.03641292	4.70542033	1717.47842
UPMAIN20	Unpaved Haul Road 20	150	14.7637795	0.03617177	4.6742586	1706.10439
UPMAIN21	Unpaved Haul Road 21	130	12.7952756	0.03134887	4.05102412	1478.6238
UPMAIN22	Unpaved Haul Road 22	130	7.54468902	0.01848475	2.38867205	871.865299
UPMAIN23	Unpaved Haul Road 23	130	7.09233079	0.01737646	2.24545403	819.59072
UPMAIN24	Unpaved Haul Road 24	130	6.72075082	0.01646607	2.12781065	776.650887
UPMAIN25	Unpaved Haul Road 25	130	6.526883	0.01599109	2.0664315	754.247496
UPMAIN26	Unpaved Haul Road 26	109	10.7283465	0.02628482	3.39662792	1239.76919
UPMAIN27	Unpaved Haul Road 27	109	10.7283465	0.02628482	3.39662792	1239.76919
UPMAIN28	Unpaved Haul Road 28	109	10.7283465	0.02628482	3.39662792	1239.76919
UPMAIN29	Unpaved Haul Road 29	1	0.0984252	0.00024115	0.03116172	11.3740293
UPMAIN30	Unpaved Haul Road 30	1	0.0984252	0.00024115	0.03116172	11.3740293
UPMAIN31	Unpaved Haul Road 31	1	0.03864929	9.4692E-05	0.01223649	4.46631705
UPMAIN32	Unpaved Haul Road 32	1	0.03753082	9.1952E-05	0.01188237	4.33706672
UPMAIN33	Unpaved Haul Road 33	1	0.03889784	9.5301E-05	0.01231518	4.49503934
UPMAIN34	Unpaved Haul Road 34	1	0.04598147	0.00011266	0.01455788	5.31362478
UPMAIN35	Unpaved Haul Road 35	1	0.0984252	0.00024115	0.03116172	11.3740293
UPMAIN36	Unpaved Haul Road 36	1	0.09320568	0.00022836	0.02950921	10.770861
UPMAIN37	Unpaved Haul Road 37	29	2.85433071	0.00699321	0.90369	329.846849
UPMAIN38	Unpaved Haul Road 38	29	2.85433071	0.00699321	0.90369	329.846849
UPMAIN39	Unpaved Haul Road 39	1	0.0984252	0.00024115	0.03116172	11.3740293
UPMAIN40	Unpaved Haul Road 40	1	0.0984252	0.00024115	0.03116172	11.3740293
UPMAIN41	Unpaved Haul Road 41	1	0.05592341	0.00013701	0.01770553	6.46251663
UPMAIN42	Unpaved Haul Road 42	1	0.03939493	9.6519E-05	0.01247256	4.55248394
UPMAIN43	Unpaved Haul Road 43	20	1.96850394	0.0048229	0.62323448	227.480585
UPMAIN44	Unpaved Haul Road 44	20	1.96850394	0.0048229	0.62323448	227.480585
UPMAIN45	Unpaved Haul Road 45	21	1.71200191	0.00419446	0.54202514	197.839176
UPMAIN46	Unpaved Haul Road 46	20	1.75723773	0.00430529	0.55634694	203.066634
UPMAIN47	Unpaved Haul Road 47	108	10.6299213	0.02604368	3.36546619	1228.39516
UPMAIN48	Unpaved Haul Road 48	108	10.6299213	0.02604368	3.36546619	1228.39516
		Totals	408	1.00	129.22	47166.74

Table B-4: Security Road Area Sources

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
SECRD1	Unpaved Security Road 1	695226.7	4235791.0	1683.7	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD2	Unpaved Security Road 2	695257.1	4235789.3	1683.4	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD3	Unpaved Security Road 3	695287.6	4235787.6	1682.9	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD4	Unpaved Security Road 4	695318.0	4235785.9	1682.9	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD5	Unpaved Security Road 5	695348.4	4235784.2	1683.2	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD6	Unpaved Security Road 6	695378.9	4235782.5	1683.4	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD7	Unpaved Security Road 7	695409.3	4235780.8	1683.7	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD8	Unpaved Security Road 8	695439.7	4235779.1	1683.9	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD9	Unpaved Security Road 9	695470.2	4235777.3	1684.0	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD10	Unpaved Security Road 10	695500.6	4235775.6	1684.0	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD11	Unpaved Security Road 11	695531.0	4235773.9	1683.9	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD12	Unpaved Security Road 12	695563.4	4235772.2	1683.7	2.33E-05	2.33E-05	2	27.00	3.05	-34	3	82.3
SECRD13	Unpaved Security Road 13	695585.7	4235790.2	1683.1	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD14	Unpaved Security Road 14	695586.7	4235820.7	1682.4	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD15	Unpaved Security Road 15	695587.7	4235851.1	1681.6	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD16	Unpaved Security Road 16	695589.1	4235881.6	1680.8	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD17	Unpaved Security Road 17	695590.4	4235912.0	1679.9	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD18	Unpaved Security Road 18	695591.7	4235942.5	1678.6	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD19	Unpaved Security Road 19	695593.0	4235972.9	1677.3	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD20	Unpaved Security Road 20	695594.4	4236003.4	1676.4	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD21	Unpaved Security Road 21	695595.7	4236033.8	1676.0	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD22	Unpaved Security Road 22	695597.0	4236064.3	1676.1	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD23	Unpaved Security Road 23	695598.4	4236094.7	1675.9	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD24	Unpaved Security Road 24	695599.7	4236125.2	1675.4	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD25	Unpaved Security Road 25	695601.0	4236155.6	1673.7	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD26	Unpaved Security Road 26	695602.3	4236186.1	1672.0	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD27	Unpaved Security Road 27	695603.7	4236216.5	1671.0	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD28	Unpaved Security Road 28	695605.0	4236247.0	1670.4	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD29	Unpaved Security Road 29	695606.3	4236277.4	1669.1	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD30	Unpaved Security Road 30	695607.7	4236307.9	1667.1	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD31	Unpaved Security Road 31	695609.0	4236338.3	1665.3	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD32	Unpaved Security Road 32	695610.3	4236368.8	1664.0	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD33	Unpaved Security Road 33	695611.7	4236399.2	1664.0	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD34	Unpaved Security Road 34	695613.0	4236429.7	1664.4	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD35	Unpaved Security Road 35	695614.3	4236460.1	1664.7	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD36	Unpaved Security Road 36	695615.6	4236490.6	1664.6	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9

Table B-4: Security Road Area Sources (continued)

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate ($g/s\text{-}m^2$)	Annual Emission Rate ($g/s\text{-}m^2$)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
SECRD37	Unpaved Security Road 37	695617.0	4236521.0	1664.3	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD38	Unpaved Security Road 38	695618.3	4236551.5	1662.3	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD39	Unpaved Security Road 39	695619.6	4236582.0	1660.6	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD40	Unpaved Security Road 40	695621.0	4236612.4	1659.8	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD41	Unpaved Security Road 41	695622.3	4236642.9	1659.1	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD42	Unpaved Security Road 42	695623.6	4236673.3	1658.1	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD43	Unpaved Security Road 43	695624.7	4236703.8	1658.3	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD44	Unpaved Security Road 44	695625.7	4236734.2	1658.8	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD45	Unpaved Security Road 45	695626.8	4236764.7	1659.1	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD46	Unpaved Security Road 46	695627.9	4236795.1	1659.4	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD47	Unpaved Security Road 47	695628.9	4236825.6	1659.6	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD48	Unpaved Security Road 48	695630.0	4236856.1	1659.8	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD49	Unpaved Security Road 49	695631.1	4236886.5	1659.7	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD50	Unpaved Security Road 50	695632.1	4236917.0	1659.5	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD51	Unpaved Security Road 51	695633.2	4236947.5	1659.2	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD52	Unpaved Security Road 52	695634.3	4236977.9	1659.0	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD53	Unpaved Security Road 53	695635.3	4237008.4	1658.8	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD54	Unpaved Security Road 54	695636.4	4237038.8	1658.8	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD55	Unpaved Security Road 55	695637.4	4237069.3	1659.0	2.33E-05	2.33E-05	2	30.48	3.05	-88	3	92.9
SECRD56	Unpaved Security Road 56	695638.1	4237102.6	1659.0	2.33E-05	2.33E-05	2	22.30	3.05	-149	3	68.0
SECRD57	Unpaved Security Road 57	695617.2	4237113.9	1658.9	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD58	Unpaved Security Road 58	695586.7	4237114.9	1658.8	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD59	Unpaved Security Road 59	695556.3	4237115.8	1658.1	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD60	Unpaved Security Road 60	695525.8	4237116.8	1657.2	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD61	Unpaved Security Road 61	695495.3	4237117.7	1656.5	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD62	Unpaved Security Road 62	695464.9	4237118.7	1656.0	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD63	Unpaved Security Road 63	695434.4	4237119.6	1655.5	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD64	Unpaved Security Road 64	695403.9	4237120.6	1655.1	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD65	Unpaved Security Road 65	695373.5	4237121.6	1655.0	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD66	Unpaved Security Road 66	695343.0	4237122.5	1655.3	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD67	Unpaved Security Road 67	695312.6	4237123.5	1655.8	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD68	Unpaved Security Road 68	695282.1	4237124.4	1656.4	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD69	Unpaved Security Road 69	695251.6	4237125.4	1656.9	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD70	Unpaved Security Road 70	695221.2	4237126.3	1657.1	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD71	Unpaved Security Road 71	695190.7	4237127.3	1657.1	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD72	Unpaved Security Road 72	695160.2	4237128.3	1657.3	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD73	Unpaved Security Road 73	695129.8	4237129.2	1657.2	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD74	Unpaved Security Road 74	695099.3	4237130.2	1656.9	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD75	Unpaved Security Road 75	695068.8	4237131.1	1656.4	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD76	Unpaved Security Road 76	695038.4	4237132.1	1656.0	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD77	Unpaved Security Road 77	695007.9	4237133.0	1655.5	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD78	Unpaved Security Road 78	694977.4	4237134.0	1655.0	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD79	Unpaved Security Road 79	694947.0	4237135.0	1654.5	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD80	Unpaved Security Road 80	694916.5	4237135.9	1654.0	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD81	Unpaved Security Road 81	694886.0	4237136.9	1653.6	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD82	Unpaved Security Road 82	694855.6	4237137.8	1653.2	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD83	Unpaved Security Road 83	694825.1	4237138.8	1652.8	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9

Table B-4: Security Road Area Sources (continued)

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
SECRD84	Unpaved Security Road 84	694794.6	4237139.8	1652.4	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD85	Unpaved Security Road 85	694764.2	4237140.7	1651.9	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD86	Unpaved Security Road 86	694733.7	4237141.7	1651.2	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD87	Unpaved Security Road 87	694703.3	4237142.6	1650.5	2.33E-05	2.33E-05	2	30.48	3.05	-178	3	92.9
SECRD88	Unpaved Security Road 88	694670.8	4237145.2	1650.2	2.33E-05	2.33E-05	2	30.40	3.05	150	3	92.7
SECRD89	Unpaved Security Road 89	694645.2	4237127.0	1650.8	2.33E-05	2.33E-05	2	30.48	3.05	91	3	92.9
SECRD90	Unpaved Security Road 90	694644.7	4237096.5	1651.3	2.33E-05	2.33E-05	2	30.48	3.05	91	3	92.9
SECRD91	Unpaved Security Road 91	694644.2	4237066.0	1651.8	2.33E-05	2.33E-05	2	30.48	3.05	91	3	92.9
SECRD92	Unpaved Security Road 92	694643.8	4237035.6	1652.3	2.33E-05	2.33E-05	2	30.48	3.05	91	3	92.9
SECRD93	Unpaved Security Road 93	694643.3	4237005.1	1652.6	2.33E-05	2.33E-05	2	30.48	3.05	91	3	92.9
SECRD94	Unpaved Security Road 94	694642.8	4236974.6	1653.0	2.33E-05	2.33E-05	2	30.48	3.05	91	3	92.9
SECRD95	Unpaved Security Road 95	694642.3	4236944.1	1653.4	2.33E-05	2.33E-05	2	30.48	3.05	92	3	92.9
SECRD96	Unpaved Security Road 96	694641.5	4236913.7	1653.7	2.33E-05	2.33E-05	2	30.48	3.05	92	3	92.9
SECRD97	Unpaved Security Road 97	694640.7	4236883.2	1654.1	2.33E-05	2.33E-05	2	30.48	3.05	92	3	92.9
SECRD98	Unpaved Security Road 98	694639.9	4236852.7	1654.6	2.33E-05	2.33E-05	2	30.48	3.05	92	3	92.9
SECRD99	Unpaved Security Road 99	694639.1	4236822.3	1655.2	2.33E-05	2.33E-05	2	30.48	3.05	92	3	92.9
SECRD100	Unpaved Security Road 100	694638.3	4236791.8	1655.9	2.33E-05	2.33E-05	2	30.48	3.05	92	3	92.9
SECRD101	Unpaved Security Road 101	694637.5	4236761.3	1656.6	2.33E-05	2.33E-05	2	30.48	3.05	92	3	92.9
SECRD102	Unpaved Security Road 102	694635.2	4236729.2	1657.4	2.33E-05	2.33E-05	2	29.50	3.05	64	3	89.9
SECRD103	Unpaved Security Road 103	694651.0	4236702.5	1658.1	2.33E-05	2.33E-05	2	30.48	3.05	1	3	92.9
SECRD104	Unpaved Security Road 104	694681.5	4236702.2	1658.3	2.33E-05	2.33E-05	2	30.48	3.05	1	3	92.9
SECRD105	Unpaved Security Road 105	694712.0	4236702.0	1658.6	2.33E-05	2.33E-05	2	30.48	3.05	1	3	92.9
SECRD106	Unpaved Security Road 106	694742.4	4236701.7	1658.4	2.33E-05	2.33E-05	2	30.48	3.05	1	3	92.9
SECRD107	Unpaved Security Road 107	694772.9	4236701.4	1658.1	2.33E-05	2.33E-05	2	30.48	3.05	1	3	92.9
SECRD108	Unpaved Security Road 108	694803.4	4236701.2	1658.0	2.33E-05	2.33E-05	2	20.00	3.05	1	3	61.0
SECRD109	Unpaved Security Road 109	694823.5	4236700.9	1658.4	2.33E-05	2.33E-05	2	13.40	3.05	30	3	40.8
SECRD110	Unpaved Security Road 110	694834.0	4236693.7	1658.6	2.33E-05	2.33E-05	2	10.40	3.05	76	3	31.7
SECRD111	Unpaved Security Road 111	694836.4	4236683.6	1658.7	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD112	Unpaved Security Road 112	694836.2	4236653.1	1659.3	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD113	Unpaved Security Road 113	694836.0	4236622.6	1660.2	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD114	Unpaved Security Road 114	694835.8	4236592.2	1661.3	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD115	Unpaved Security Road 115	694835.5	4236561.7	1662.3	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD116	Unpaved Security Road 116	694835.3	4236531.2	1663.2	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD117	Unpaved Security Road 117	694835.1	4236500.7	1663.9	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD118	Unpaved Security Road 118	694834.9	4236470.2	1664.4	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD119	Unpaved Security Road 119	694834.7	4236439.8	1665.2	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD120	Unpaved Security Road 120	694834.5	4236409.3	1665.8	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD121	Unpaved Security Road 121	694834.3	4236378.8	1666.2	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD122	Unpaved Security Road 122	694834.1	4236348.3	1666.8	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD123	Unpaved Security Road 123	694833.8	4236317.8	1667.7	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD124	Unpaved Security Road 124	694833.6	4236287.4	1668.8	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD125	Unpaved Security Road 125	694833.4	4236256.9	1669.9	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD126	Unpaved Security Road 126	694833.2	4236226.4	1670.6	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD127	Unpaved Security Road 127	694833.0	4236195.9	1670.8	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD128	Unpaved Security Road 128	694832.8	4236165.5	1671.1	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD129	Unpaved Security Road 129	694832.6	4236135.0	1671.0	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD130	Unpaved Security Road 130	694832.4	4236104.5	1670.7	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD131	Unpaved Security Road 131	694832.1	4236074.0	1671.1	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9

Table B-4: Security Road Area Sources (continued)

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
SECRD132	Unpaved Security Road 132	694831.9	4236043.5	1671.5	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD133	Unpaved Security Road 133	694831.7	4236013.1	1673.4	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD134	Unpaved Security Road 134	694831.5	4235982.6	1675.1	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD135	Unpaved Security Road 135	694831.3	4235952.1	1675.7	2.33E-05	2.33E-05	2	30.48	3.05	90	3	92.9
SECRD136	Unpaved Security Road 136	694832.5	4235920.2	1676.0	2.33E-05	2.33E-05	2	30.48	3.05	60	3	92.9
SECRD137	Unpaved Security Road 137	694847.6	4235893.7	1676.0	2.33E-05	2.33E-05	2	30.48	3.05	60	3	92.9
SECRD138	Unpaved Security Road 138	694862.6	4235867.2	1676.3	2.33E-05	2.33E-05	2	30.48	3.05	60	3	92.9
SECRD139	Unpaved Security Road 139	694877.7	4235840.7	1676.5	2.33E-05	2.33E-05	2	25.00	3.05	60	3	76.2
SECRD140	Unpaved Security Road 140	694891.5	4235817.8	1676.9	2.33E-05	2.33E-05	2	13.20	3.05	29	3	40.2
SECRD141	Unpaved Security Road 141	694904.7	4235811.1	1677.5	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD142	Unpaved Security Road 142	694935.1	4235809.4	1678.7	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD143	Unpaved Security Road 143	694965.6	4235807.7	1679.7	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD144	Unpaved Security Road 144	694996.0	4235806.0	1680.7	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD145	Unpaved Security Road 145	695026.4	4235804.3	1681.5	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD146	Unpaved Security Road 146	695056.9	4235802.6	1682.1	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD147	Unpaved Security Road 147	695087.3	4235800.9	1682.9	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD148	Unpaved Security Road 148	695117.7	4235799.2	1683.5	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD149	Unpaved Security Road 149	695148.2	4235797.4	1683.8	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD150	Unpaved Security Road 150	695178.6	4235795.7	1683.9	2.33E-05	2.33E-05	2	30.48	3.05	3	3	92.9
SECRD151	Unpaved Security Road 151	695209.2	4235793.9	1683.9	2.33E-05	2.33E-05	2	17.40	3.05	9	3	53.0
SECRD152	Unpaved Security Road 152	695223.0	4235791.0	1683.8	2.33E-05	2.33E-05	2	22.50	3.05	94	3	68.6

