Appendix A
Modeling Protocol Approval

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03/23/2006 12:52 PM

To <pmiller@retec.com>
cc
bcc
Subject Thompson Creek Mine Modeling Protocol

Mr. Miller,

DEQ has reviewed the proposed air quality modeling protocol, received by DEQ on 3/13/06, for the Thompson Creek Mining Company (TCMC) Tier II Operating Permit renewal. DEQ determined that the methods and data proposed for the air quality analyses are appropriate and acceptable, with the following considerations addressed in the submitted analyses:

1) The protocol states that fugitive emissions from various sources (haul roads, drilling, blasting, grading/bulldozing, combustion from mobile equipment, and wind erosion from storage piles) will not be included in the modeling analyses, as discussed with DEQ. The decision on not including these sources in the modeling analyses was based on a reasonably high level of emissions control through implemented measures and the high degree of variability and uncertainty of emissions estimations. In cases where fugitive emissions are not modeled, the issued Tier II Operating Permit will likely require measures to control fugitive dust emissions or a fugitive dust control plan.

2) ISC-PRIME was proposed for cases where a receptor may be located within a building recirculation cavity. It was then stated that the total air quality impact would be calculated as the sum of the ISC3ST and ISC-PRIME impacts. If receptors are located within recirculation cavities DEQ will allow and prefers that ISC-PRIME to be used for the entire modeling analyses. In most all situations, the PRIME algorithm is recognized as being superior to the downwash algorithm in ISC3ST.

3) Both the surface and upper air meteorological data provided by DEQ was collected from Boise. If the windrose from the Boise data do not seem reasonable for the topography in the region of the mine, the wind vectors can be rotated to provide a more realistic wind direction.

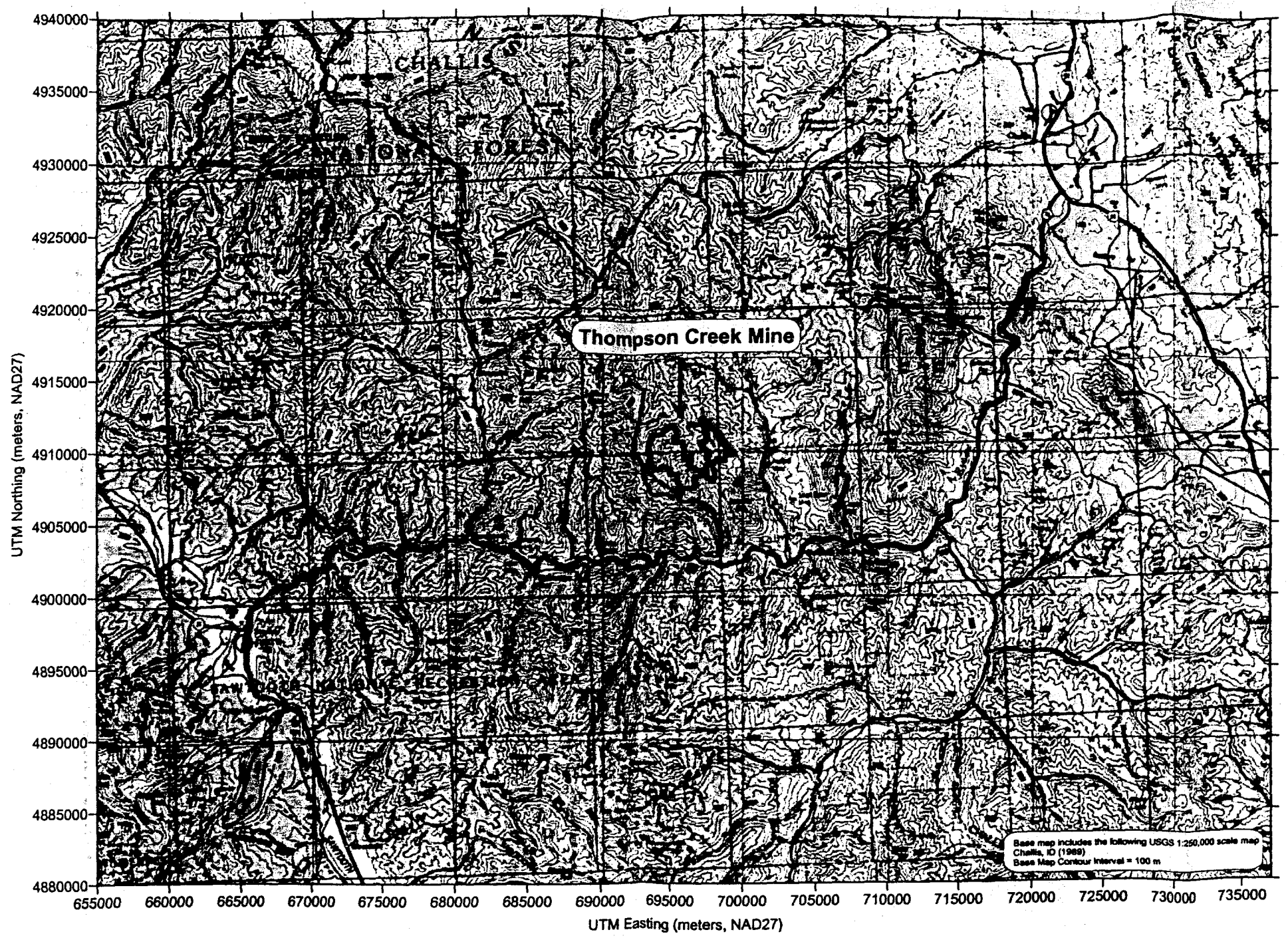
4) The protocol states that elevations for structures and EUs will be determined from recent topographic maps rather than from DEM data. When doing this, you should make sure there are not substantial differences between the datum used. In some instances where receptor elevations were calculated differently from buildings and EUs, buildings or EUs were either located below grade or were left suspended above ground.

This email provides documentation of a DEQ-approved modeling protocol.

Please call me at 208 373-0112 if you have any questions regarding the air quality analyses.

Kevin Schilling
Stationary Source Air Modeling Coordinator
Idaho Department of Environmental Quality
208 373-0112

Appendix D Ambient Air Quality Impact Analysis



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THOMPSON CREEK MINING COMPANY THOMPSON CREEK MINE	REGIONAL MAP
Date: 03/27/2006	

Figure 1 Regional Map