Table B-5: Monitoring Road Area Sources

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate ($g/s-m^2$)	Annual Emission Rate ($g/s-m^2$)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
MONRD1	Unpaved Monitoring Road 1	695507.5	4235435.8	1693.3	1.81E-05	1.81E-05	2	30.48	3.05	111	3	92.9
MONRD2	Unpaved Monitoring Road 2	695496.8	4235407.0	1694.4	1.81E-05	1.81E-05	2	30.48	3.05	111	3	92.9
MONRD3	Unpaved Monitoring Road 3	695486.0	4235378.0	1695.5	1.81E-05	1.81E-05	2	30.48	3.05	119	3	92.9
MONRD4	Unpaved Monitoring Road 4	695470.9	4235350.9	1696.6	1.81E-05	1.81E-05	2	30.48	3.05	130	3	92.9
MONRD5	Unpaved Monitoring Road 5	695451.0	4235327.3	1697.6	1.81E-05	1.81E-05	2	30.48	3.05	138	3	92.9
MONRD6	Unpaved Monitoring Road 6	695427.8	4235306.9	1698.6	1.81E-05	1.81E-05	2	24.80	3.05	161	3	75.6
MONRD7	Unpaved Monitoring Road 7	695404.1	4235298.1	1699.2	1.81E-05	1.81E-05	2	30.48	3.05	180	3	92.9
MONRD8	Unpaved Monitoring Road 8	695373.2	4235297.8	1699.6	1.81E-05	1.81E-05	2	30.48	3.05	179	3	92.9
MONRD9	Unpaved Monitoring Road 9	695342.4	4235297.1	1700.3	1.81E-05	1.81E-05	2	30.48	3.05	180	3	92.9
MONRD10	Unpaved Monitoring Road 10	695311.6	4235297.0	1701.1	1.81E-05	1.81E-05	2	30.48	3.05	-180	3	92.9
MONRD11	Unpaved Monitoring Road 11	695280.8	4235297.2	1701.6	1.81E-05	1.81E-05	2	30.48	3.05	180	3	92.9
MONRD12	Unpaved Monitoring Road 12	695250.0	4235297.4	1702.0	1.81E-05	1.81E-05	2	30.48	3.05	-180	3	92.9
MONRD13	Unpaved Monitoring Road 13	695219.3	4235297.8	1702.2	1.81E-05	1.81E-05	2	30.48	3.05	-179	3	92.9
MONRD14	Unpaved Monitoring Road 14	695188.4	4235298.2	1702.1	1.81E-05	1.81E-05	2	30.48	3.05	-176	3	92.9
MONRD15	Unpaved Monitoring Road 15	695157.6	4235300.3	1701.6	1.81E-05	1.81E-05	2	30.48	3.05	-175	3	92.9
MONRD16	Unpaved Monitoring Road 16	695126.9	4235302.9	1700.5	1.81E-05	1.81E-05	2	30.48	3.05	-166	3	92.9
MONRD17	Unpaved Monitoring Road 17	695096.9	4235310.4	1698.9	1.81E-05	1.81E-05	2	30.48	3.05	-167	3	92.9
MONRD18	Unpaved Monitoring Road 18	695066.8	4235317.5	1698.0	1.81E-05	1.81E-05	2	30.48	3.05	-166	3	92.9
MONRD19	Unpaved Monitoring Road 19	695036.8	4235324.6	1697.3	1.81E-05	1.81E-05	2	30.48	3.05	-166	3	92.9
MONRD20	Unpaved Monitoring Road 20	695006.9	4235332.1	1697.9	1.81E-05	1.81E-05	2	30.48	3.05	-167	3	92.9
MONRD21	Unpaved Monitoring Road 21	694976.8	4235339.1	1699.9	1.81E-05	1.81E-05	2	30.48	3.05	-166	3	92.9
MONRD22	Unpaved Monitoring Road 22	694946.8	4235346.5	1700.5	1.81E-05	1.81E-05	2	30.48	3.05	-169	3	92.9
MONRD23	Unpaved Monitoring Road 23	694916.5	4235352.2	1700.9	1.81E-05	1.81E-05	2	30.48	3.05	-171	3	92.9
MONRD24	Unpaved Monitoring Road 24	694886.0	4235356.8	1701.6	1.81E-05	1.81E-05	2	30.48	3.05	-171	3	92.9
MONRD25	Unpaved Monitoring Road 25	694855.5	4235361.5	1699.7	1.81E-05	1.81E-05	2	30.48	3.05	-171	3	92.9
MONRD26	Unpaved Monitoring Road 26	694825.1	4235366.3	1699.8	1.81E-05	1.81E-05	2	25.00	3.05	-159	3	76.2
MONRD27	Unpaved Monitoring Road 27	694801.4	4235375.5	1699.9	1.81E-05	1.81E-05	2	23.40	3.05	-133	3	71.3
MONRD28	Unpaved Monitoring Road 28	694785.2	4235392.9	1697.0	1.81E-05	1.81E-05	2	30.48	3.05	-102	3	92.9
MONRD29	Unpaved Monitoring Road 29	694778.4	4235422.9	1694.1	1.81E-05	1.81E-05	2	30.48	3.05	-104	3	92.9
MONRD30	Unpaved Monitoring Road 30	694770.8	4235452.9	1693.3	1.81E-05	1.81E-05	2	30.48	3.05	-105	3	92.9
MONRD31	Unpaved Monitoring Road 31	694762.6	4235482.7	1692.6	1.81E-05	1.81E-05	2	30.48	3.05	-105	3	92.9
MONRD32	Unpaved Monitoring Road 32	694754.6	4235512.6	1691.9	1.81E-05	1.81E-05	2	30.48	3.05	-105	3	92.9
MONRD33	Unpaved Monitoring Road 33	694746.7	4235542.4	1691.4	1.81E-05	1.81E-05	2	4.90	3.05	-106	3	14.9
MONRD34	Unpaved Monitoring Road 34	694744.7	4235548.9	1691.2	1.81E-05	1.81E-05	2	24.90	3.05	-136	3	75.9
MONRD35	Unpaved Monitoring Road 35	694725.7	4235567.1	1691.4	1.81E-05	1.81E-05	2	30.48	3.05	-154	3	92.9
MONRD36	Unpaved Monitoring Road 36	694697.8	4235580.8	1692.0	1.81E-05	1.81E-05	2	30.48	3.05	-160	3	92.9
MONRD37	Unpaved Monitoring Road 37	694668.7	4235591.3	1692.5	1.81E-05	1.81E-05	2	30.48	3.05	-161	3	92.9
MONRD38	Unpaved Monitoring Road 38	694639.7	4235601.4	1692.9	1.81E-05	1.81E-05	2	30.48	3.05	-163	3	92.9
MONRD39	Unpaved Monitoring Road 39	694610.2	4235610.4	1693.1	1.81E-05	1.81E-05	2	30.48	3.05	-164	3	92.9
MONRD40	Unpaved Monitoring Road 40	694580.7	4235619.2	1693.2	1.81E-05	1.81E-05	2	30.48	3.05	-163	3	92.9
MONRD41	Unpaved Monitoring Road 41	694551.2	4235628.3	1693.2	1.81E-05	1.81E-05	2	30.48	3.05	-161	3	92.9
MONRD42	Unpaved Monitoring Road 42	694521.7	4235637.5	1693.0	1.81E-05	1.81E-05	2	30.48	3.05	-146	3	92.9
MONRD43	Unpaved Monitoring Road 43	694496.1	4235654.9	1692.6	1.81E-05	1.81E-05	2	30.48	3.05	-143	3	92.9
MONRD44	Unpaved Monitoring Road 44	694471.2	4235673.3	1692.7	1.81E-05	1.81E-05	2	30.48	3.05	-139	3	92.9
MONRD45	Unpaved Monitoring Road 45	694447.2	4235694.9	1693.1	1.81E-05	1.81E-05	2	30.48	3.05	-156	3	92.9
MONRD46	Unpaved Monitoring Road 46	694418.5	4235706.2	1693.9	1.81E-05	1.81E-05	2	30.48	3.05	-160	3	92.9
MONRD47	Unpaved Monitoring Road 47	694389.5	4235717.2	1694.4	1.81E-05	1.81E-05	2	30.48	3.05	-135	3	92.9
MONRD48	Unpaved Monitoring Road 48	694368.0	4235740.0	1693.3	1.81E-05	1.81E-05	2	30.48	3.05	-111	3	92.9
MONRD49	Unpaved Monitoring Road 49	694356.8	4235768.8	1691.0	1.81E-05	1.81E-05	2	23.00	3.05	-105	3	70.1

Table B-5: Monitoring Road Area Sources (continued)

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
MONRD50	Unpaved Monitoring Road 50	694351.3	4235791.4	1689.5	1.81E-05	1.81E-05	2	30.48	3.05	-87	3	92.9
MONRD51	Unpaved Monitoring Road 51	694353.9	4235822.2	1686.9	1.81E-05	1.81E-05	2	30.48	3.05	-87	3	92.9
MONRD52	Unpaved Monitoring Road 52	694355.7	4235852.9	1684.6	1.81E-05	1.81E-05	2	30.48	3.05	-87	3	92.9
MONRD53	Unpaved Monitoring Road 53	694357.9	4235883.8	1683.7	1.81E-05	1.81E-05	2	30.48	3.05	-87	3	92.9
MONRD54	Unpaved Monitoring Road 54	694359.9	4235914.8	1682.5	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD55	Unpaved Monitoring Road 55	694361.6	4235945.7	1681.7	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD56	Unpaved Monitoring Road 56	694362.9	4235976.6	1680.8	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD57	Unpaved Monitoring Road 57	694364.0	4236007.5	1679.6	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD58	Unpaved Monitoring Road 58	694365.3	4236038.2	1678.1	1.81E-05	1.81E-05	2	30.48	3.05	-87	3	92.9
MONRD59	Unpaved Monitoring Road 59	694366.7	4236069.0	1676.6	1.81E-05	1.81E-05	2	30.48	3.05	-84	3	92.9
MONRD60	Unpaved Monitoring Road 60	694369.9	4236099.6	1675.3	1.81E-05	1.81E-05	2	30.48	3.05	-84	3	92.9
MONRD61	Unpaved Monitoring Road 61	694373.3	4236130.3	1673.8	1.81E-05	1.81E-05	2	30.48	3.05	-83	3	92.9
MONRD62	Unpaved Monitoring Road 62	694378.6	4236160.3	1671.9	1.81E-05	1.81E-05	2	30.48	3.05	-80	3	92.9
MONRD63	Unpaved Monitoring Road 63	694384.7	4236190.2	1670.4	1.81E-05	1.81E-05	2	30.48	3.05	-79	3	92.9
MONRD64	Unpaved Monitoring Road 64	694390.7	4236220.1	1669.8	1.81E-05	1.81E-05	2	30.48	3.05	-79	3	92.9
MONRD65	Unpaved Monitoring Road 65	694396.8	4236249.9	1669.4	1.81E-05	1.81E-05	2	30.48	3.05	-79	3	92.9
MONRD66	Unpaved Monitoring Road 66	694402.9	4236279.8	1668.8	1.81E-05	1.81E-05	2	30.48	3.05	-79	3	92.9
MONRD67	Unpaved Monitoring Road 67	694407.1	4236310.0	1668.1	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD68	Unpaved Monitoring Road 68	694411.4	4236340.2	1667.2	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD69	Unpaved Monitoring Road 69	694415.6	4236370.3	1666.2	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD70	Unpaved Monitoring Road 70	694419.9	4236400.5	1665.5	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD71	Unpaved Monitoring Road 71	694424.1	4236430.7	1664.7	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD72	Unpaved Monitoring Road 72	694428.4	4236460.9	1663.8	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD73	Unpaved Monitoring Road 73	694432.6	4236491.1	1662.7	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD74	Unpaved Monitoring Road 74	694436.8	4236521.3	1661.7	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD75	Unpaved Monitoring Road 75	694440.6	4236551.5	1660.7	1.81E-05	1.81E-05	2	30.48	3.05	-83	3	92.9
MONRD76	Unpaved Monitoring Road 76	694444.5	4236582.0	1659.6	1.81E-05	1.81E-05	2	30.48	3.05	-75	3	92.9
MONRD77	Unpaved Monitoring Road 77	694452.6	4236611.8	1658.5	1.81E-05	1.81E-05	2	30.48	3.05	-70	3	92.9
MONRD78	Unpaved Monitoring Road 78	694463.7	4236640.2	1657.5	1.81E-05	1.81E-05	2	30.48	3.05	-64	3	92.9
MONRD79	Unpaved Monitoring Road 79	694477.5	4236667.7	1656.7	1.81E-05	1.81E-05	2	30.48	3.05	-63	3	92.9
MONRD80	Unpaved Monitoring Road 80	694491.2	4236695.1	1655.5	1.81E-05	1.81E-05	2	30.48	3.05	-60	3	92.9
MONRD81	Unpaved Monitoring Road 81	694506.6	4236721.7	1654.8	1.81E-05	1.81E-05	2	30.48	3.05	-59	3	92.9
MONRD82	Unpaved Monitoring Road 82	694516.9	4236739.0	1654.6	1.81E-05	1.81E-05	2	30.48	3.05	-49	3	92.9
MONRD83	Unpaved Monitoring Road 83	694537.2	4236763.9	1654.5	1.81E-05	1.81E-05	2	30.48	3.05	-85	3	92.9
MONRD84	Unpaved Monitoring Road 84	694539.3	4236791.0	1654.2	1.81E-05	1.81E-05	2	30.48	3.05	-101	3	92.9
MONRD85	Unpaved Monitoring Road 85	694533.0	4236821.1	1653.8	1.81E-05	1.81E-05	2	30.48	3.05	-102	3	92.9
MONRD86	Unpaved Monitoring Road 86	694526.4	4236851.1	1653.4	1.81E-05	1.81E-05	2	30.48	3.05	-93	3	92.9
MONRD87	Unpaved Monitoring Road 87	694525.2	4236881.7	1653.1	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD88	Unpaved Monitoring Road 88	694525.8	4236912.2	1652.9	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD89	Unpaved Monitoring Road 89	694526.4	4236942.6	1652.6	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD90	Unpaved Monitoring Road 90	694527.0	4236973.1	1652.3	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD91	Unpaved Monitoring Road 91	694527.5	4237003.6	1652.0	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD92	Unpaved Monitoring Road 92	694528.1	4237034.1	1652.0	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD93	Unpaved Monitoring Road 93	694528.7	4237064.5	1651.8	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD94	Unpaved Monitoring Road 94	694529.3	4237095.0	1651.5	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD95	Unpaved Monitoring Road 95	694529.9	4237125.5	1652.1	1.81E-05	1.81E-05	2	30.48	3.05	-89	3	92.9
MONRD96	Unpaved Monitoring Road 96	694530.3	4237156.3	1652.4	1.81E-05	1.81E-05	2	30.48	3.05	-85	3	92.9
MONRD97	Unpaved Monitoring Road 97	694533.1	4237186.7	1651.9	1.81E-05	1.81E-05	2	30.48	3.05	-85	3	92.9
MONRD98	Unpaved Monitoring Road 98	694535.9	4237217.0	1650.9	1.81E-05	1.81E-05	2	30.48	3.05	-85	3	92.9

Table B-5: Monitoring Road Area Sources (continued)

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
MONRD99	Unpaved Monitoring Road 99	694538.7	4237247.3	1649.5	1.81E-05	1.81E-05	2	30.48	3.05	-85	3	92.9
MONRD100	Unpaved Monitoring Road 100	694541.7	4237277.9	1648.4	1.81E-05	1.81E-05	2	30.48	3.05	-77	3	92.9
MONRD101	Unpaved Monitoring Road 101	694548.3	4237308.2	1647.7	1.81E-05	1.81E-05	2	7.40	3.05	-53	3	22.6
MONRD102	Unpaved Monitoring Road 102	694552.8	4237311.2	1647.7	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD103	Unpaved Monitoring Road 103	694583.3	4237309.9	1647.9	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD104	Unpaved Monitoring Road 104	694613.7	4237308.5	1648.1	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD105	Unpaved Monitoring Road 105	694644.2	4237307.2	1648.4	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD106	Unpaved Monitoring Road 106	694674.6	4237305.9	1648.7	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD107	Unpaved Monitoring Road 107	694705.1	4237304.6	1649.4	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD108	Unpaved Monitoring Road 108	694735.5	4237303.2	1650.1	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD109	Unpaved Monitoring Road 109	694766.0	4237301.9	1650.7	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD110	Unpaved Monitoring Road 110	694796.4	4237300.6	1651.4	1.81E-05	1.81E-05	2	30.48	3.05	3	3	92.9
MONRD111	Unpaved Monitoring Road 111	694827.1	4237299.3	1651.9	1.81E-05	1.81E-05	2	30.48	3.05	0	3	92.9
MONRD112	Unpaved Monitoring Road 112	694857.6	4237299.3	1652.5	1.81E-05	1.81E-05	2	30.48	3.05	0	3	92.9
MONRD113	Unpaved Monitoring Road 113	694888.1	4237299.3	1653.1	1.81E-05	1.81E-05	2	30.48	3.05	0	3	92.9
MONRD114	Unpaved Monitoring Road 114	694918.5	4237299.3	1653.6	1.81E-05	1.81E-05	2	30.48	3.05	0	3	92.9
MONRD115	Unpaved Monitoring Road 115	694949.3	4237297.9	1654.2	1.81E-05	1.81E-05	2	30.48	3.05	2	3	92.9
MONRD116	Unpaved Monitoring Road 116	694979.8	4237296.9	1655.1	1.81E-05	1.81E-05	2	30.48	3.05	2	3	92.9
MONRD117	Unpaved Monitoring Road 117	695010.2	4237295.9	1655.9	1.81E-05	1.81E-05	2	30.48	3.05	2	3	92.9
MONRD118	Unpaved Monitoring Road 118	695040.7	4237294.9	1656.7	1.81E-05	1.81E-05	2	30.48	3.05	2	3	92.9
MONRD119	Unpaved Monitoring Road 119	695071.4	4237293.9	1657.3	1.81E-05	1.81E-05	2	30.48	3.05	-1	3	92.9
MONRD120	Unpaved Monitoring Road 120	695102.1	4237294.6	1657.7	1.81E-05	1.81E-05	2	30.48	3.05	-3	3	92.9
MONRD121	Unpaved Monitoring Road 121	695133.4	4237296.1	1658.0	1.81E-05	1.81E-05	2	16.50	3.05	-19	3	50.3
MONRD122	Unpaved Monitoring Road 122	695151.0	4237303.0	1658.3	1.81E-05	1.81E-05	2	17.10	3.05	-56	3	52.1
MONRD123	Unpaved Monitoring Road 123	695161.2	4237318.7	1658.7	1.81E-05	1.81E-05	2	30.48	3.05	-82	3	92.9
MONRD124	Unpaved Monitoring Road 124	695164.4	4237349.4	1659.2	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD125	Unpaved Monitoring Road 125	695165.5	4237379.9	1659.6	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD126	Unpaved Monitoring Road 126	695166.5	4237410.3	1660.1	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD127	Unpaved Monitoring Road 127	695167.6	4237440.8	1660.4	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD128	Unpaved Monitoring Road 128	695168.7	4237471.2	1660.7	1.81E-05	1.81E-05	2	30.48	3.05	-88	3	92.9
MONRD129	Unpaved Monitoring Road 129	695170.5	4237502.1	1660.8	1.81E-05	1.81E-05	2	28.30	3.05	-87	3	86.3
MONRD130	Unpaved Monitoring Road 130	695168.8	4237531.7	1660.3	1.81E-05	1.81E-05	2	30.48	3.05	16	3	92.9
MONRD131	Unpaved Monitoring Road 131	695198.2	4237523.3	1662.3	1.81E-05	1.81E-05	2	29.00	3.05	19	3	88.4
MONRD132	Unpaved Monitoring Road 132	695225.6	4237513.5	1663.4	1.81E-05	1.81E-05	2	15.50	3.05	56	3	47.2
MONRD133	Unpaved Monitoring Road 133	695234.3	4237500.6	1663.2	1.81E-05	1.81E-05	2	21.60	3.05	84	3	65.8
MONRD134	Unpaved Monitoring Road 134	695236.4	4237479.0	1662.4	1.81E-05	1.81E-05	2	30.48	3.05	98	3	92.9
MONRD135	Unpaved Monitoring Road 135	695232.0	4237448.7	1661.4	1.81E-05	1.81E-05	2	27.00	3.05	109	3	82.3
MONRD136	Unpaved Monitoring Road 136	695225.4	4237420.4	1660.6	1.81E-05	1.81E-05	2	30.48	3.05	32	3	92.9
MONRD137	Unpaved Monitoring Road 137	695251.3	4237404.4	1660.0	1.81E-05	1.81E-05	2	30.48	3.05	32	3	92.9
MONRD138	Unpaved Monitoring Road 138	695277.3	4237388.4	1659.3	1.81E-05	1.81E-05	2	30.48	3.05	32	3	92.9
MONRD139	Unpaved Monitoring Road 139	695303.2	4237372.4	1658.3	1.81E-05	1.81E-05	2	30.48	3.05	32	3	92.9
MONRD140	Unpaved Monitoring Road 140	695329.1	4237356.3	1657.1	1.81E-05	1.81E-05	2	30.48	3.05	32	3	92.9
MONRD141	Unpaved Monitoring Road 141	695355.3	4237340.3	1655.7	1.81E-05	1.81E-05	2	30.48	3.05	28	3	92.9
MONRD142	Unpaved Monitoring Road 142	695382.1	4237325.8	1654.3	1.81E-05	1.81E-05	2	30.48	3.05	28	3	92.9
MONRD143	Unpaved Monitoring Road 143	695408.9	4237311.3	1652.9	1.81E-05	1.81E-05	2	30.48	3.05	28	3	92.9
MONRD144	Unpaved Monitoring Road 144	695435.7	4237296.8	1651.8	1.81E-05	1.81E-05	2	30.48	3.05	28	3	92.9
MONRD145	Unpaved Monitoring Road 145	695462.3	4237281.2	1651.4	1.81E-05	1.81E-05	2	30.48	3.05	29	3	92.9
MONRD146	Unpaved Monitoring Road 146	695488.9	4237266.3	1651.4	1.81E-05	1.81E-05	2	30.48	3.05	29	3	92.9
MONRD147	Unpaved Monitoring Road 147	695515.5	4237251.4	1651.8	1.81E-05	1.81E-05	2	30.48	3.05	29	3	92.9

Table B-5: Monitoring Road Area Sources (continued)

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
MONRD148	Unpaved Monitoring Road 148	695541.9	4237235.7	1652.9	1.81E-05	1.81E-05	2	30.48	3.05	31	3	92.9
MONRD149	Unpaved Monitoring Road 149	695568.0	4237220.0	1654.4	1.81E-05	1.81E-05	2	30.48	3.05	31	3	92.9
MONRD150	Unpaved Monitoring Road 150	695594.1	4237204.2	1655.9	1.81E-05	1.81E-05	2	30.48	3.05	31	3	92.9
MONRD151	Unpaved Monitoring Road 151	695620.2	4237188.5	1657.1	1.81E-05	1.81E-05	2	30.48	3.05	31	3	92.9
MONRD152	Unpaved Monitoring Road 152	695646.3	4237172.7	1658.1	1.81E-05	1.81E-05	2	30.48	3.05	31	3	92.9
MONRD153	Unpaved Monitoring Road 153	695672.4	4237157.0	1658.3	1.81E-05	1.81E-05	2	30.48	3.05	31	3	92.9
MONRD154	Unpaved Monitoring Road 154	695698.2	4237140.5	1657.6	1.81E-05	1.81E-05	2	30.48	3.05	34	3	92.9
MONRD155	Unpaved Monitoring Road 155	695723.5	4237123.5	1656.1	1.81E-05	1.81E-05	2	30.48	3.05	34	3	92.9
MONRD156	Unpaved Monitoring Road 156	695748.8	4237106.5	1654.4	1.81E-05	1.81E-05	2	23.00	3.05	34	3	70.1
MONRD157	Unpaved Monitoring Road 157	695788.9	4237111.1	1652.2	1.81E-05	1.81E-05	2	13.50	3.05	32	3	41.1
MONRD158	Unpaved Monitoring Road 158	695802.4	4237103.5	1652.0	1.81E-05	1.81E-05	2	13.00	3.04	-1	3	39.5
MONRD159	Unpaved Monitoring Road 159	695817.3	4237104.3	1652.2	1.81E-05	1.81E-05	2	13.20	3.05	-31	3	40.2
MONRD160	Unpaved Monitoring Road 160	695829.1	4237111.6	1652.4	1.81E-05	1.81E-05	2	16.40	3.05	-42	3	50.0
MONRD161	Unpaved Monitoring Road 161	695841.5	4237122.7	1652.6	1.81E-05	1.81E-05	2	19.50	3.05	-11	3	59.4
MONRD162	Unpaved Monitoring Road 162	695860.7	4237126.6	1653.2	1.81E-05	1.81E-05	2	21.90	3.05	22	3	66.8
MONRD163	Unpaved Monitoring Road 163	695881.1	4237118.3	1654.0	1.81E-05	1.81E-05	2	30.48	3.05	41	3	92.9
MONRD164	Unpaved Monitoring Road 164	695903.9	4237098.1	1655.2	1.81E-05	1.81E-05	2	27.00	3.05	59	3	82.3
MONRD165	Unpaved Monitoring Road 165	695917.2	4237074.5	1656.1	1.81E-05	1.81E-05	2	30.48	3.05	73	3	92.9
MONRD166	Unpaved Monitoring Road 166	695926.4	4237045.4	1656.5	1.81E-05	1.81E-05	2	4.90	3.05	73	3	14.9
MONRD167	Unpaved Monitoring Road 167	695927.8	4237040.6	1656.5	1.81E-05	1.81E-05	2	30.48	3.05	90	3	92.9
MONRD168	Unpaved Monitoring Road 168	695927.9	4237009.8	1656.6	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD169	Unpaved Monitoring Road 169	695926.8	4236979.2	1657.1	1.81E-05	1.81E-05	2	30.48	3.05	94	3	92.9
MONRD170	Unpaved Monitoring Road 170	695924.8	4236948.6	1657.8	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD171	Unpaved Monitoring Road 171	695923.7	4236918.1	1659.0	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD172	Unpaved Monitoring Road 172	695922.6	4236887.7	1660.7	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD173	Unpaved Monitoring Road 173	695920.8	4236856.9	1662.8	1.81E-05	1.81E-05	2	30.48	3.05	93	3	92.9
MONRD174	Unpaved Monitoring Road 174	695919.1	4236826.3	1664.4	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD175	Unpaved Monitoring Road 175	695917.9	4236795.6	1664.1	1.81E-05	1.81E-05	2	30.48	3.05	93	3	92.9
MONRD176	Unpaved Monitoring Road 176	695916.3	4236764.9	1664.1	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD177	Unpaved Monitoring Road 177	695915.0	4236734.4	1664.9	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD178	Unpaved Monitoring Road 178	695913.7	4236704.0	1665.5	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD179	Unpaved Monitoring Road 179	695912.5	4236673.5	1666.2	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD180	Unpaved Monitoring Road 180	695911.2	4236643.1	1667.3	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD181	Unpaved Monitoring Road 181	695909.9	4236612.6	1668.1	1.81E-05	1.81E-05	2	30.48	3.05	92	3	92.9
MONRD182	Unpaved Monitoring Road 182	695908.0	4236581.8	1668.9	1.81E-05	1.81E-05	2	30.48	3.05	94	3	92.9
MONRD183	Unpaved Monitoring Road 183	695905.4	4236551.1	1669.6	1.81E-05	1.81E-05	2	30.48	3.05	95	3	92.9
MONRD184	Unpaved Monitoring Road 184	695903.1	4236520.4	1670.2	1.81E-05	1.81E-05	2	30.48	3.05	99	3	92.9
MONRD185	Unpaved Monitoring Road 185	695898.1	4236490.0	1670.4	1.81E-05	1.81E-05	2	30.48	3.05	108	3	92.9
MONRD186	Unpaved Monitoring Road 186	695888.8	4236460.6	1670.5	1.81E-05	1.81E-05	2	30.48	3.05	107	3	92.9
MONRD187	Unpaved Monitoring Road 187	695879.9	4236431.0	1670.3	1.81E-05	1.81E-05	2	30.48	3.05	110	3	92.9
MONRD188	Unpaved Monitoring Road 188	695869.6	4236402.0	1670.1	1.81E-05	1.81E-05	2	30.48	3.05	113	3	92.9
MONRD189	Unpaved Monitoring Road 189	695857.7	4236373.7	1669.9	1.81E-05	1.81E-05	2	30.48	3.05	112	3	92.9
MONRD190	Unpaved Monitoring Road 190	695846.0	4236345.2	1670.2	1.81E-05	1.81E-05	2	30.48	3.05	113	3	92.9
MONRD191	Unpaved Monitoring Road 191	695834.0	4236316.8	1670.4	1.81E-05	1.81E-05	2	26.00	3.05	111	3	79.2
MONRD192	Unpaved Monitoring Road 192	695824.4	4236294.8	1670.6	1.81E-05	1.81E-05	2	30.48	3.05	-177	3	92.9
MONRD193	Unpaved Monitoring Road 193	695794.0	4236296.5	1670.2	1.81E-05	1.81E-05	2	30.48	3.05	-177	3	92.9
MONRD194	Unpaved Monitoring Road 194	695763.5	4236298.2	1670.6	1.81E-05	1.81E-05	2	30.48	3.05	-177	3	92.9
MONRD195	Unpaved Monitoring Road 195	695733.1	4236299.9	1671.0	1.81E-05	1.81E-05	2	30.48	3.05	-177	3	92.9
MONRD196	Unpaved Monitoring Road 196	695702.7	4236301.6	1671.2	1.81E-05	1.81E-05	2	30.48	3.05	-177	3	92.9

Table B-5: Monitoring Road Area Sources (continued)

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate ($g/s-m^2$)	Annual Emission Rate ($g/s-m^2$)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
MONRD197	Unpaved Monitoring Road 197	695671.8	4236303.0	1670.6	1.81E-05	1.81E-05	2	30.48	3.05	-179	3	92.9
MONRD198	Unpaved Monitoring Road 198	695498.3	4235398.8	1694.7	1.81E-05	1.81E-05	2	30.48	3.05	19	3	92.9
MONRD199	Unpaved Monitoring Road 199	695527.4	4235389.0	1694.8	1.81E-05	1.81E-05	2	30.48	3.05	9	3	92.9
MONRD200	Unpaved Monitoring Road 200	695558.4	4235385.3	1694.6	1.81E-05	1.81E-05	2	30.48	3.05	0	3	92.9
MONRD201	Unpaved Monitoring Road 201	695589.2	4235385.6	1694.2	1.81E-05	1.81E-05	2	30.48	3.05	-11	3	92.9
MONRD202	Unpaved Monitoring Road 202	695619.3	4235391.7	1693.2	1.81E-05	1.81E-05	2	30.38	3.05	-16	3	92.6
MONRD203	Unpaved Monitoring Road 203	695648.7	4235400.2	1691.7	1.81E-05	1.81E-05	2	30.48	3.05	-15	3	92.9
MONRD204	Unpaved Monitoring Road 204	695678.3	4235408.2	1690.8	1.81E-05	1.81E-05	2	30.48	3.05	-15	3	92.9
MONRD205	Unpaved Monitoring Road 205	695707.8	4235416.4	1690.3	1.81E-05	1.81E-05	2	30.48	3.05	-17	3	92.9
MONRD206	Unpaved Monitoring Road 206	695737.1	4235425.4	1690.2	1.81E-05	1.81E-05	2	30.48	3.05	-18	3	92.9
MONRD207	Unpaved Monitoring Road 207	695773.4	4235437.1	1689.9	1.81E-05	1.81E-05	2	30.48	3.05	-18	3	92.9

Table B-6: Travel on Ore Pad Area Sources

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	Area (m^2)
ORERD1	Ore Pad Loader Travel 1	695403.7	4235612.4	1688.3	8.82E-05	8.82E-05	2	30.48	3.05	-145	3	92.9
ORERD2	Ore Pad Loader Travel 2	695378.7	4235629.9	1687.7	8.82E-05	8.82E-05	2	30.48	3.05	-145	3	92.9
ORERD3	Ore Pad Loader Travel 3	695353.8	4235647.4	1687.3	8.82E-05	8.82E-05	2	30.48	3.05	-145	3	92.9
ORERD4	Ore Pad Loader Travel 4	695328.8	4235664.8	1687.2	8.82E-05	8.82E-05	2	30.48	3.05	-145	3	92.9
ORERD5	Ore Pad Loader Travel 5	695400.0	4235602.7	1688.5	8.82E-05	8.82E-05	2	30.48	3.05	136	3	92.9
ORERD6	Ore Pad Loader Travel 6	695378.1	4235581.5	1688.7	8.82E-05	8.82E-05	2	30.48	3.05	136	3	92.9
ORERD7	Ore Pad Loader Travel 7	695356.1	4235560.4	1689.4	8.82E-05	8.82E-05	2	30.48	3.05	136	3	92.9
ORERD8	Ore Pad Loader Travel 8	695334.2	4235539.2	1690.3	8.82E-05	8.82E-05	2	30.48	3.05	136	3	92.9

Table B-7: Tailing Cell Wind Erosion Area Sources

Source ID	Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)	Initial Vertical Dimension (m)	24-Hour Model Area (m^2)	Annual Model Area (m^2)
WIND2A	Wind Erosion of Tailing Cell A	695471.9	4235796.8	1683.7	6.75E-07	6.75E-07	0	220.0	551.8	-87	0	121396	60698
WIND2B	Wind Erosion of Tailing Cell B	695118.6	4236064.9	1677.2	6.75E-07	6.75E-07	0	220.5	183.9	-86	0	40550	6064

Table B-8: Evaporation Pond and Ore Stockpile Wind Erosion Polygon Area Sources

Source ID	Polygon Area Source Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	24 Hour Emission Rate (g/s-m^2)	Annual Emission Rate (g/s-m^2)	Release Height (m)	Number of Vertices	Initial Vertical Dimension (m)	Area (m^2)
WIND3	Wind Erosion of Evap Pond	694689.2	4237103.9	1650.5	6.87E-07	6.87E-07	0	4	0	159077
WIND1A	Wind Erosion of Ore Stockpiles	695404.0	4235648.1	1687.4	3.20E-05	3.20E-05	2.74	5	1.28	3519
WIND1B	Wind Erosion of Ore Stockpiles	695315.4	4235514.8	1691.3	3.20E-05	3.20E-05	2.74	4	1.28	4777
WIND1C	Wind Erosion of Ore Stockpiles	695302.6	4235675.1	1687.5	3.20E-05	3.20E-05	2.74	3	1.28	6949

Table B-9: Rectangular Buildings

Building ID	Rectangular Building Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	Height (m)	X Length (m)	Y Length (m)	Angle (Degrees)
BLDG01	Change House and Lab	695143.8	4235558.2	1690.0	7.92	40.00	53.34	90
BLDG02	Warehouse and Shop	695106.4	4235557.9	1688.7	10.97	32.10	31.40	90
BLDG03	Truck Shop	695015.7	4235672.7	1684.3	10.06	24.50	24.20	90
BLDG04	Uranium and Vanadium SX Bldg	695054.8	4235720.3	1684.9	12.19	43.70	114.60	90
BLDG05	SX Building Tier	695157.2	4235720.3	1687.6	20.73	43.70	12.19	90
BLDG06	Uranium Precipitation Building	695074.4	4235648.8	1688.5	20.12	77.50	24.20	90
BLDG07	Vanadium Precipitation Building	695074.4	4235606.3	1688.3	29.26	35.00	24.20	90
BLDG08	Ammonium Tank Section of Precip Bldg	695098.6	4235579.1	1688.5	17.37	10.30	23.70	90
BLDG09	CCD Thickener Building	695205.0	4235710.9	1688.7	6.10	58.80	6.60	90
BLDG10	Feed Hopper Building	695295.4	4235605.0	1688.9	7.32	7.70	6.00	180

Table B-10: Polygon Buildings

Building ID	Polygon Building Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	Height (m)
BLDG11	Boiler Building	695198.9	4235651.0	1689.3	12.50
BLDG12	Fire Water Pump Section of Precip Bldg	695074.4	4235648.8	1688.5	7.32
BLDG13	Standby Generator Building	695241.9	4235592.6	1689.7	4.27
BLDG14	SAG Mill/Leach Building	695198.9	4235651.1	1689.3	29.26
BLDG15	Process Water Tier of Precipitation Bldg	695074.4	4235648.8	1688.5	14.33

Table B-11: Circular Tanks

Building ID	Circular Building Description	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	Height (m)	Radius (m)	Number of Vertices
TANK1	Raw Water Storage Tank	695115.8	4235640.8	1689.2	12.19	5.64	24
TANK2	Sulfuric Acid Tank 1	695264.3	4235565.9	1690.1	8.53	4.27	24
TANK3	Sulfuric Acid Tank 2	695275.7	4235566.0	1690.0	8.53	4.27	24
TANK4	Sulfuric Acid Tank 3	695264.3	4235554.2	1690.4	8.53	4.27	24
TANK5	Kerosene Storage Tank	695032.4	4235691.1	1684.9	5.49	2.74	24
TANK6	Vanadium SX Feed Tank	695147.0	4235671.1	1688.2	6.10	3.96	24
TANK7	Uranium SX Feed Tank	695068.0	4235670.7	1687.6	6.10	3.96	24
TANK8	Sodium Carbonate Slurry Storage Tank	695125.0	4235589.5	1689.5	6.10	2.29	24
TANK9	Dilute Sodium Carbonate Storage Tank	695124.5	4235583.4	1689.5	5.49	1.83	24
TANK10	Pre-Leach Clarifier	695179.9	4235630.0	1689.6	9.75	7.62	24
TANK11	Pre-Leach Thickener	695166.1	4235615.8	1689.8	10.97	9.14	24
TANK12	Pre-Leach Tank 2	695182.1	4235616.2	1689.9	12.19	3.66	24
TANK13	Pre-Leach Tank 1	695181.9	4235607.4	1690.0	12.19	3.66	24
TANK14	Pulp Storage Tank 2	695179.5	4235594.6	1690.2	13.41	5.94	24
TANK15	Pulp Storage Tank 1	695165.6	4235594.2	1690.2	13.41	5.94	24
TANK16	CCD Thickener 8	695196.1	4235703.8	1688.8	7.01	6.10	24
TANK17	CCD Thickener 7	695196.4	4235688.2	1689.0	7.01	6.10	24
TANK18	CCD Thickener 6	695196.3	4235673.6	1689.2	7.01	6.10	24
TANK19	CCD Thickener 5	695196.3	4235658.1	1689.3	7.01	6.10	24
TANK20	CCD Thickener 4	695220.1	4235704.1	1688.3	7.01	6.10	24
TANK21	CCD Thickener 3	695220.5	4235688.8	1688.4	7.01	6.10	24
TANK22	CCD Thickener 2	695219.9	4235673.8	1688.5	7.01	6.10	24
TANK23	CCD Thickener 1	695220.7	4235658.3	1688.7	7.01	6.10	24

Potential to Emit Calculations

Energy Fuels Resources Corporation Pinon Ridge Mill Facility
Montrose County, CO

Controlled Potential to Emit Summary (tons per year) **Plant Capacity:** **1,000 tons of ore processed per day**

Source ID	Emission Source	PM	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	Total HAPs	Sulfuric Acid	Ammonia
FUGITIVE SOURCES											
UPMAIN	Unpaved Main Road	79.90	23.58	2.36	-----	-----	-----	-----	-----	-----	-----
PMAIN	Paved Main Road	0.72	0.14	0.02	-----	-----	-----	-----	-----	-----	-----
MONRD	Unpaved Monitoring Road	14.46	5.79	0.58	-----	-----	-----	-----	-----	-----	-----
SECRD	Unpaved Security Road	27.97	11.20	1.12	-----	-----	-----	-----	-----	-----	-----
UNLOAD1	Ore Unloading from Trucks	0.91	0.37	0.06	-----	-----	-----	-----	1.33E-02	-----	-----
UNLOAD2	Unloading from dumping platform to ore pad	0.91	0.37	0.06	-----	-----	-----	-----	3.57E-03	-----	-----
ORERD	Ore Pad Travel	7.72	2.28	0.23	-----	-----	-----	-----	-----	-----	-----
WIND1	Wind erosion of ore stockpiles	33.94	16.97	2.55	-----	-----	-----	-----	1.33E-02	-----	-----
110-FRAG	Oversized ore fragmenting	5.20E-03	2.34E-03	4.33E-04	-----	-----	-----	-----	-----	-----	-----
WIND2	Tailings Cell Wind Erosion	3.14	1.57	0.24	-----	-----	-----	-----	2.18E-03	-----	-----
WIND3	Evaporation Pond Wind Erosion	7.60	3.80	0.57	-----	-----	-----	-----	-----	-----	-----
EVAP1	Tailing Cell Evaporation	-----	-----	-----	-----	-----	-----	57.35	-----	11.63	-----
EVAP2	Evaporation Pond Evaporation	-----	-----	-----	-----	-----	-----	104.27	-----	2.57	-----
810-TKH-01	Sulfuric Acid Tank #1	-----	-----	-----	-----	-----	-----	-----	-----	0.002	-----
810-TKH-02	Sulfuric Acid Tank #2	-----	-----	-----	-----	-----	-----	-----	-----	0.002	-----
810-TKH-03	Sulfuric Acid Tank #3	-----	-----	-----	-----	-----	-----	-----	-----	0.002	-----
860-TKH-01	Kerosene Tank	-----	-----	-----	-----	-----	-----	0.006	-----	-----	-----
860-TKH-02	Organic Make-Up Tank	-----	-----	-----	-----	-----	-----	0.003	-----	-----	-----
820-CVS-01	Ammonium Sulfate transfer conveyor	4.59E-04	1.51E-04	4.27E-05	-----	-----	-----	-----	-----	-----	-----
820-CVS-02	Ammonium Sulfate feed conveyor	4.59E-04	1.51E-04	4.27E-05	-----	-----	-----	-----	-----	-----	-----
850-HPF-01	Flocculant Hopper	5.58E-06	1.83E-06	5.18E-07	-----	-----	-----	-----	-----	-----	-----
850-CVS-01	Flocculant Feed Conveyor	5.58E-06	1.83E-06	5.18E-07	-----	-----	-----	-----	-----	-----	-----
950-TKH-04	Gasoline Tank	-----	-----	-----	-----	-----	-----	0.38	-----	-----	-----
950-TKH-01	Diesel Main Tank	-----	-----	-----	-----	-----	-----	0.003	-----	-----	-----

Energy Fuels Resources Corporation Pinon Ridge Mill Facility
Montrose County, CO

Controlled Potential to Emit Summary (tons per year) **Plant Capacity:** **1,000 tons of ore processed per day**

Source ID	Emission Source	PM	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	Total HAPs	Sulfuric Acid	Ammonia
NON-FUGITIVE SOURCES											
110-STK-01	Feed System Dust Collector	0.04	0.01	2.21E-03	-----	-----	-----	-----	7.88E-05	-----	-----
120-DCS-01	SAG Mill Dust Scrubber	0.02	0.01	1.20E-03	-----	-----	-----	-----	3.94E-05	-----	-----
220-GHS-01	Leach Train Vent Gas Scrubber	-----	-----	-----	-----	-----	-----	-----	1.54E-09	7.76	-----
410-BBB-01	DE Bag Breaker	4.65E-04	4.65E-04	2.33E-04	-----	-----	-----	-----	-----	-----	-----
420-MSS-01	Uranium Mixer Settler Tank A1	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
420-MSS-02	Uranium Mixer Settler Tank A2	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
420-MSS-03	Uranium Mixer Settler Tank A3	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
420-MSS-04	Uranium Mixer Settler Tank A4	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-01	Uranium Mixer Settler Tank B1	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-02	Uranium Mixer Settler Tank B2	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-03	Uranium Mixer Settler Tank B3	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-04	Uranium Mixer Settler Tank B4	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
440-MSS-01	Uranium Scrubber Mixer Settler	-----	-----	-----	-----	-----	-----	0.87	-----	-----	-----
440-MSS-02	Uranium Stripper Mixer Settler #1	-----	-----	-----	-----	-----	-----	0.87	-----	-----	-----
440-MSS-03	Uranium Stripper Mixer Settler #2	-----	-----	-----	-----	-----	-----	0.87	-----	-----	-----
440-TKH-01	Uranium SX Loaded Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
440-TKH-02	Uramium SX Barren Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
620-MSS-01	Vanadium Mixer Settler Tank A1	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-02	Vanadium Mixer Settler Tank A2	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-03	Vanadium Mixer Settler Tank A3	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-04	Vanadium Mixer Settler Tank A4	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-05	Vanadium Mixer Settler Tank A5	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-01	Vanadium Mixer Settler Tank B1	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-02	Vanadium Mixer Settler Tank B2	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-03	Vanadium Mixer Settler Tank B3	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-04	Vanadium Mixer Settler Tank B4	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-05	Vanadium Mixer Settler Tank B5	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
640-MSS-01	Vanadium Scrubber Mixer Settler	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-MSS-02	Vanadium Stripper Mixer Settler #1	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-MSS-03	Vanadium Stripper Mixer Settler #2	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-MSS-04	Vanadium Stripper Mixer Settler #3	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-TKH-01	Vanadium SX Loaded Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
640-TKH-02	Vanadium SX Barren Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
730-GHS-01	Packed Bed Wet Vent Scrubber	4.37E-03	4.37E-03	4.37E-03	-----	-----	-----	-----	3.74E-05	-----	5.15
730-GHS-02	Wet Venturi Scrubber	0.21	0.21	0.21	-----	-----	-----	-----	-----	-----	-----
910-PPL-01	Fire Water Diesel Pump	3.65E-03	3.65E-03	3.65E-03	0.11	0.02	0.01	3.88E-03	2.75E-04	-----	-----
920-STK-01	Combined Boiler Stack	0.82	0.82	0.82	3.91	1.76	8.79	0.58	1.98E-01	-----	-----
1000-SG-01	Standby Generator	0.14	0.14	0.14	2.31	6.18E-02	2.87	0.33	1.37E-03	-----	-----
Fugitive Source Total (ton per year)		**177.26**	**66.06**	**7.77**	**0.00**	**0.00**	**0.00**	**162.01**	**0.03**	**14.21**	**0.00**
Non-Fugitive Source Total (ton per year)		**1.24**	**1.20**	**1.18**	**6.33**	**1.84**	**11.67**	**37.30**	**0.20**	**7.76**	**5.15**
Facility Total (Fugitive and Non-Fugitive) (ton per year)		**178.50**	**67.26**	**8.95**	**6.33**	**1.84**	**11.67**	**199.30**	**0.23**	**21.96**	**5.15**

Energy Fuels Resources Corporation Pinon Ridge Mill Facility
Montrose County, CO

Uncontrolled Potential to Emit Summary (tons per year) **Plant Capacity:** **1,000 tons of ore processed per day**
Non-Fugitive Sources only

Source ID	Emission Source	PM	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	Total HAPs	Sulfuric Acid	Ammonia
110-STK-01	Feed System Dust Collector	3.65	1.46	0.22	-----	-----	-----	-----	7.88E-03	-----	-----
120-DCS-01	SAG Mill Dust Scrubber	2.23	0.87	0.12	-----	-----	-----	-----	3.94E-03	-----	-----
220-GHS-01	Leach Train Vent Gas Scrubber	-----	-----	-----	-----	-----	-----	-----	1.54E-07	7.76	-----
410-BBB-01	DE Bag Breaker	4.65E-02	4.65E-02	2.33E-02	-----	-----	-----	-----	-----	-----	-----
420-MSS-01	Uranium Mixer Settler Tank A1	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
420-MSS-02	Uranium Mixer Settler Tank A2	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
420-MSS-03	Uranium Mixer Settler Tank A3	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
420-MSS-04	Uranium Mixer Settler Tank A4	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-01	Uranium Mixer Settler Tank B1	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-02	Uranium Mixer Settler Tank B2	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-03	Uranium Mixer Settler Tank B3	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
430-MSS-04	Uranium Mixer Settler Tank B4	-----	-----	-----	-----	-----	-----	1.62	-----	-----	-----
440-MSS-01	Uranium Scrubber Mixer Settler	-----	-----	-----	-----	-----	-----	0.87	-----	-----	-----
440-MSS-02	Uranium Stripper Mixer Settler #1	-----	-----	-----	-----	-----	-----	0.87	-----	-----	-----
440-MSS-03	Uranium Stripper Mixer Settler #2	-----	-----	-----	-----	-----	-----	0.87	-----	-----	-----
440-TKH-01	Uranium SX Loaded Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
440-TKH-02	Uramium SX Barren Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
620-MSS-01	Vanadium Mixer Settler Tank A1	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-02	Vanadium Mixer Settler Tank A2	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-03	Vanadium Mixer Settler Tank A3	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-04	Vanadium Mixer Settler Tank A4	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
620-MSS-05	Vanadium Mixer Settler Tank A5	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-01	Vanadium Mixer Settler Tank B1	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-02	Vanadium Mixer Settler Tank B2	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-03	Vanadium Mixer Settler Tank B3	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-04	Vanadium Mixer Settler Tank B4	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
630-MSS-05	Vanadium Mixer Settler Tank B5	-----	-----	-----	-----	-----	-----	1.70	-----	-----	-----
640-MSS-01	Vanadium Scrubber Mixer Settler	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-MSS-02	Vanadium Stripper Mixer Settler #1	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-MSS-03	Vanadium Stripper Mixer Settler #2	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-MSS-04	Vanadium Stripper Mixer Settler #3	-----	-----	-----	-----	-----	-----	0.93	-----	-----	-----
640-TKH-01	Vanadium SX Loaded Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
640-TKH-02	Vanadium SX Barren Organic Tank	-----	-----	-----	-----	-----	-----	0.009	-----	-----	-----
730-DCS-01	Vanadium Dryer Dust Collector	22.53	22.53	22.53	-----	-----	-----	-----	3.74E-01	-----	-----
730-GHS-01	Packed Bed Wet Vent Scrubber	4.37E-01	4.37E-01	4.37E-01	-----	-----	-----	-----	-----	-----	5.41
730-GHS-02	Wet Venturi Scrubber	21.16	21.16	21.16	-----	-----	-----	-----	-----	-----	-----
910-PPL-01	Fire Water Diesel Pump	3.65E-03	3.65E-03	3.65E-03	0.11	0.02	0.01	3.88E-03	2.75E-04	-----	-----
920-STK-01	Combined Boiler Stack	0.82	0.82	0.82	15.24	1.76	8.79	0.58	1.98E-01	-----	-----
1000-SG-01	Standby Generator	0.14	0.14	0.14	2.31	6.18E-02	2.87	0.33	1.37E-03	-----	-----
Facility Non-Fugitive Source Total (ton per year)		**51.01**	**47.46**	**45.45**	**17.67**	**1.84**	**11.67**	**37.30**	**0.59**	**7.76**	**5.41**

Unpaved Main Plant Road

AP-42 Section 13.2.2 Unpaved Haul Roads, Final Section, November 2006.

Emission Factor Equation: $E=[k(s/12)^a(W/3)^b]*[(365-P)/365]$ Equation 13.2.2-1a and 13.2.2-2

where:
E = particulate emission factor (pounds per vehicle mile traveled, lb/VMT)
k, a, b = dimensionless constants
s = surface material silt content (%)
W = mean vehicle weight of the vehicles traveling the road (tons)
P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period

Operating Parameters:

Amount of ore delivered per day	1,000	tons per day
Delivery hours per day	10	hours per day
Delivery days per year[1]	365	days per year
Ore truck empty weight	18.5	tons
Ore truck capacity	24	tons
Water truck empty weight	13	tons
Water truck capacity	5,000	gallons
FedEx type vehicle weight	8	tons
Product truck empty weight	18.5	tons
Product truck capacity	26	tons
Worker hours per day	24	hours per day
Worker days per year	365	days per year
Worker vehicle weight	2.4	tons

Emission Factor Parameters:

Mean Silt Content[4]	s	10	%	AP-42, Table 13.2.2-1. Stone quarrying and processing
Average Weight of Ore Trucks	W	30.5	tons	
Average Weight of Water/Consumables Trucks[2]	W	23.4	tons	
Average Weight of Worker Vehicles	W	2.4	tons	
Average Weight of FedEx Trucks	W	8.0	tons	
Average Weight of Product trucks	W	31.5	tons	
Average Weight of Fleet	W	14.7	tons	
Mean Days > 0.01-in precipitation	P	75	days	AP-42, Figure 13.2.2-1. Avg of 90 and 60 days contours
Control Efficiency	CE	85%	%	March 10 UDEQ memo from Regg Olsen

		PM	PM_{10}	$PM_{2.5}$
Particle Size Multipliers for Unpaved Road Equation	k	4.9	1.5	0.15
Table 13.2.2-2	a	0.7	0.9	0.9
	b	0.45	0.45	0.45

Emission Factor:

		PM	PM_{10}	$PM_{2.5}$
Average Fleet Emission Factor (lb/VMT)	EF	7.00	2.07	0.21

Unpaved Main Plant Road

VMT Calculations:

Ore Trucks		
Ore Delivery Trucks per Day:	42	trucks/day
Number of Trucks to North dumping pad	20	trucks/day
Number of Trucks to South dumping pad	20	trucks/day
Number of Trucks to North Ore Pad	1	truck/day
Number of Trucks to South Ore Pad	1	truck/day
Distance to North Dumping Pad	5,570	feet
Distance to South Dumping Pad	6,410	feet
Distance to North Ore Pad	5630	feet
Distance to South Ore Pad	6230	feet
Daily VMT to North Dumping Pad	42	miles/day
Daily VMT to South Dumping Pad	49	miles/day
Daily VMT to North Ore Pad	2	miles/day
Daily VMT to South Ore Pad	2	miles/day
Total Daily VMT	95	miles/day

FedEx Trucks		
FedEx trucks per day	3	trucks/day
Distance to delivery area	4550	feet
Total Daily VMT	5	miles/day

Worker Vehicles		
Number of worker vehicles to administration building[3]	27	vechicles/day
Number of worker vehicles to mill area[3]	60	vechicles/day
Distance to administration building	1800	feet
Distance to mill area	7300	feet
Daily VMT to administration building	18	miles/day
Daily VMT to mill area	166	miles/day
Total Daily VMT	184	miles/day

Water/Consumable Trucks		
Non-potable water delivery trucks per day	30	trucks/day
Potable water delivery trucks per day	1	trucks/day
Fuel and Consumables trucks per day	16	trucks/day
Distance to Non-potable Water Delivery Area	7300	feet
Distance to Potable Water Delivery Area (average of two sites)	4550	feet
Distance to Reagent Unloading Area	7300	feet
Daily VMT to Non-potable Water Delivery Area	83	miles/day
Daily VMT to Potable Water Delivery Area	2	miles/day
Daily VMT to Reagent Unloading Area	44	miles/day
Total Daily VMT	129	miles/day

Product Shipping Trucks		
Product shipping trucks per day	1	trucks/day
Distance from shipping area	8180	feet
Total Daily VMT	3	miles/day

Overall VMT Numbers		
Total Vechicles per Day	180	vehicles/day
Total VMT per Day	417	miles/day

Unpaved Main Plant Road

Emissions:

PM		Uncontrolled			Controlled		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UPMAIN	Unpaved Main Road	291.87	2918.72	532.67	43.78	437.81	79.90

PM_{10}		Uncontrolled			Controlled		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UPMAIN	Unpaved Main Road	86.15	861.49	157.22	12.92	129.22	23.58

$PM_{2.5}$		Uncontrolled			Controlled		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UPMAIN	Unpaved Main Road	8.61	86.15	15.72	1.29	12.92	2.36

Notes:

1. All delivery is assumed to be on a 7 day per week schedule as an upper bound value even though delivery will most likely not occur each day.

2. Delivery trucks with consumables such as fuel and chemicals are assumed to be the same size and capacity as the water trucks. Emissions from water and consumable trucks are combined into the water truck category.

3. Worker vehicles are calculated as the maximum that could occur per day even though the weekend shifts will not have as many employees on site.

4. The Roadway Pavement Design Recommendations Report, dated October 30, 2008, states that the top 5 inches of aggregate on the unpaved portion of road will be such that 6-12% of the material passes the No. 200 sieve. Thus, a silt value of 10% from AP-42 falls within the upper bound of the actual design range for silt.

Paved Main Plant Road

AP-42 Section 13.2.1 Paved Haul Roads, Final Section, November 2006.

Emission Factor Equation: $E=[k(sL/2)^{0.65}(W/3)^{1.5}-C]*(1-(P/(4N)))$ Equation 13.2.1.3(1) and 13.2.1.3(2)

where:

E = particulate emission factor (pounds per vehicle mile traveled, lb/VMT)
k = particle size multiplier
sL = road surface silt loading (g/m^2)
W = mean vehicle weight of the vehicles traveling the road (tons)
C = emission factor for 1980's vehicle fleet exhaust, break wear and tire wear
N = number of days in the averaging period
P = number of "wet" days with at least 0.254 mm (0.01-in) of precipitation during the averaging period

Operating Parameters:

Amount of ore delivered per day	1,000	tons per day
Delivery hours per day	10	hours per day
Delivery days per year[1]	365	days per year
Ore truck empty weight	18.5	tons
Ore truck capacity	24	tons
Water truck empty weight	13	tons
Water truck capacity	5,000	gallons
FedEx type vehicle weight	8	tons
Product truck empty weight	18.5	tons
Product truck capacity	26	tons
Worker hours per day	24	hours per day
Worker days per year	365	days per year
Worker vehicle weight	2.4	tons

Emission Factor Parameters:

Mean Silt Content[2]	sL	0.6	g/m^2	AP-42, Table 13.2.1-3. Baseline silt loading value for public roads
Average Weight of Ore Trucks	W	30.5	tons	
Average Weight of Water/Consumables Trucks[3]	W	23.4	tons	
Average Weight of Worker Vehicles	W	2.4	tons	
Average Weight of FedEx Trucks	W	8.0	tons	
Average Weight of Product trucks	W	31.5	tons	
Weighted Average of Fleet	W	14.7	tons	
Number of days in the averaging period	N	365	days	
Mean Days > 0.01-in precipitation	P	75	days	AP-42, Figure 13.2.2-1. Avg of 90 and 60 days contours
Control Efficiency	CE	0%	%	No controls specified for paved section.

		PM_{30}	PM_{10}	$PM_{2.5}$	
Constants for Paved Road Equation	k	0.082	0.016	0.0024	Table 13.2.1-1
	C	0.00047	0.00047	0.00036	Table 13.2.1-2

Emission Factor:

		PM_{30}	PM_{10}	$PM_{2.5}$
Weighted Average Fleet Emission Factor (lb/VMT)	EF	0.38	0.07	0.01

Paved Main Plant Road

VMT Calculations:

Ore Delivery Trucks per Day:	42	trucks/day
FedEx trucks per day	3	trucks/day
Number of worker vehicles to administration building[4]	27	vechicles/day
Number of worker vehicles to mill area[4]	60	vechicles/day
Non-potable water delivery trucks per day	30	trucks/day
Potable water delivery trucks per day	1	trucks/day
Fuel and Consumables trucks per day	16	trucks/day
Product shipping trucks per day	1	trucks/day
Total number of vehicles per day	180	vechicles/day
Length of Paved Road Segment	150	feet
Total Daily VMT	10	miles/day

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
PMAIN	Paved Main Road	0.39	3.94	0.72	0.39	3.94	0.72

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
PMAIN	Paved Main Road	0.08	0.76	0.14	0.08	0.76	0.14

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
PMAIN	Paved Main Road	0.01	0.11	0.02	0.01	0.11	0.02

Notes:

1. All delivery is assumed to be on a 7 day per week schedule as a upper bound even though delivery will most likely not occur each day.

2. Paved portion of the main haul road is immediately adjacent to the highway and approximatley one mile from the facility processing areas. Therefore it was not treated as an industrial paved road and the silt loading value for a public road was applied.

3. Delivery trucks with consumables such as fuel and chemicals are assumed to be the same size and capacity as the water trucks. Emissions from water and consumable trucks are combined into the water truck category.

4. Worker vehicles are calculated as the maximum that could occur per day even though the weekend shifts will not have as many employees on site.

Unpaved Secondary Service Roads

AP-42 Section 13.2.2 Unpaved Haul Roads, Final Section, November 2006.

Emission Factor Equation: $E=[k(s/12)^a(W/3)^b]*[(365-P)/365]$ Equation 13.2.2-1a and 13.2.2-2

where:
E = particulate emission factor (pounds per vehicle mile traveled, lb/VMT)
k, a, b = dimensionless constants
s = surface material silt content (%)
W = mean vehicle weight of the vehicles traveling the road (tons)
P = number of "wet" days with at least 0.254 mm (0.01-in) of precipitation during the averaging period

Operating Parameters:

Hours per day for monitoring	10	hours per day
Days per year for monitoring	365	days per year
One way trips per day for monitoring	6.4	trips per day
Hours per day for Security travel	24	hours per day
Days per year for Security travel	365	days per year
Round trips per day for security travel	6	trips per day
Weight of vehicle	2.4	tons

Emission Factor Parameters:

Mean Silt Content	s	%	46	Average value from borings <=10 feet from Table 1 of Golder's Geotech report and Table C-1 of Kleinfelder's Geotech report.
Weight of Trucks	W	tons	2.4	
Mean Days > 0.01-in precipitation	P	days	75	AP-42, Figure 13.2.2-1. Avg of 90 and 60 days contours
Control Efficiency	CE	%	0%	Will use magnesium chloride if necessary. No gravel.

		PM	PM_{10}	$PM_{2.5}$
Particle Size Multipliers for Unpaved Road Equation Table 13.2-2	k	4.9	1.5	0.15
	a	0.7	0.9	0.9
	b	0.45	0.45	0.45

Emission Factor:

		PM	PM_{10}	$PM_{2.5}$
Emission Factor (lb/VMT)	EF	9.02	3.61	0.36

VMT Calculations:

One way trips per day for monitoring	6.4	trips
Round trips per day for security travel	6	trips
Monitoring distance	7245	feet * one way distance
Security loop distance	14951	feet * round trip distance
Monitoring Daily VMT	9	miles/day
Security Daily VMT	17	miles/day

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
MONRD	Unpaved Monitoring Road	7.92	79.21	14.46	7.92	79.21	14.46
SECRD	Unpaved Security Road	6.39	153.24	27.97	6.39	153.24	27.97

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
MONRD	Unpaved Monitoring Road	3.17	31.72	5.79	3.17	31.72	5.79
SECRD	Unpaved Security Road	2.56	61.38	11.20	2.56	61.38	11.20

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
MONRD	Unpaved Monitoring Road	0.32	3.17	0.58	0.32	3.17	0.58
SECRD	Unpaved Security Road	0.26	6.14	1.12	0.26	6.14	1.12

Dumping Platform and Ore Pad

Ore Unloading

AP-42 Section 11.24 Metallic Minerals Processing, Final Section, August 1982.

Operating Parameters:

Delivery hours per day	10	hours/day
Delivery days per year	365	days/year
Mill operating hours per day	16	hours/day
Mill operating days per year	365	days/year
Amount of Ore delivered	1,000	tons/day
Amount of Ore transferred from Platform to Pad	1,000	tons/day

Emission Factor Parameters:

Control Efficiency (water spray)[1]	CE	50%

		PM	PM_{10}	$PM_{2.5}$	Reference
Particle Size Multipliers	k	0.74	0.35	0.053	Table 13.2.4-4

Emission Factors:

		PM	PM_{10}	$PM_{2.5}$ [2,3]	Reference	
Emission Factor (lb/ton)	EF	0.01	0.004	0.000605714	Table 11.24-2 [4]	

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UNLOAD1	Ore Unloading from Trucks	1.00	10.00	1.83	0.50	5.00	0.91
UNLOAD2	Unloading from dumping platform to ore pad	0.63	10.00	1.83	0.31	5.00	0.91

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UNLOAD1	Ore Unloading from Trucks	0.40	4.00	0.73	0.20	2.00	0.37
UNLOAD2	Unloading from dumping platform to ore pad	0.25	4.00	0.73	0.13	2.00	0.37

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UNLOAD1	Ore Unloading from Trucks	0.06	0.61	0.11	0.03	0.30	0.06
UNLOAD2	Unloading from dumping platform to ore pad	0.04	0.61	0.11	0.02	0.30	0.06

Notes:

1. WRAP Fugitive Dust Handbook, Chapter 4 Materials Handling, lists 62% for continuous water spray at transfer points. Since water spray will be intermittent, then control efficiency was reduced to 50%.
2. No Emission factor for $PM_{2.5}$ listed in Table 11.24-2.
3. $PM_{2.5}$ Emission Factor calculated using a ratio of k factors from AP-42, Section 13.2.4, Aggregate Handling and Storage Piles, and applying the k factors to the PM_{10} emission factor from Section 11.24.
4. Emission factors for high moisture ore were used (ore with 4% or greater moisture content)

Dumping Platform and Ore Pad

Driving between Dumping Platform and Ore Pad

AP-42 Section 13.2.2 Unpaved Haul Roads, Final Section, November 2006.

Emission Factor Equation:

$$E=[k(s/12)^a(W/3)^b]*[(365-P)/365]$$ Equation 13.2.2-1a and 13.2.2-2

where:
E = particulate emission factor (pounds per vehicle mile traveled, lb/VMT)
k, a, b = dimensionless constants
s = surface material silt content (%)
W = mean vehicle weight of the vehicles traveling the road (tons)
P = number of "wet" days with at least 0.254 mm (0.01-in) of precipitation during the averaging period

Operating Parameters:

Mill hours per day	16	hours/day
Mill operating days per year	365	days/year
Amount of ore moved per day[1]	1,000	tons/day
Caterpillar 988 operating weight	54.6	tons
Caterpillar 988 capacity	9	cubic yards
Rated Payload of Cat 988	12.5	tons

Emission Factor Parameters:

Mean Silt Content	s	%	10	Table 13.2.2-1
Average Weight of 988 Catepillar	W	tons	61	
Mean Days > 0.01-in precipitation	P	days	75	AP-42, Figure 13.2.2-1. Avg of 90 and 60 days contours
Control Efficiency	CE	%	75%	March 10 UDEQ memo, Regg Olsen

		PM	PM_{10}	$PM_{2.5}$
Particle Size Multipliers for Unpaved Road	k	4.9	1.5	0.15
Equation	a	0.7	0.9	0.9
Table 13.2.2-2	b	0.45	0.45	0.45

Emission Factor:

		PM	PM_{10}	$PM_{2.5}$
Loader Emission Factor (lb/VMT)	EF	13.29	3.92	0.39

VMT Calculations:

Amount of Ore moved per day	1,000	tons/day
Maximum capacity of the loader	12.5	tons
Loader trips per day	80	trips/day
Average trip distance from dumping platform to ore pad	420	feet
Daily VMT to ore pad	13	miles/day

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
ORERD	Ore Pad Travel	10.57	169.16	30.87	2.64	42.29	7.72

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
ORERD	Ore Pad Travel	3.12	49.93	9.11	0.78	12.48	2.28

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
ORERD	Ore Pad Travel	0.31	4.99	0.91	0.08	1.25	0.23

Note:

1. Dumping platform can hold 20 loads (24 tons each) of ore, so assume all ore that comes in each day must also be moved to keep available space on the dumping platform.

Dumping Platform and Ore Pad

Wind Erosion of Ore Pad Stockpiles

AP-42 Section 11.9 Western Surface Coal Mining, Final Section, October 1998.

Emission Factor Equation:

0.72u lb PM/acre-hour Table 11.9-1
where: u=wind speed (mph)

Operating Parameters:

Average wind speed	6.33	mph	*average of on site 10m tower wind speed
Total acreage of stockpiles	3.4	acres	
Wind Erosion hours per day	24	hours/day	
Wind Erosion days per year	365	days/year	

Emission Factor Parameters:

Control Efficiency (water/raffinate spray)[1]	CE	50%

		PM	PM_{10}	$PM_{2.5}$	Reference
Particle Size Multipliers [2]	k	1	0.5	0.075	Table on page 13.2.5-3

Emission Factors:

		PM	PM_{10}	$PM_{2.5}$ [2,3]	Reference
Emission Factor for stockpiles (lb/acre-hour)	EF	4.56	2.28	0.34	Table 11.9-1

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
WIND1	Wind erosion of ore stockpiles	15.50	371.90	67.87	7.75	185.95	33.94

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
WIND1	Wind erosion of ore stockpiles	7.75	185.95	33.94	3.87	92.98	16.97

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
WIND1	Wind erosion of ore stockpiles	1.16	27.89	5.09	0.58	13.95	2.55

Notes:

1. WRAP Fugitive Dust Handbook, Chapter 9 Storage Pile Wind Erosion, lists 90% for hand watering or covering. Since water spray will be intermittent and covers will not be used, then control efficiency was reduced to 50%.

2. No emission factor for $PM_{2.5}$ listed in Table 11.9-1.

3. $PM_{2.5}$ Emission Factor calculated using a ratio of k factors from AP-42, Section 13.2.5, Industrial Wind Erosion, and applying the k factors to the PM_{10} emission factor from Section 11.9.

Dumping Platform and Ore Pad

Radionuclide Emissions

Emission Basis: **Based on "Assessment of Potential Off-site Doses Resulting from the Proposed Piñon Ridge Uranium Mill", Craig Little, Sr. Scientist, dated November, 2009.**

Specific Activity of Radionuclides

Radium-226	1	Ci/g
Thorium-230	0.019	Ci/g
Lead-210	88	Ci/g
Uranium-238	3.30E-07	Ci/g

Emissions:

Radionuclides			**Uncontrolled**	**Controlled**	
Source ID	Emission Source	Compound	(lb/yr)	(Ci/yr)	(lb/yr)
UNLOAD1	Ore Unloading from Trucks	Radium-226	1.8E-05	3.99E-03	8.80E-06
		Thorium-230	9.3E-04	3.99E-03	4.63E-04
		Lead-210	2.0E-07	3.99E-03	1.00E-07
		Uranium-238	5.3E+01	3.99E-03	2.67E+01
		Total Radionuclides	53.31		26.66
UNLOAD2	Unloading from dumping platform to ore pad	Radium-226	4.7E-06	1.07E-03	2.36E-06
		Thorium-230	2.5E-04	1.07E-03	1.24E-04
		Lead-210	5.4E-08	1.07E-03	2.68E-08
		Uranium-238	1.4E+01	1.07E-03	7.15E+00
		Total Radionuclides	14.30		7.15
WIND1	Wind erosion of ore stockpiles	Radium-226	1.8E-05	3.99E-03	8.80E-06
		Thorium-230	9.3E-04	3.99E-03	4.63E-04
		Lead-210	2.0E-07	3.99E-03	1.00E-07
		Uranium-238	5.3E+01	3.99E-03	2.67E+01
		Total Radionuclides	53.31		26.66

Oversized Ore Fragmenting

AP-42 Section 11.24 Metallic Minerals Processing, Final Section, August 1982.

Emission Factor: **E=0.02 lb PM/ton** Table 11.24-2, Primary crushing
E=0.009 lb PM_{10}/ton Table 11.24-2, Primary crushing

Operating Parameters:

Total ore delivered per day	1,000	tons/day
Fragmenting days per week	1	days/week
Fragmenting days per year	52	days/year
Amount of total fragmented	1%	

Emission Factor Parameters:

		PM	PM_{10}	$PM_{2.5}$	Reference
Emission Factors for scaling $PM_{2.5}$ (lb/ton)[2]	EF	0.0012	0.00054	0.0001	Table 11.19.2-2

Emission Factors:

		PM	PM_{10}	$PM_{2.5}$ [2]	Reference
Emission Factor (lb/ton)	EF	0.02	0.009	0.002	Table 11.24-2 [1]

Emissions:

PM		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)[3]	(lb/day)	(ton/yr)
110-FRAG	Oversized ore fragmenting	3.33E-02	2.00E-01	5.20E-03

PM_{10}		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)[3]	(lb/day)	(ton/yr)
110-FRAG	Oversized ore fragmenting	1.50E-02	9.00E-02	2.34E-03

$PM_{2.5}$		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)[3]	(lb/day)	(ton/yr)
110-FRAG	Oversized ore fragmenting	2.78E-03	1.67E-02	4.33E-04

Notes:
1. Emission factors for high moisture ore were used (ore with 4% or greater moisture content)
2. Emission factor for PM2.5 scaled from the PM10 emission factor from Table 11.24-2 and the ratio of PM2.5/PM10 from Table 11.19.2-2
3. Assume fragmenting takes 6 hours each day the process is carried out.

Area 110 Feed Hopper and Conveyor

AP-42 Section 11.24 Metallic Minerals Processing, Final Section, August 1982.

Operating Parameters:

Amount of ore processed	1,000	tons/day
Maximum amount of ore delivered by conveyor to mill	100	tons/hour
Mill operating hours per day	16	hours/day
Mill operating days per year	365	days/year

Source Parameters:

Source ID	Emission Source	Stack Flow Rate (scfm)	Stack Diameter (ft)	Stack Height (ft)	Gas Temperature (deg F)	Control Efficiency %
110-STK-01	Feed System Dust Collector	39,000	4	35	Ambient	99%

Emission Factor Parameters:

Control Efficiency of Baghouse	99%	99% from Farr brochure

		PM	PM_{10}	$PM_{2.5}$	Reference
Particle Size Multipliers [2]	k	0.74	0.35	0.053	Table, page 13.2.4-4

Emission Factors:

		PM	PM_{10}	$PM_{2.5}$ [2]	Reference
Emission Factor (lb/ton)	EF	0.01	0.004	0.00061	Table 11.24-2[1]

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
110-SNG-01	Unloading to Grizzly Screen	0.63	10.00	1.83	-----	-----	-----
110-FDA-01	Ore transfer - Apron Feeder to Conveyor	1.00	10.00	1.83	-----	-----	-----
110-STK-01	Feed System Dust Collector	-----	-----	-----	1.63E-02	2.00E-01	0.04

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
110-SNG-01	Unloading to Grizzly Screen	0.25	4.00	0.73	-----	-----	-----
110-FDA-01	Ore transfer - Apron Feeder to Conveyor	0.40	4.00	0.73	-----	-----	-----
110-STK-01	Feed System Dust Collector	-----	-----	-----	6.50E-03	8.00E-02	0.01

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
110-SNG-01	Unloading to Grizzly Screen	0.04	0.61	0.11	-----	-----	-----
110-FDA-01	Ore transfer - Apron Feeder to Conveyor	0.06	0.61	0.11	-----	-----	-----
110-STK-01	Feed System Dust Collector	-----	-----	-----	9.84E-04	1.21E-02	2.21E-03

Notes:

1. Emission Factors for high moisture ore were used (ore with 4% or greater moisture).
2. $PM_{2.5}$ Emission Factor calculated using a ratio of k factors from AP-42, Section 13.2.4, Aggregate Handling and Storage Piles, and applying the k factors to the PM_{10} emission factor from Section 11.24.

Area 110 Feed Hopper and Conveyor

Radionuclide Emissions

Emission Basis: **Based on "Assessment of Potential Off-site Doses Resulting from the Proposed Piñon Ridge Uranium Mill", Craig Little, Sr. Scientist, dated November, 2009.**

Specific Activity of Radionuclides

Radium-226	1	Ci/g
Thorium-230	0.019	Ci/g
Lead-210	88	Ci/g
Uranium-238	3.30E-07	Ci/g

Emissions:

Radionuclides			**Uncontrolled**	**Controlled**	
Source ID	Emission Source	Radionuclide Compound	(lb/yr)	(Ci/yr)	(lb/yr)
110-STK-01	Feed System Dust Collector	Radium-226	5.20E-06	2.36E-05	5.20E-08
		Thorium-230	2.74E-04	2.36E-05	2.74E-06
		Lead-210	5.91E-08	2.36E-05	5.91E-10
		Uranium-238	1.58E+01	2.36E-05	1.58E-01
		Total Radionuclides	15.8		0.16

Area 120 SAG Mill

AP-42 Section 11.24 Metallic Minerals Processing, Final Section, August 1982.
AP-42 Section 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing, Final Section, August 2004.

Operating Parameters:

Amount of ore processed	1,000	tons/day
Maximum amount of ore delivered by conveyor	100	tons/hour
Mill operating hours per day	16	hours/day
Mill operating days per year	365	days/year

Emission Factor Parameters:

		PM	PM_{10}	$PM_{2.5}$	Reference
Particle Size Multipliers	k	0.74	0.35	0.053	Table, page 13.2.4-4

Emission Factors:

		PM	PM_{10}	$PM_{2.5}$	Unit	Reference
Emission Factor for material transfer points	EF	0.01	0.004	0.0006	lb/ton	Table 11.24-2 [1,2]
Emission Factor for wet grinding	EF	Negligible	Negligible	Negligible	lb/ton	Table 11.24-2 [1,2]
Emission Factor for screening (controlled)	EF	0.0022	0.00074	0.00005	lb/ton	Table 11.19.2-2 [3]

Source Parameters:

Source ID	Emission Source	Stack Flow Rate (scfm)	Stack Diameter (ft)	Stack Height (ft)	Gas Temperature (deg F)	Control Efficiency %
120-DCS-01	SAG Mill Dust Scrubber	2,000	1	35	Ambient	99%

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UNLOAD3	Unloading to Vibrating Feeder	1.00	10.00	1.83	---	---	---
120-FDV-01	Vibrating Feeder	0.22	2.20	0.40	---	---	---
120-DCS-01	SAG Mill Dust Scrubber	---	---	---	1.22E-02	0.12	0.02

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UNLOAD3	Unloading to Vibrating Feeder	0.40	4.00	0.73	---	---	---
120-FDV-01	Vibrating Feeder	0.07	0.74	0.14	---	---	---
120-DCS-01	SAG Mill Dust Scrubber	---	---	---	4.74E-03	0.05	0.01

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
UNLOAD3	Unloading to Vibrating Feeder	0.06	0.61	0.11	---	---	---
120-FDV-01	Vibrating Feeder	0.01	0.05	0.01	---	---	---
120-DCS-01	SAG Mill Dust Scrubber	---	---	---	6.56E-04	0.01	0.001

Notes:

1. Emission factors (from 11.24-2) for high moisture ore were used (ore with 4% or greater moisture content)
2. $PM_{2.5}$ Emission Factor for material transfer point calculated using a ratio of k factors from AP-42, Section 13.2.4, Aggregate Handling and Storage Piles, and applying the k factors to the PM_{10} emission factor from Section 11.24.
3. Controlled screening emission factor used because water is added as part of the process at this point.

Area 120 SAG Mill

Radionuclide Emissions

Emission Basis: **Based on "Assessment of Potential Off-site Doses Resulting from the Proposed Piñon Ridge Uranium Mill", Craig Little, Sr. Scientist, dated November, 2009.**

Specific Activity of Radionuclides

Radium-226	1	Ci/g
Thorium-230	0.019	Ci/g
Lead-210	88	Ci/g
Uranium-238	3.30E-07	Ci/g

Emissions:

Radionuclides			**Uncontrolled**	**Controlled**	
Source ID	Emission Source	Radionuclide Compound	(lb/yr)	(Ci/yr)	(lb/yr)
120-DCS-01	SAG Mill Dust Scrubber	Radium-226	2.60E-06	1.18E-05	2.60E-08
		Thorium-230	1.37E-04	1.18E-05	1.37E-06
		Lead-210	2.96E-08	1.18E-05	2.96E-10
		Uranium-238	7.88E+00	1.18E-05	7.88E-02
		Total Radionuclides	7.88		7.88E-02

Area 200 Pre-Leach and Leach Systems

Sulfuric Acid Emissions

Source Parameters:

Source ID	Emission Source	Stack Flow Rate (scfm)	Stack Diameter (ft)	Stack Height (ft)	Stack Temp. (deg F)	Gas Temperature (deg C)	Control Efficiency %
220-GHS-01	Leach Train Vent Gas Scrubber	2,500	1	35	Ambient	21	99%

Basis/Assumptions:

Sulfuric acid has an extremely low vapor pressure and a high boiling point, meaning that sulfuric acid does not readily volatilize to form gaseous H_2SO_4. However, acid mist will be carried within water vapor in the inlet stream to the scrubber. Therefore, water vapor is assumed to be the volatile substance in the EPA diffusion equation. Then the basis of acid emissions will be that the aqueous solution in the pre-leach tanks contains 1-5% H_2SO_4, assumed 5% for these calculations. Additionally, the basis of acid emissions will be that the aqueous solution in the leach tanks contains 11% H_2SO_4.

Reference	From Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form, dated December 1987.

Based on the EPA Diffusion Equation:

$$VGR = (3.1536 \times 10^{7}) \times F \times \frac{MKAP}{RT} \times (1-CE)$$

Where:
VGR = Vapor Generation Rate (lb/yr)
M = MW of Species i, (lb/lbmol) (Water = 18.02 lb/lbmol)
A = Tank Surface Area (ft^2)
P = Partial Pressure of the Volatile Chemical, species i, in the mixture (psia)
R = Universal Gas Constant, psia-$ft^3/^oR$-lbmol
= 10.73 psia-$ft^3/^oR$-lbmol
T = Temperature ^oR
= $100^oF = 559.67^oR$ (Pre-Leach Tanks)
= $185^oF = 644.67^oR$ (Leach Tanks - Steam Added)
K = Gas-Phase Mass Transfer Coefficient, ft/s
= $0.00438 \times (U)^{0.78} \times (18/M)^{1/3}$
U = Speed of air across liquid surface, miles/hr
= 1.7 mph (EPA default value, as defined in the attached EPCRA example calc)
3.1536×10^7 = Conversion factor for lb/s to lb/yr
F = Dimensionless Factor
= 1.1 for agitated tank
CE = Scrubber Control Efficiency

Pre-Leach Tank Surface Area Dimensions=	346.36 ft^2	P_{Water} =	0.951 psia	at 37.8°C / 100 °F
Leach Tank Surface Area Dimensions=	346.36 ft^2	P_{Water} =	8.38 psia	at 85°C / 185 °F

Area 200 Pre-Leach and Leach Systems

Leach Circuit Calculation Parameters:

Source ID	Emission Source	Chemical Species (i)	Mol Wt. (Species i) (lb/lbmol)	Partial Pressure (psia)	Bath Surface Area (ft^2)	Temp. (^oR)	Gas Constant R (psia-ft^3/^oR-lbmol)	Air Speed Across Liq. Surface (mph)	Gas Phase Mass Transfer Coeff. (ft/s)	Agitated Tank Factor	Percent Acid in Solution	Scrubber Control Efficiency (99%)
210-TKL-01	Pre-Leach Tank #1	Water	18.02	9.51E-01	346.4	559.67	10.73	1.7	0.00662314	1.1	5%	99%
210-TKL-02	Pre-Leach Tank #2	Water	18.02	9.51E-01	346.4	559.67	10.73	1.7	0.00662314	1.1	5%	99%
220-TKL-01	Leach Tank #1	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%
220-TKL-02	Leach Tank #2	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%
220-TKL-03	Leach Tank #3	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%
220-TKL-04	Leach Tank #4	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%
220-TKL-05	Leach Tank #5	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%
220-TKL-06	Leach Tank #6	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%
220-TKL-07	Leach Tank #7	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%
220-TKL-08	Leach Tank #8	Water	18.02	8.38E+00	346.4	644.67	10.73	1.7	0.00662314	1.1	11%	99%

Leach Circuit Emissions:		***Uncontrolled Emissions:*** [1]				***Controlled Emissions:***			
Source ID	Emission Source	Sulfuric Acid Emissions (lb/hr)	Sulfuric Acid Emissions (lb/day)	Sulfuric Acid Emissions (lb/yr)	Sulfuric Acid Emissions (ton/yr)	Sulfuric Acid Emissions (lb/hr)	Sulfuric Acid Emissions (lb/day)	Sulfuric Acid Emissions (lb/yr)	Sulfuric Acid Emissions (ton/yr)
210-TKL-01	Pre-Leach Tank #1	0.01	0.31	113.54	0.06	0.013	0.31	113.54	0.06
210-TKL-02	Pre-Leach Tank #2	0.01	0.31	113.54	0.06	0.013	0.31	113.54	0.06
220-TKL-01	Leach Tank #1	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
220-TKL-02	Leach Tank #2	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
220-TKL-03	Leach Tank #3	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
220-TKL-04	Leach Tank #4	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
220-TKL-05	Leach Tank #5	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
220-TKL-06	Leach Tank #6	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
220-TKL-07	Leach Tank #7	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
220-TKL-08	Leach Tank #8	0.22	5.24	1910.93	0.96	0.22	5.24	1910.93	0.96
	Totals:	**1.77**	**43**	**15,515**	**7.76**	**1.77**	**42.51**	**15,515**	**7.76**

Note:

1. The scrubber is integral to the pre-leach and leach process in that it is necessary for worker health and safety. The leach system would not operate without the scrubber as otherwise the levels of sulfuric acid would be greater than those mandated by the Mine Safety and Health Administration. The scrubber is electrically interlocked such that if it malfunctions, the entire leach system will shut down. Because the scrubber is integral to the leach process itself, and the worker safety level of 0.009 lb/hr is lower than the controlled emissions, the uncontrolled emissions are calculated as being the same as the controlled emissions. See "Rational for PTE basis for sulfuric acid emissions" document for full details.

Area 200 Pre-Leach and Leach Systems

Radionuclide Emissions

Emission Basis: Based on "Assessment of Potential Off-site Doses Resulting from the Proposed Piñon Ridge Uranium Mill", Craig Little, Sr. Scientist, dated November, 2009.

Specific Activity of Radionuclides

Radium-226	1	Ci/g
Thorium-230	0.019	Ci/g
Lead-210	88	Ci/g
Uranium-238	3.30E-07	Ci/g

Emissions:

Radionuclides			**Uncontrolled**	**Controlled**	
Source ID	Emission Source	Radionuclide Compound	(lb/yr)	(Ci/yr)	(lb/yr)
220-GHS-01	Leach Train Vent Gas Scrubber	Radium-226	5.72E-06	2.59E-05	5.72E-08
		Thorium-230	3.02E-04	2.60E-05	3.02E-06
		Lead-210	6.50E-08	2.59E-05	6.50E-10
		Uranium-238	0.00E+00	0.00E+00	0.00E+00
		Total Radionuclides	3.08E-04		3.08E-06

Area 300 - Tailing Cells and Evaporation Ponds

Evaporation

Operating Parameters:

Evaporation hours per day	24	hours/day	
Evaporation days per year	365	days/year	
Liquid entering tailings	118	tons/hour	* Based on data from 300-PF-002 (Area 300 Process Flow Diagram)
Tailings liquid returning to mill	101.1	tons/hour	* Based on data from 300-PF-002 (Area 300 Process Flow Diagram)
Liquid entering Evap Ponds	62,762	lb/hour	* Based on "Pinon Ridge Project (Rev 2) Tailing Stream Analysis"
Annual organic usage	198.0	tons/year	

Basis: Sulfuric acid concentration values from "Pinon Ridge Project (Rev. 2) Tailing Stream Analysis", Brett Berg, March 12, 2008.

Emission Factor Parameters:

Tailings Cells:[1]		
Sulfuric acid concentration:	0.084	g/L
Evaporation Pond:[2]		
Sulfuric acid concentration:	0.01	g/L
S.G. Aqueous Liquid	1.07	
Density Aqueous Liquid	8.92	lb/gal

Notes:

1. For sulfuric acid emissions, assume all aqueous liquid to the tailing cell that does not get recirculated back to the mill will evaporate.
2. For sulfuric acid emissions, assume all aqueous liquid to the evaporation pond will evaporate.

Emissions:

Sulfuric Acid		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
EVAP1	Tailing Cell Evaporation	2.66	63.72	11.63
EVAP2	Evaporation Pond Evaporation	0.59	14.09	2.57

Example Calc EVAP1 H_2SO_4 (lb/hr): (Total Liquid Entering - Liquid Recycled to Mill) (ton/hr) x (lb/ton) / Liq Density (lb/gal) x Sulfuric Conc (g/L) x (lb/g) x L/gal

Example Calc EVAP2 H_2SO_4 (lb/hr): (Total Liquid Entering) (lb/hr) / Liq Density (lb/gal) x Sulfuric Conc (g/L) x (lb/g) x L/gal

Basis: Liquid organics entering the tailing cells and evaporation ponds is equal to the mass balance of the organic used by the facility on an annual basis minus the VOCs emitted by processes upstream of the tailing cells and evaporation ponds. An analysis based on the "Pinon Ridge Project (Rev. 2) Tailing Stream Analysis" document showed that the amount of VOCs evaporating from the tailing cells was 55% of the amount of VOCs evaporating from the evaporation ponds; thus, that ratio will be kept in order to determine how much of the mass balance of VOCs enter each source. Assume all liquid organic entering the tailing cells or evaporation ponds will evaporate.

Emission Factor Parameters:

Annual organic usage	198.0	tons/year
VOC process emissions from Area 400	15.61	tons/year
VOC process emissions from Area 600	20.77	tons/year
Organic mass balance	161.6	tons/year

Organics to tailings cells	57.35	tons/year
Organics to evaporation ponds	104.27	tons/year

Emissions:

VOCs		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
EVAP1	Tailing Cell Evaporation	13.09	314.23	57.35
EVAP2	Evaporation Pond Evaporation	23.81	571.33	104.27

Area 300 - Tailing Cells and Evaporation Ponds

Wind Erosion

AP-42 Section 11.9 Western Surface Coal Mining, Final Section, August 1982.

Emission Factor: **0.38 tons PM/acre-year** Table 11.9-4

Operating Parameters:

Size of each Tailing Cell	30	acres
Maximum active Tailing Cells	2	cells
Maximum Daily Exposed Area of Cell A[5]	30	acres
Annual Average Exposed Area of Cell A[5]	15	acres
Maximum Daily Exposed Area of Cell B[5]	10	acres
Annual Average Exposed Area of Cell B[5]	1.5	acres
Size of Evaporation Pond Set	40	acres
Number of Pond Sets	2	sets
Maximum exposed % of pond[3]	50%	%
Wind Erosion hours per day	24	hours/day
Wind Erosion days per year	365	days/year

Emission Factor Parameters:

Control Efficiency (water/raffinate spray)[4]	CE	50%

		PM	PM_{10}	$PM_{2.5}$	Reference
Particle Size Multipliers	k	1	0.5	0.075	Table on page 13.2.5-3

Emission Factors:

		PM	PM_{10}	$PM_{2.5}$ [1,2]	Reference
Emission Factor for open areas (ton/acre-year)	EF	0.38	0.19	0.0285	Table 11.9-4

Notes:

1. No emission factor for $PM_{2.5}$ listed in Table 11.9-4.
2. $PM_{2.5}$ Emission Factor calculated using a ratio of k factors from AP-42, Section 13.2.5, Industrial Wind Erosion, and applying the k factors to the PM_{10} emission factor from Section 11.9.
3. As an upper bound estimate, it is assumed that only 50% of the evaporation ponds are covered with aqueous solution, so 50% is exposed to wind erosion.
4. The WRAP Fugitive Dust Control Handbook lists 84% control for dust suppressants to stabilize open areas. Routine watering is assumed to provide 50% control.
5. There will be two 30 acre tailing cells that are active; however, not all 30 acres of each will be exposed at all times. On average, 15 acres of Tailing Cell A will be exposed with 15 acres covered with water. On average, 1.5 acres of Tailing Cell B will be exposed with 1.5 acres covered with water. The maximum daily scenario would be all 30 acres of Tailing Cell A exposed and 10 acres of Tailing Cell B exposed.

Emissions:

PM		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
WIND2	Tailings Cell Wind Erosion	3.47	83.29	6.27	1.74	41.64	3.14
WIND3	Evaporation Pond Wind Erosion	3.47	83.29	15.20	1.74	41.64	7.60

PM_{10}		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
WIND2	Tailings Cell Wind Erosion	1.74	41.64	3.14	0.87	20.82	1.57
WIND3	Evaporation Pond Wind Erosion	1.74	41.64	7.6	0.87	20.82	3.80

$PM_{2.5}$		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
WIND2	Tailings Cell Wind Erosion	0.26	6.25	0.47	0.13	3.12	0.24
WIND3	Evaporation Pond Wind Erosion	0.26	6.25	1.14	0.13	3.12	0.57

Area 300 - Tailing Cells and Evaporation Ponds

Radionuclide Emissions

Emission Basis: **Based on "Assessment of Potential Off-site Doses Resulting from the Proposed Piñon Ridge Uranium Mill", Craig Little, Sr. Scientist, dated November, 2009.**

Specific Activity of Radionuclides

Radium-226	1	Ci/g
Thorium-230	0.019	Ci/g
Lead-210	88	Ci/g
Uranium-238	3.30E-07	Ci/g

Controlled:	(Ci/day)[1]	(Ci/year)[1]
Radium-226	1.08E-04	1.63E-02
Thorium-230	1.08E-04	1.63E-02
Lead-210	1.08E-04	1.63E-02
Uranium-238	4.30E-06	6.51E-04

Emissions:

Radionuclides		**Radionuclide Compound**	**Uncontrolled**		**Controlled**	
Source ID	Emission Source		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
WIND2	Tailings Cell Wind Erosion	Radium-226	4.8E-07	7.19E-05	2.4E-07	3.59E-05
		Thorium-230	2.5E-05	3.78E-03	1.3E-05	1.89E-03
		Lead-210	5.4E-09	8.17E-07	2.7E-09	4.08E-07
		Uranium-238	5.7E-02	8.70E+00	2.9E-02	4.35E+00
		Total Radionuclides	5.75E-02	8.70	2.87E-02	4.35

Note:

1. There will be two 30 acre tailing cells that are active; however, not all 30 acres of each will be exposed at all times. On average, 15 acres of Tailing Cell A will be exposed with 15 acres covered with water. On average, 1.5 acres of Tailing Cell B will be exposed with 1.5 acres covered with water. The maximum daily scenario would be all 30 acres of Tailing Cell A exposed and 10 acres of Tailing Cell B exposed.

Area 400 Uranium Solvent Extraction

Particulate Emissions

AP-42, Section 8.12, Sodium Carbonate, Final Section, July 1993

Basis/Assumptions:

A bag breaker is used to break 100 pound bags of diatomaceous earth (DE) and pour it into the DE mix tank. The process is controlled by a dust filter. Emissions are assumed to be similar to the contolled emission factor presented for sodium carbonate storage/loading and unloading, as provided in AP-42 Table 8.12-2 The process requires 958 pounds of DE per day and bag breaking will occur every day. Because the bags weigh 100 pounds each, it is asssumed that the process will use 10 bags per day (total of 1,000 pounds per day). Although bag breaking does not occur all day, hourly emissions are averaged over the 24-hr period.

Operating Parameters:

Diatomaceous Earth (DE) used	1,000	lb/day
Bags of DE used per day	10	bags/day
Size of DE bags	100	lbs
Operation hours per day	24	hrs/day
Operational days per year	365	days/yr
Efficiency of bag breaker dust collector	99%	

Emission Factor (Controlled):

0.0051	lb PM/ton	Table 8.12-2

Emissions:

PM/PM_{10}/$PM_{2.5}$		**Controlled PM**			**Controlled PM_{10}[1]**			**Controlled $PM_{2.5}$[1]**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
410-BBB-01	DE Bag Breaker	1.06E-04	2.55E-03	4.65E-04	1.06E-04	2.55E-03	4.65E-04	5.31E-05	1.28E-03	2.33E-04

Notes:

1. Diatomaceous earth has a median particle size of 5 um. Therefore, all of the particulate is assumed to be PM_{10} and half of the particulate is assumed to be $PM_{2.5}$.

Area 400 Uranium Solvent Extraction

VOC Emissions

Uranium SX Extraction Circuit

Basis/Assumptions:

Based on the EPA Diffusion Equation:

$$VGR = (3.1536 \times 10^{7}) \times F \times \frac{MKAP}{RT} \times (1-CF)$$

Where:
VGR = Vapor Generation Rate (lb/yr)
M = MW of Species i, (lb/lbmol) (Kerosene = 170 lb/lbmol (approx))
A = Bath Surface Area (ft^2)
P = Partial Pressure of the Volatile Chemical, species i, in the mixture (psia)
R = Universal Gas Constant, psia-$ft^3/^oR$-lbmol
= 10.73 psia-$ft^3/^oR$-lbmol
T = Temperature ^oR
= $70^oF = 529.67^oR$
K = Gas-Phase Mass Transfer Coefficient, ft/s
= $0.00438 \times (U)^{0.78} \times (18/M)^{1/3}$
U = Speed of air across liquid surface, miles/hr
= 1.7 mph (EPA suggested value)
3.1536×10^7 = Conversion factor for lb/s to lb/yr
F = Dimensionless Factor
= 1.1 for agitated tank
CF = Covered process tank parameter

Tank Surface Area Dimensions= 10.5 feet x 20 feet = 210 ft^2
Scrubber Mixer Settler Dimensions= 15 feet x 7.5 feet = 112.5 ft^2
$P_{Kerosene}$ = 0.019 psia at 21°C

Note: Covered process tank parameter takes into account that the lids will have a 90% covered process tank factor; however, that factor has been reduced to 75% to be conservative in the emission calculations because of the time the lids may be open for maintenance.

Uranium SX VOC Emissions:

Source ID	Emission Source	Chemical Species (i)	Mol Wt. (Species i) (lb/lbmol)	Partial Pressure (psia)	Bath Surface Area (ft^2)	Temp. (^oR)	Gas Constant R (psia-$ft^3/^oR$-lbmol)	Air Speed Across Liq. Surface (mph)	Gas Phase Mass Transfer Coeff. (ft/s)	Covered Process Tank Parameter	Agitated Tank Factor	VOC Emissions (lb/hr)	VOC Emissions (lb/day)	VOC Emissions (ton/yr)
420-MSS-01	Uranium Mixer Settler Tank A1	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
420-MSS-02	Uranium Mixer Settler Tank A2	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
420-MSS-03	Uranium Mixer Settler Tank A3	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
420-MSS-04	Uranium Mixer Settler Tank A4	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
430-MSS-01	Uranium Mixer Settler Tank B1	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
430-MSS-02	Uranium Mixer Settler Tank B2	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
430-MSS-03	Uranium Mixer Settler Tank B3	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
430-MSS-04	Uranium Mixer Settler Tank B4	Kerosene	170	1.90E-02	210.0	529.67	10.73	1.7	0.003136827	75%	1.1	0.37	8.90	1.62
440-MSS-01	Uranium Scrubber Mixer Settler	Kerosene	170	1.90E-02	112.5	529.67	10.73	1.7	0.003136827	75%	1.1	0.20	4.77	0.87
440-MSS-02	Uranium Stripper Mixer Settler #1	Kerosene	170	1.90E-02	112.5	529.67	10.73	1.7	0.003136827	75%	1.1	0.20	4.77	0.87
440-MSS-03	Uranium Stripper Mixer Settler #2	Kerosene	170	1.90E-02	112.5	529.67	10.73	1.7	0.003136827	75%	1.1	0.20	4.77	0.87
											TOTAL:	**3.56**	**85.46**	**15.60**

Area 400 Uranium Solvent Extraction

Uranium SX Organic Process Tanks

Source ID	Emission Source	Chemical Species	Capacity (gal)	Length (ft.)	Dia (ft.)	Annual Throughput (gal.)	VOC Emissions (lb/hr)	VOC Emissions (lb/day)	VOC Emissions (ton/yr)
440-TKH-01	Uranium SX Loaded Organic Tank	94% Kerosene, 1% Trimethylamine, 3% Isodecanol	64,298	19.0	24.0	202,222	0.002	0.047	0.009
440-TKH-02	Uramium SX Barren Organic Tank	94% Kerosene, 1% Trimethylamine, 3% Isodecanol	64,298	19.0	24.0	202,222	0.002	0.05	0.009
						TOTAL:	**0.004**	**0.09**	**0.02**

Table Notes:
1. Annual VOC Emissions calculated using the EPA TANKS Program, version 4.09d.
2. Based on 8760 hours per year, Hourly Emissions (lbs/ hour) = Annual Emissions (lbs/yr) / 8760 (hours/year)
3. Annual Emissions (tons/yr) = Annual Emissions (lbs/yr) / 2000 (lbs/ton)
4. Since trimethylamine and isodecanol are not listed compounds in the TANKS 4.09d model, the contents are assumed to be 100% kerosene.
5. Although annual throughput was revised to 74,000 gallons/year, the TANKS program was not used to recalculate emission values with the new throughput. The emission values with the higher throughput are more conservative and are only a small portion of the overall total; thus, the higher emission values were kept.

Area 500 Uranium Precipitation and Packaging

Sulfuric Acid Emissions

Basis/Assumptions:

Sulfuric acid is added to the precipitation tanks for pH control. However, since the pH is held between 2.5 and 4.5 for optimal precipitation of the solution, the average amount of free acid in solution is estimated to be about 0.0002 N H_2SO_4 (0.001% H_2SO_4). Therefore, sulfuric acid emissions are assumed to be negligible. Note: Since pH = -log (H^+) and if the average pH is 4, then the Molarity (moles/L) = $10^{-4.}$ Then there are 2 equivalent H+ ions when H_2SO_4 dissociates, so the Normality = 2 x 10^{-4}.

Source Parameters:

Source ID	Emission Source	Stack Flow Rate (scfm)	Stack Diameter (ft)	Stack Height (ft)	Gas Temp (deg F)	Control Efficiency %
530-GHS-01	Uranium Vent Gas Scrubber	2,000	1	35	225	99%

Particulate Emissions

Basis/Assumptions:

The yellowcake dryer is a vacuum dryer, where water vapor exhaust will be sent through a condenser and the water will be recycled back into the system. This system is considered a 'no emission' dryer.

Area 600 Vanadium Oxidation and Solvent Extraction

Inorganic Emissions

Basis/Assumptions:

The vanadium oxidation and solvent extraction area will use various inorganic reagents in the oxidation tanks and the mixer settler tanks, including sodium carbonate, sodium hydroxide, sulfuric acid, and ammonia. These reagents are generally added for pH control based on the chemical reactions as the vanadium product moves through the circuit. It is assumed that these reagents are consumed by chemical reactions to maintain the pH and negligible inorganic emissions will occur in this area.

VOC Emissions

Vanadium SX Extraction Circuit

Basis/Assumptions:

Based on the EPA Diffusion Equation:

$$VGR = (3.1536 \times 10^{7}) \times F \times \frac{MKAP}{RT} \times (1-CF)$$

Where:
VGR = Vapor Generation Rate (lb/yr)
M = MW of Species i, (lb/lbmol) (Kerosene = 170 lb/lbmol (approx))
A = Bath Surface Area (ft^2)
P = Partial Pressure of the Volatile Chemical, species i, in the mixture (psia)
R = Universal Gas Constant, psia-$ft^3/^oR$-lbmol
= 10.73 psia-$ft^3/^oR$-lbmol
T = Temperature ^oR
= $70^oF = 529.67^oR$
K = Gas-Phase Mass Transfer Coefficient, ft/s
= $0.00438 \times (U)^{0.78} \times (18/M)^{1/3}$
U = Speed of air across liquid surface, miles/hr
= 1.7 mph (EPA suggested value)
3.1536×10^7 = Conversion factor for lb/s to lb/yr
F = Dimensionless Factor
= 1.1 for agitated tank
CF = Covered process tank parameter

Tank Surface Area Dimensions=	10.5 feet x 21 feet =	220.5 ft^2
Scrubber Mixer Settler Dimensions=	15 feet x 8 feet =	120 ft^2
$P_{Kerosene}$ =	0.019 psia	at 21^oC

Note: Covered process tank parameter takes into account that the lids will have a 90% covered process tank factor; however, that factor has been reduced to 75% to be conservative in the emission calculations because of the time the lids may be open for maintenance.

Area 600 Vanadium Oxidation and Solvent Extraction

Vanadium SX VOC Emissions:

Source ID	Emission Source	Chemical Species (i)	Mol Wt. (Species i) (lb/lbmol)	Partial Pressure (psia)	Bath Surface Area (ft^2)	Temp. (^oR)	Gas Constant R (psia-$ft^3/^oR$-lbmol)	Air Speed Across Liq. Surface (mph)	Gas Phase Mass Transfer Coeff. (ft/s)	Covered Process Tank Parameter	Agitated Tank Factor	VOC Emissions (lb/hr)	VOC Emissions (lb/day)	VOC Emissions (ton/yr)
620-MSS-01	Vanadium Mixer Settler Tank A1	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
620-MSS-02	Vanadium Mixer Settler Tank A2	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
620-MSS-03	Vanadium Mixer Settler Tank A3	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
620-MSS-04	Vanadium Mixer Settler Tank A4	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
620-MSS-05	Vanadium Mixer Settler Tank A5	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
630-MSS-01	Vanadium Mixer Settler Tank B1	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
630-MSS-02	Vanadium Mixer Settler Tank B2	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
630-MSS-03	Vanadium Mixer Settler Tank B3	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
630-MSS-04	Vanadium Mixer Settler Tank B4	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
630-MSS-05	Vanadium Mixer Settler Tank B5	Kerosene	170	1.90E-02	220.5	529.67	10.73	1.7	0.0031368	75%	1.1	0.39	9.34	1.70
640-MSS-01	Vanadium Scrubber Mixer Settler	Kerosene	170	1.90E-02	120.0	529.67	10.73	1.7	0.0031368	75%	1.1	0.21	5.08	0.93
640-MSS-02	Vanadium Stripper Mixer Settler #1	Kerosene	170	1.90E-02	120.0	529.67	10.73	1.7	0.0031368	75%	1.1	0.21	5.08	0.93
640-MSS-03	Vanadium Stripper Mixer Settler #2	Kerosene	170	1.90E-02	120.0	529.67	10.73	1.7	0.0031368	75%	1.1	0.21	5.08	0.93
640-MSS-04	Vanadium Stripper Mixer Settler #3	Kerosene	170	1.90E-02	120.0	529.67	10.73	1.7	0.0031368	75%	1.1	0.21	5.08	0.93
											TOTAL:	**4.74**	**113.73**	**20.76**

Vanadium SX Organic Process Tanks

Source ID	Emission Source	Chemical Species	Capacity (gal)	Length (ft.)	Dia (ft.)	Annual Throughput (gal.)	VOC Emissions (lb/hr)	VOC Emissions (lb/day)	VOC Emissions (ton/yr)
640-TKH-01	Vanadium SX Loaded Organic Tank	94% Kerosene, 1% Trimethylamine, 3% Isodecanol	64,298	19.0	24.0	200,000	0.002	0.047	0.009
640-TKH-02	Vanadium SX Barren Organic Tank	94% Kerosene, 1% Trimethylamine, 3% Isodecanol	64,298	19.0	24.0	200,000	0.002	0.047	0.009
						TOTAL:	**0.004**	**0.09**	**0.02**

Vanadium SX Organic Process Tanks Table Notes:
1. Annual VOC Emissions calculated using the EPA TANKS Program, version 4.09d.
2. Based on 8760 hours per year, Hourly Emissions (lbs/ hour) = Annual Emissions (lbs/yr) / 8760 (hours/year)
3. Annual Emissions (tons/yr) = Annual Emissions (lbs/yr) / 2000 (lbs/ton)
4. Since trimethylamine and isodecanol are not listed compounds in the TANKS 4.09d model, the contents are assumed to be 100% kerosene.
5. Although annual throughput was revised to 74,000 gallons/year, the TANKS program was not used to recalculate emission values with the new throughput. The emission values with the higher throughput are more conservative and are only a small portion of the overall total; thus, the higher emission values were kept.

Area 700 Vanadium Precipitation and Packaging

Operating Parameters:

Operating hours per day	24	hour/day
Operating days per year	365	days/year

Ammonia Emissions (Rotary Kiln)

Basis/Assumptions:

730-GHS-01: The vanadium precipitation process will use ammonia and ammonium sulfate for pH control to maintain optimal precipitation of the vanadium product. Ammonia will then be driven off in the rotary kiln when heated to 698 ^{o}F. By mass balance, the amount of ammonia generated by the belt filter vacuum and the rotary kiln is 117 lb/hr, as inlet to the scrubber.

Source Parameters:

Source ID	Emission Source	Stack Flow Rate	Stack Diameter	Stack Height	Gas Exit Temperatur	Control Efficiency
		(scfm)	(ft)	(ft)	(deg F)	%
730-GHS-01	Packed Bed Wet Vent Scrubber	1,000	0.67	106	225	99%

*vent gases from precip tanks 1-5, belt filter vacuum, rotary kiln, dryer

Ammonia Emission Factor:

$EF_{Ammonia}$ = 117 lb/hr

Emissions (rotary kiln portion):

Ammonia		**Uncontrolled** [1,2]			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
730-GHS-01	Packed Bed Wet Vent Scrubber	1.17	28.08	5.12	1.17	28.08	5.12

Area 700 Vanadium Precipitation and Packaging

Ammonia Emissions (Precipitation)

Source Parameters:

Source ID	Emission Source	Stack Flow Rate (scfm)	Stack Diameter (ft)	Stack Height (ft)	Stack Temp. (deg F)	Control Efficiency %
730-GHS-01	Packed Bed Wet Vent Scrubber	1,000	0.67	106	225	99%

Basis/Assumptions:

Ammonia emissions are calculated using the EPA Diffusion Equation. Since the concentration of ammonia in solution is very small (<0.01%), the vapor pressure of water will be used in the EPA diffusion equation. The concentration of ammonia in solution is estimated to be much less than 1%, however due to buffering and for conservative emission calculations, the basis will be that the aqueous solution in the vanadium precipitation tanks contains 1% ammonia.

Based on the EPA Diffusion Equation:

$$VGR = (3.1536 \times 10^{7}) \times F \times \frac{MKAP}{RT} \times (1-CE)$$

Where:

VGR = Vapor Generation Rate (lb/yr)

M = MW of Species i, (lb/lbmol) (Ammonia = 17.03 lb/lbmol)

A = Tank Surface Area (ft^2)

P = Partial Pressure of the Volatile Chemical, species i, in the mixture (psia)

R = Universal Gas Constant, psia-$ft^3/^oR$-lbmol

= 10.73 psia-$ft^3/^oR$-lbmol

T = Temperature ^oR

= 149^oF = 608.67^oR

K = Gas-Phase Mass Transfer Coefficient, ft/s

= $0.00438 \times (U)^{0.78} \times (18/M)^{1/3}$

U = Speed of air across liquid surface, miles/hr

= 1.7 mph (EPA suggested value)

3.1536×10^{7} = Conversion factor for lb/s to lb/yr

F = Dimensionless Factor

= 1.1 for agitated tank

CE = Scrubber Control Efficiency

Precipitation Tank Surface Area = 50.27 ft^2 P_{Water} = 3.73 psia at 65^oC / 149 ^oF

Vanadium Precipitation Circuit Calculation Parameters:

Source ID	Emission Source	Chemical Species (i)	Mol Wt. (Species i) (lb/lbmol)	Partial Pressure (psia)	Bath Surface Area (ft^2)	Temp. (^oR)	Gas Constant R (psia-$ft^3/^oR$-lbmol)	Air Speed Across Liq. Surface (mph)	Gas Phase Mass Transfer Coeff. (ft/s)	Agitated Tank Factor	Percent Acid in Solution	Scrubber Control Efficiency (99%)
710-TKP-01	Vanadium Precipitation Tank #1	Ammonia	17.03	3.73E+00	50.3	608.67	10.73	1.7	0.006749064	1.1	1%	99%
710-TKP-02	Vanadium Precipitation Tank #2	Ammonia	17.03	3.73E+00	50.3	608.67	10.73	1.7	0.006749064	1.1	1%	99%
710-TKP-03	Vanadium Precipitation Tank #3	Ammonia	17.03	3.73E+00	50.3	608.67	10.73	1.7	0.006749064	1.1	1%	99%
710-TKP-04	Vanadium Precipitation Tank #4	Ammonia	17.03	3.73E+00	50.3	608.67	10.73	1.7	0.006749064	1.1	1%	99%
710-TKP-05	Vanadium Precipitation Tank #5	Ammonia	17.03	3.73E+00	50.3	608.67	10.73	1.7	0.006749064	1.1	1%	99%

Area 700 Vanadium Precipitation and Packaging

Vanadium Precipitation Circuit Emissions:		***Uncontrolled Emissions:*** [1,3]				***Controlled Emissions:***			
Source ID	Emission Source	Ammonia Emissions (lb/hr)	Ammonia Emissions (lb/day)	Ammonia Emissions (lb/yr)	Ammonia Emissions (ton/yr)	Ammonia Emissions (lb/hr)	Ammonia Emissions (lb/day)	Ammonia Emissions (lb/yr)	Ammonia Emissions (ton/yr)
710-TKP-01	Vanadium Precipitation Tank #1	0.013	0.31	112.70	0.06	0.001	0.03	11.45	0.01
710-TKP-02	Vanadium Precipitation Tank #2	0.013	0.31	112.70	0.06	0.001	0.03	11.45	0.01
710-TKP-03	Vanadium Precipitation Tank #3	0.013	0.31	112.70	0.06	0.001	0.03	11.45	0.01
710-TKP-04	Vanadium Precipitation Tank #4	0.013	0.31	112.70	0.06	0.001	0.03	11.45	0.01
710-TKP-05	Vanadium Precipitation Tank #5	0.013	0.31	112.70	0.06	0.001	0.03	11.45	0.01
	Totals:	**0.06**	**1.54**	**563.50**	**0.28**	**0.01**	**0.16**	**57.23**	**0.03**

Total Emissions (rotary kiln and precipitation tanks) :

Ammonia		**Uncontrolled** [1,2,3]			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
730-GHS-01	Packed Bed Wet Vent Scrubber	1.23	591.58	5.41	1.18	28.24	5.15

Note:

1. The scrubber (730-GHS-01) is integral to the vanadium precipitation process in that it is necessary for worker health and safety. The vanadium precipitation system would not operate without the scrubber as otherwise the levels of ammonia would be greater than those mandated by the Mine Safety and Health Administration.

2. Because the scrubber is integral to the vanadium precipitation process itself, and the worker safety level of 0.064 lb/hr is lower than the controlled emissions, the uncontrolled emissions are calculated as being the same as the controlled emissions. See "Rational for PTE basis for ammonia emissions" document for full details.

3. Because the scrubber is integral to the vanadium precipitation process itself, and the worker safety level of 0.064 lb/hr is greather than the controlled emissions, the uncontrolled emissions are calculated as being the same as the worker safety level value because the emission credit can not exceed the worker safety value. See "Rational for PTE basis for ammonia emissions" document for full details.

Area 700 Vanadium Precipitation and Packaging

Particulate Emissions (Dryer)

Basis/Assumptions:

730-DCS-01: Vanadium particulate from the dryer will be controlled with a baghouse (730-DCS-01), however, the emissions from the baghouse will be further controlled by the packed bed scrubber (730-GHS-01). The baghouse exhaust will be rated at 0.02 gr/scf. The belt filter and rotary kiln exhaust is vented to the packed bed scrubber only (730-GHS-01) and emissions are estimated to be 10 ppm, as inlet to the scrubber.

Dryer Baghouse Exhaust: 0.02 gr/scf
Where lb/hr = gr/scf x lb/gr x scf/hr
E_{PM} = 0.051 lb/hr

Source ID	Emission Source	Stack Flow Rate	Stack Diameter	Stack Height	Temperature	Control Efficiency
		(cfm)	(ft)	(ft)	(deg F)	%
730-DCS-01	Vanadium Dryer Dust Collector	300	TBD	TBD	190	99%

Emissions (Dryer Exhaust)

Particulate (PM / PM_{10} / $PM_{2.5}$)		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
730-DCS-01	Vanadium Dryer Dust Collector	5.14	123.43	22.53	5.14E-02	1.23E+00	2.25E-01

Particulate Emissions Calculation (belt filter and rotary kiln)

$E_{PM} = (C_{PM}) \times Q \times d_{Air} \times (1\ tonne/1000\ kg) \times (1\ lb / 453.59\ g) \times (60\ min/hr)$

Where:
E_{PM} = Particulate Emissions (kg/yr)
C_{PM} = Conc of PM in gas stream (g/tonne)
Q = Flow Rate (m^3/min) - @STP
d_{Air} = Density of Air (1.29 kg/m^3 at STP)

Source ID	Emission Source	Stack Flow Rate	Stack Diameter	Stack Height	Temperature	Control Efficiency
		(cfm)	(ft)	(ft)	(deg F)	%
730-GHS-01	Packed Bed Wet Vent Scrubber	1,000	0.67	106	225	99%

Basis:
Particulate inlet to scrubber (belt filter & kiln): 10 ppm E_{PM} = 0.048 lb/hr
Where: 10 ppm (mass) = 10 g / tonne

Emissions (Rotary Kiln + Belt Filter):

Particulate (PM / PM_{10} / $PM_{2.5}$)		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
730-KLR-01	Vanadium Rotary Kiln	4.83E-02	1.16E+00	2.12E-01

Total Emissions (Dryer Baghouse Exhaust + Rotary Kiln + Belt Filter):

Particulate (PM / PM_{10} / $PM_{2.5}$)		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
730-GHS-01	Packed Bed Wet Vent Scrubber	9.97E-02	2.39E+00	4.37E-01	9.97E-04	2.39E-02	4.37E-03

Area 700 Vanadium Precipitation and Packaging

Radionuclide Emissions

Emission Basis: **Based on "Assessment of Potential Off-site Doses Resulting from the Proposed Piñon Ridge Uranium Mill", Craig Little, Sr. Scientist, dated November, 2009.**

Specific Activity of Radionuclides

Radium-226	1	Ci/g
Thorium-230	0.019	Ci/g
Lead-210	88	Ci/g
Uranium-238	3.30E-07	Ci/g

Emissions:

Radionuclides			**Uncontrolled[1]**	**Pre-Controlled[1]**		**Controlled[1]**
Source ID	Emission Source	Radionuclide Compound	(lb/yr)	(Ci/yr)	(lb/yr)	(lb/yr)
730-DCS-01/ 730-GHS-01	Vanadium Dryer Dust Collector/ Packed Bed Wet Vent Scrubber	Radium-226	0.0E+00	0.0E+00	0.0E+00	0.0E+00
		Thorium-230	0.0E+00	0.0E+00	0.0E+00	0.0E+00
		Lead-210	0.0E+00	0.0E+00	0.0E+00	0.0E+00
		Uranium-238	7.5E+02	1.1E-03	7.5E+00	7.5E-02
		Total Radionuclides	748.2		7.48	7.48E-02

Note:

1. Radionuclides are emitted from the vanadium dryer as uncontrolled emissions to the inlet of the dust collector; emissions from the outlet of the dryer dust collector are equivalent to the pre-controlled emissions. The pre-controlled emissions then pass through the scrubber where the emissions from the outlet of the scrubber are equivalent to the controlled emissions.

Area 700 Vanadium Precipitation and Packaging

Particulate Emissions (Furnace, Casting Wheel, & Packaging)

Basis/Assumptions:
730-GHS-02: The fusion furnace, casting wheel, and packaging system is estimated to yield 200 ppm of vanadium particulate, as inlet to the scrubber.

Source Parameters:

Source ID	Emission Source	Stack Flow Rate (scfm)	Stack Diameter (ft)	Stack Height (ft)	Gas Exit Temperature (deg F)	Control Efficiency %
730-GHS-02	Wet Venturi Scrubber	5,000	1.33	106	250	99%

* vent gases from fusion furnace, hood vent of casting wheel, hood vent of packaging system

Particulate Emissions Calculation:
$E_{PM} = (C_{PM}) \times Q \times d_{Air} \times (1 \text{ tonne}/1000 \text{ kg}) \times (1 \text{ lb} / 453.59 \text{ g}) \times (60 \text{ min/hr})$

Where:
E_{PM} = Particulate Emissions (kg/yr)
C_{PM} = Conc of PM in gas stream (g/tonne)
Q = Flow Rate (m^3/min) - @STP
d_{Air} = Density of Air (1.29 kg/m^3 at STP)

Basis:
Particulate inlet to scrubber: 200 ppm
Where: 200 ppm (mass) = 200 g / tonne

Particulate (PM / PM_{10} / $PM_{2.5}$) Emissions:

		Uncontrolled			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
730-GHS-02	Wet Venturi Scrubber	4.83	115.97	21.16	0.05	1.16	0.21

Area 800 Reagents

Operating Parameters:

Operational hours per day	24	hours/day
Operational days per year	365	days/year
Number of H_2SO_4 Tanks	3	tanks
Capacity of each H_2SO_4 tank	128,963	gallons
Number of NH_3 Tanks	2	tanks
Capacity of each NH_3 tank	12,000	gallons
Number of Kerosene tanks	1	tanks
Capacity of each Kerosene tank	38,069	gallons
Number of Organic Tanks	1	tanks
Capacity of each Organic tank	5,875	gallons

Tank Calculations:

Supplied Sulfuric Acid:	15421	lb/hr
Density of Sulfuric Acid:	1.84	g/cm^3
Throughput of Sulfuric Acid:	8,797,323	gal/year
Throughput of each tank	2,932,441	gal/year/tank
Turnover per tank	23	tanks

* Referenced from 800-PF-001

Although annual usage for kerosene/organic was revised to 0.21 gallon/ton ore from 0.55 gallon/ton ore, the TANKS program was not used to recalculate emission values with the new throughput. The emission values with the higher throughput are more conservative and are only a small portion of the overall total; thus, the higher emission values were kept. The throughput values below are not the revised annual usage rates of 250 ton per year as was used in the volatile organic compound mass balance calculations. Further, although the emissions were calculated, the kerosene and organic make-up storage tanks are actually APEN exempt based on Regulation 3, Part A, Section II.D.1.fff.

Supplied Kerosene:	0.55	gal/ton ore
Throughput of Kerosene:	202,210	gal/year
Throughput of Organic Solution	202,210	gal/year

Emissions:

		Sulfuric Acid			**VOC**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
810-TKH-01	Sulfuric Acid Tank #1	0.0004	0.010	0.002	--	--	--
810-TKH-02	Sulfuric Acid Tank #2	0.0004	0.010	0.002	--	--	--
810-TKH-03	Sulfuric Acid Tank #3	0.0004	0.010	0.002	--	--	--
860-TKH-01	Kerosene Tank	--	--	--	0.001	0.033	0.006
860-TKH-02	Organic Make-Up Tank	--	--	--	0.001	0.016	0.003

Table Notes:
1. Emissions calculated using the EPA TANKS Program, version 4.09d.
2. Based on 8760 hours per year, Hourly Emissions (lbs/ hour) = Annual Emissions (lbs/yr) / 8760 (hours/year)
3. Annual Emissions (tons/yr) = Annual Emissions (lbs/yr) / 2000 (lbs/ton)
4. Since trimethylamine and isodecanol are not listed compounds in the TANKS 4.09d model, the contents of the organic make-up tank are assumed to be 100% kerosene.

Basis/Assumptions:
Since the ammonia storage tank is a stationary pressure vessel (horizontal cylinder), there are no emissions from this tank.

Ammonia Emissions

Supplied Ammonia:	488.21	lb/hr
Density of Liquid Ammonia:	38	lb/ft^3
Throughput of Ammonia:	841,838	gal/year
Throughput of each tank	420,919	gal/year/tank
Turnover per tank	35	turnovers/yr

* Referenced from 800-PF-001

Area 800 Reagents

Fugitive Emissions from Unloading Dry Reagents

AP-42 Section 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing, Final Section, August 2004.

Emission Factors:

0.003	lb PM/ton	Table 11.19.2-2, Conveyor Transfer Point
1.10E-03	lb PM_{10}/ton	Table 11.19.2-2, Conveyor Transfer Point
3.11E-04	lb $PM_{2.5}$/ton	Estimated using the ratio for PM10 controlled vs uncontrolled
0.00014	lb PM/ton	Table 11.19.2-2, Conveyor Transfer Point (controlled)
4.60E-05	lb PM_{10}/ton	Table 11.19.2-2, Conveyor Transfer Point (controlled)
1.30E-05	lb $PM_{2.5}$/ton	Table 11.19.2-2, Conveyor Transfer Point (controlled)

*controlled emission factors are used because water sprays are used at the transfer points.

Operating Parameters:

Operational hours per day	10	hours/day	
Operational days per year	365	days/year	
Supplied Ammonium Sulfate	1798	lb/hr	* Referenced from 800-PF-001
	0.90	tons/hr	
Number of transfer points on each Ammonium Sulfate conveyor	2	transfers	*Emissions are doubled since transfer points occur on each end of conveyors
Supplied Flocculant	43.7	lb/hr	* Referenced from 800-PF-003
	0.02185	tons/hr	

Emissions:

Uncontrolled		PM			PM_{10}			$PM_{2.5}$		
820-CVS-01	Ammonium Sulfate transfer conveyor	5.39E-03	5.39E-02	9.84E-03	1.98E-03	1.98E-02	3.61E-03	5.59E-04	5.59E-03	1.02E-03
820-CVS-02	Ammonium Sulfate feed conveyor	5.39E-03	5.39E-02	9.84E-03	1.98E-03	1.98E-02	3.61E-03	5.59E-04	5.59E-03	1.02E-03
850-HPF-01	Flocculant Hopper	6.56E-05	6.56E-04	1.20E-04	2.40E-05	2.40E-04	4.39E-05	6.79E-06	6.79E-05	1.24E-05
850-CVS-01	Flocculant Feed Conveyor	6.56E-05	6.56E-04	1.20E-04	2.40E-05	2.40E-04	4.39E-05	6.79E-06	6.79E-05	1.24E-05

Controlled		PM			PM_{10}			$PM_{2.5}$		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
820-CVS-01	Ammonium Sulfate transfer conveyor	2.52E-04	2.52E-03	4.59E-04	8.27E-05	8.27E-04	1.51E-04	2.34E-05	2.34E-04	4.27E-05
820-CVS-02	Ammonium Sulfate feed conveyor	2.52E-04	2.52E-03	4.59E-04	8.27E-05	8.27E-04	1.51E-04	2.34E-05	2.34E-04	4.27E-05
850-HPF-01	Flocculant Hopper	3.06E-06	3.06E-05	5.58E-06	1.01E-06	1.01E-05	1.83E-06	2.84E-07	2.84E-06	5.18E-07
850-CVS-01	Flocculant Feed Conveyor	3.06E-06	3.06E-05	5.58E-06	1.01E-06	1.01E-05	1.83E-06	2.84E-07	2.84E-06	5.18E-07

Area 900 Boilers

(A) AP-42 Section 1.5, Liquified Petroleum Gas Combustion, Final Section July 2008.
(B) AP-42 Section 1.5 LPG Combustion states that PM, CO, and TOC emissions are the same, on a heat input basis, as for natural gas. Thus, VOC factor is scaled from table 1.4-2 factor and heating values of propane and natural gas.

Operating Parameters:

Total fuel supplied	1,135	lb/hr	12.25	MMBtu/hr	* 900-PF-002
Operational hours per day	24	hours/day			
Operational days per year	365	days/year			
Number of total boilers	3	boilers			
Number of operational boilers	2	boilers			

density of propane	4.24	lb/gal	* AP-42, Appendix A, September 1985
HHV of propane	91.5	MMBtu/10^3 gal	* AP-42, Section 1.5
Heat content of methane	1020	MMBtu/10^6 scf	

Stack Parameters:

		StackParameters[5]			
		Flow Rate	Diameter	Height	Temperature
Source ID	Emission Source	(scfm)	(ft)	(ft)	(deg F)
920-STK-01	Combined Boiler Stack	2,418	4	100	455

Emission Factors:

PM Total[6]	0.7	lb/10^3 gal	0.008	lb/MMBtu	Table 1.5-1 for Industrial Boilers
SO_2[1]	0.10S	lb/10^3 gal	0.016	lb/MMBtu	Table 1.5-1 for Industrial Boilers
NO_x	13	lb/10^3 gal	0.142	lb/MMBtu	Table 1.5-1 for Industrial Boilers
Controlled NO_x (as NO_2)[2]	30	ppm	0.036	lb/MMBtu	Low No_x Burner
CO	7.5	lb/10^3 gal	0.082	lb/MMBtu	Table 1.5-1 for Industrial Boilers
TOC	1	lb/10^3 gal	0.011	lb/MMBtu	Table 1.5-1 for Industrial Boilers
VOC	5.5	lb/10^6 scf	0.005	lb/MMBtu	Table 1.4-2 and scaled by heat value

Emissions:

$PM/PM_{10}/PM_{2.5}$		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
920-BLR-01	Steam Boiler #1	0.09	2.25	0.41
920-BLR-02	Steam Boiler #2	0.09	2.25	0.41
920-BLR-03	Steam Boiler #3	0.09	2.25	0.41

NO_x		**Uncontrolled**			**Controlled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)	(lb/hr)	(lb/day)	(ton/yr)
920-BLR-01	Steam Boiler #1	1.74	41.76	7.62	0.45	10.71	1.95
920-BLR-02	Steam Boiler #2	1.74	41.76	7.62	0.45	10.71	1.95
920-BLR-03	Steam Boiler #3	1.74	41.76	7.62	0.45	10.71	1.95

CO		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
920-BLR-01	Steam Boiler #1	1.00	24.09	4.40
920-BLR-02	Steam Boiler #2	1.00	24.09	4.40
920-BLR-03	Steam Boiler #3	1.00	24.09	4.40

SO_2		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
920-BLR-01	Steam Boiler #1	0.20	4.82	0.88
920-BLR-02	Steam Boiler #2	0.20	4.82	0.88
920-BLR-03	Steam Boiler #3	0.20	4.82	0.88

VOC		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
920-BLR-01	Steam Boiler #1	0.07	1.59	0.29
920-BLR-02	Steam Boiler #2	0.07	1.59	0.29
920-BLR-03	Steam Boiler #3	0.07	1.59	0.29

Area 900 Boilers

HAPs Emissions from Propane Combustion

AP-42 Section 1.4 Natural Gas Combustion, Final Section, July 1998. Tables 1.4-3 and 1.4-4
AP-42 Section 1.5 LPG Combustion states that PM, CO, and TOC emissions are the same, on a heat input basis, as for natural gas. Thus, HAPs from the organic compound table in Section 1.4 are scaled by heating values of propane and natural gas.

Heat content of Propane	91.5	MMBtu/10^3 gal
Heat content of Methane	1020	MMBtu/10^6 scf

	Emission Factor for NG	Emission Factor for Propane	Emissions per Boiler		
HAP [3,4]	(lb/10^6 scf)	(lb/MMBtu)	(lb/hr)	(lb/day)	(ton/yr)
2-Methylnaphthalene	2.4E-05	2.4E-08	2.88E-07	6.92E-06	1.26E-06
Benzene	2.1E-03	2.1E-06	2.52E-05	6.05E-04	1.10E-04
Dichlorobenzene	1.2E-03	1.2E-06	1.44E-05	3.46E-04	6.31E-05
Fluoranthene	3.0E-06	2.9E-09	3.60E-08	8.65E-07	1.58E-07
Fluorene	2.8E-06	2.7E-09	3.36E-08	8.07E-07	1.47E-07
Formaldehyde	7.5E-02	7.4E-05	9.01E-04	2.16E-02	3.94E-03
Hexane	1.8E+00	1.8E-03	2.16E-02	5.19E-01	9.47E-02
Naphthalene	6.1E-04	6.0E-07	7.32E-06	1.76E-04	3.21E-05
Phenanathrene	1.7E-05	1.7E-08	2.04E-07	4.90E-06	8.94E-07
Toluene	3.4E-03	3.3E-06	4.08E-05	9.80E-04	1.79E-04
Arsenic	2.0E-04	2.0E-07	2.40E-06	5.76E-05	1.05E-05
Cadmium	1.1E-03	1.1E-06	1.32E-05	3.17E-04	5.79E-05
Cobalt	8.4E-05	8.2E-08	1.01E-06	2.42E-05	4.42E-06
Manganese	3.8E-04	3.7E-07	4.56E-06	1.10E-04	2.00E-05
Nickel	2.1E-03	2.1E-06	2.52E-05	6.05E-04	1.10E-04
		Total			9.92E-02

Notes:

1. Sulfur concentration based on Gas Processors Association Engineering Data Book (Ninth Edition, 1972), Figure 15-50 (GPA Liquefied Petroleum Gas Specifications, rev. 1979), Commercial Propane = 15 gr/100 scf
2. Controlled emission factors for NOx in parts per million (ppm) converted to lb/MMBtu as follows:

$$EF\ (lb/MMBtu) = (C) \times (F_d) \times (20.9/(20.9-\%O2))$$ EPA Method 19, Eq. 19-1

Where:

C=	concentration in lb/dscf		
F_d =	8710	dscf/MMBtu	EPA Method 19, Table 19-2

convert ppm to lb/dscf:

C=	(ppm) x MW / 385.3 / 106		MW = Molecular Weight
MW=	46		(for NOx as NO2)
NOx =	30	ppm	
C=	3.58E-06	lb/dscf	
%O2 =	3	%	
EF =	0.036	lb/MMBtu	

3. Only AP-42 factors for pollutants noted as HAPs as defined by Section 112 of the Clean Air Act listed.
4. AP-42 factors marked as "less than (<)" are omitted as emissions are negligible.
5. Emissions from the three boilers exit through a single stack.

6. Since particulate emissions from natural gas & propane combustion are assumed to be less than 1.0 micrometer in diameter, PM, PM_{10}, and $PM_{2.5}$ emissions are assumed to be the same, as stated in note c to Table 1.4-2 of AP-42, Section 1.4, Final Section, dated July 1998.

Area 900 - Fire Water Pump Engine

AP-42 Section 3.3 Gasoline and Diesel Industrial Engines, Final Section, October 1996.

Operating Parameters:

Annual Operations[1]	100	hrs/yr
Fire Pump Engine Rated Power	207	hp

Stack Parameters:

		Stack Parameters			
		Flow Rate	Diameter	Height	Temperature
Source ID	Emission Source	(cfm)	(ft)	(in)	(deg F)
910-PPL-01	Fire Water Diesel Pump	1,189	35	5	1,030

Emission Factors:

NO_x		4.93	g/hp-hr	0.0108688	lb/hp-hr	Quadna Mnfr Spec Data[3]
SO_2		0.002050	lb/hp-hr	0.002050	lb/hp-hr	AP-42 Table 3.3-1[4]
CO		0.41	g/hp-hr	0.0009039	lb/hp-hr	Quadna Mnfr Spec Data[3]
VOC (as NMHC)		0.17	g/hp-hr	0.0003748	lb/hp-hr	Quadna Mnfr Spec Data[3]
$PM/PM_{10}/PM_{2.5}$		0.16	g/hp-hr	0.0003527	lb/hp-hr	Quadna Mnfr Spec Data[3]

7000	Btu/hp-hr	*AP-42 3.3-1 conversion for lb/Btu to lb/hp-hr

Emissions:

$PM/PM_{10}/PM_{2.5}$		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
910-PPL-01	Fire Water Diesel Pump	0.07	0.15	0.004

NO_x		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
910-PPL-01	Fire Water Diesel Pump	2.25	4.50	0.11

CO		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
910-PPL-01	Fire Water Diesel Pump	0.19	0.37	0.01

SO_2		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
910-PPL-01	Fire Water Diesel Pump	0.42	0.85	0.02

VOC		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
910-PPL-01	Fire Water Diesel Pump	0.08	0.16	0.004

Area 900 - Fire Water Pump Engine

HAPs Emissions from Diesel Combustion

AP-42 Section 3.3 Gasoline and Diesel Industrial Engines, Final Section, October 1996.

Operating Parameters:

Annual Operations	100	hrs/yr
Rated Fire Pump Engine Power	207	hp

Emission Factors:

HAP [6]	Emission Factor (lb/MMBtu)	Emission Factor (lb/hp-hr)
Benzene	9.33E-04	6.53E-06
Toluene	4.09E-04	2.86E-06
Xylenes	2.85E-04	2.00E-06
1,3-Butadiene	3.91E-05	2.74E-07
Formaldehyde	1.18E-03	8.26E-06
Acetaldehyde	7.67E-04	5.37E-06
Acrolein	9.25E-05	6.48E-07
Naphthalene	8.48E-05	5.94E-07

Emissions:

HAP	(lb/hr)	(lb/day)	(ton/yr)
Benzene	1.35E-03	2.70E-03	6.76E-05
Toluene	5.93E-04	1.19E-03	2.96E-05
Xylenes	4.13E-04	8.26E-04	2.06E-05
1,3-Butadiene	5.67E-05	1.13E-04	2.83E-06
Formaldehyde	1.71E-03	3.42E-03	8.55E-05
Acetaldehyde	1.11E-03	2.22E-03	5.56E-05
Acrolein	1.34E-04	2.68E-04	6.70E-06
Naphthalene	1.23E-04	2.46E-04	6.14E-06
Total	5.49E-03	1.10E-02	2.75E-04

Notes:

1. The firewater pump engine will be limited to operation and maintenance testing of 100 hr/yr to comply with 40 CFR Part 60.4211(e). There is no time limit on the use during an emergency situation in 40 CFR Part 60 Subpart IIII.

2. Daily emissions calculated based on a maximum operation time of 2 hr/day. However, the total annual operation time must still stay under 100 hr/year.

3. Emission factors are from the Quadna Diesel Fire Pump Specs Sheet from Clark Fire Protection Products.

4. Emission factor for SO_2 is from Ap-42, Section 3.3, Table 3.3-1, since no manufacturer emission factor is provided.

5. Since particulate emissions from diesel combustion are assumed to be less than 1.0 micrometer in diameter, PM, PM_{10}, and $PM_{2.5}$ emissions are assumed to be the same, as stated in note b to Table 3.3-1 of AP-42, Section 3.3, Final Section, dated October 1996.

6. Only AP-42 factors for pollutants noted as HAPs as defined by Section 112 of the Clean Air Act listed.

Area 900 Fuel Storage

TANKS 4.0.9d, Storage Tank Emissions Calculation Software, October 3, 2005

Operating Parameters:

Operational hours per day	24	hours/day
Operational days per year	365	days/year
Number of Main Diesel Tanks	1	tanks
Capacity of Main Diesel tank	12,000	gallons
Number of Gasoline tanks	1	tanks
Capacity of each Gasoline tank	2,000	gallons
Amount of Diesel delivered	8,000	gal/2 weeks
Amount of Gasoline delivered	2,000	gal/2 weeks

Tank Calculations:

Supplied Diesel:	208,000	gal/year
Tanks per year	17	tanks/year

Supplied Gasoline:	52000	gal/year
Tanks per year	26	tanks/year

Emissions:

VOCs		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
950-TKH-01	Diesel Main Tank	0.001	0.017	0.003
950-TKH-04	Gasoline Tank	0.09	2.10	0.38

Notes:

1. RVP-9 Gasoline used as the tank contents for the gasoline tank.
2. HAPs from the fuel storage tanks are considered negligible.

Area 900 - Standby Generator

AP-42 Section 3.4 Large Stationary Diesel and All Stationary Dual-fuel Engines, Final Section, October 1996.
40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

Operating Parameters:

Annual Operations[1]	100	hrs/yr
Daily Operations	2	hrs/day
Maximum Fuel Consumption	147.3	gal/hr
Engine Rated Power	3,058	hp

Source Parameters:

		Stack Parameters			
		Flow Rate	Diameter	Height	Temperature
Source ID	Emission Source	(cfm)	(in)	(ft)	(deg F)
1000-SG-01	Standby Generator	16,103	10	35	896

Note: The Standby Generator has two exhaust ports and will have two stacks.

Emission Factors:

NO_x	9.2	g/kW-hr	0.015	lb/hp-hr	NSPS Subpart IIII Table 1	
SO_2	8.09e-3*S	lb/hp-hr	4.05E-04	lb/hp-hr	AP-42 Table 3.4-1	S= 0.05
CO	11.4	g/kW-hr	0.019	lb/hp-hr	NSPS Subpart IIII Table 1	
VOC	1.3	g/kW-hr	0.002	lb/hp-hr	NSPS Subpart IIII Table 1	
$PM/PM_{10}/PM_{2.5}$	0.54	g/kW-hr	0.001	lb/hp-hr	NSPS Subpart IIII Table 1	

Heating value of Diesel	19,300	Btu/lb	* AP-42 Table 3.4-1 footnote a
Density of Diesel	7.1	lb/gal	* AP-42 Table 3.4-1 footnote a

Emissions:

PM		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
1000-SG-01	Standby Generator	2.71	5.43	0.14

PM_{10}		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
1000-SG-01	Standby Generator	2.71	5.43	0.14

$PM_{2.5}$		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
1000-SG-01	Standby Generator	2.71	5.43	0.14

NO_x		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
1000-SG-01	Standby Generator	46.25	92.50	2.31

CO		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
1000-SG-01	Standby Generator	57.31	114.63	2.87

SO_2		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
1000-SG-01	Standby Generator	1.24	2.47	0.062

VOC		**Uncontrolled**		
Source ID	Emission Source	(lb/hr)	(lb/day)	(ton/yr)
1000-SG-01	Standby Generator	6.54	13.07	0.33

Area 900 - Standby Generator

HAPs Emissions from Diesel Combustion

AP-42 Section 3.4 Large Stationary Diesel and All Stationary Dual-fuel Engines, Final Section, October 1996.

Operating Parameters:

Annual Operations	100	hrs/yr
Daily Operations	2	hrs/day
Maximum Fuel Consumption	147.3	gal/hr
Rated Engine Power	3058	hp

Emission Factors:

HAP [6,7]	Emission Factor (lb/MMBtu)	Emission Factor (lb/gal)
Benzene	7.76E-04	1.06E-04
Toluene	2.81E-04	3.85E-05
Xylenes	1.93E-04	2.64E-05
Formaldehyde	7.89E-05	1.08E-05
Acetaldehyde	2.52E-05	3.45E-06
Acrolein	7.88E-06	1.08E-06
Naphthalene	1.30E-04	1.78E-05

Table 3.4-3 and Table 3.4-4

Emissions:

HAP	(lb/hr)	(lb/day)	(ton/yr)
Benzene	1.57E-02	3.13E-02	7.83E-04
Toluene	5.67E-03	1.13E-02	2.84E-04
Xylenes	3.90E-03	7.79E-03	1.95E-04
Formaldehyde	1.59E-03	3.19E-03	7.96E-05
Acetaldehyde	5.09E-04	1.02E-03	2.54E-05
Acrolein	1.59E-04	3.18E-04	7.95E-06
Naphthalene	2.62E-03	5.25E-03	1.31E-04
Total	2.75E-02	6.02E-02	1.37E-03

Notes:

1. The backup generator will be limited to operation and maintenance testing of 100 hr/yr to comply with 40 CFR Part 60.4211(e). There is no time limit on the use during an emergency situation in 40 CFR Part 60 Subpart IIII.
2. The diesel fuel used for the backup generator is subject to 40 CFR Part 60.4207 which states limits on the sulfur content of the fuel (500 ppm).
3. Daily emissions calculated based on a maximum operation time of 2 hr/day. However, the total annual operation time must still stay under 100 hr/year.
4. Only AP-42 factors for pollutants noted as HAPs as defined by Section 112 of the Clean Air Act listed.
5. AP-42 factors marked as "less than" are omitted as emissions are assumed to be negligible.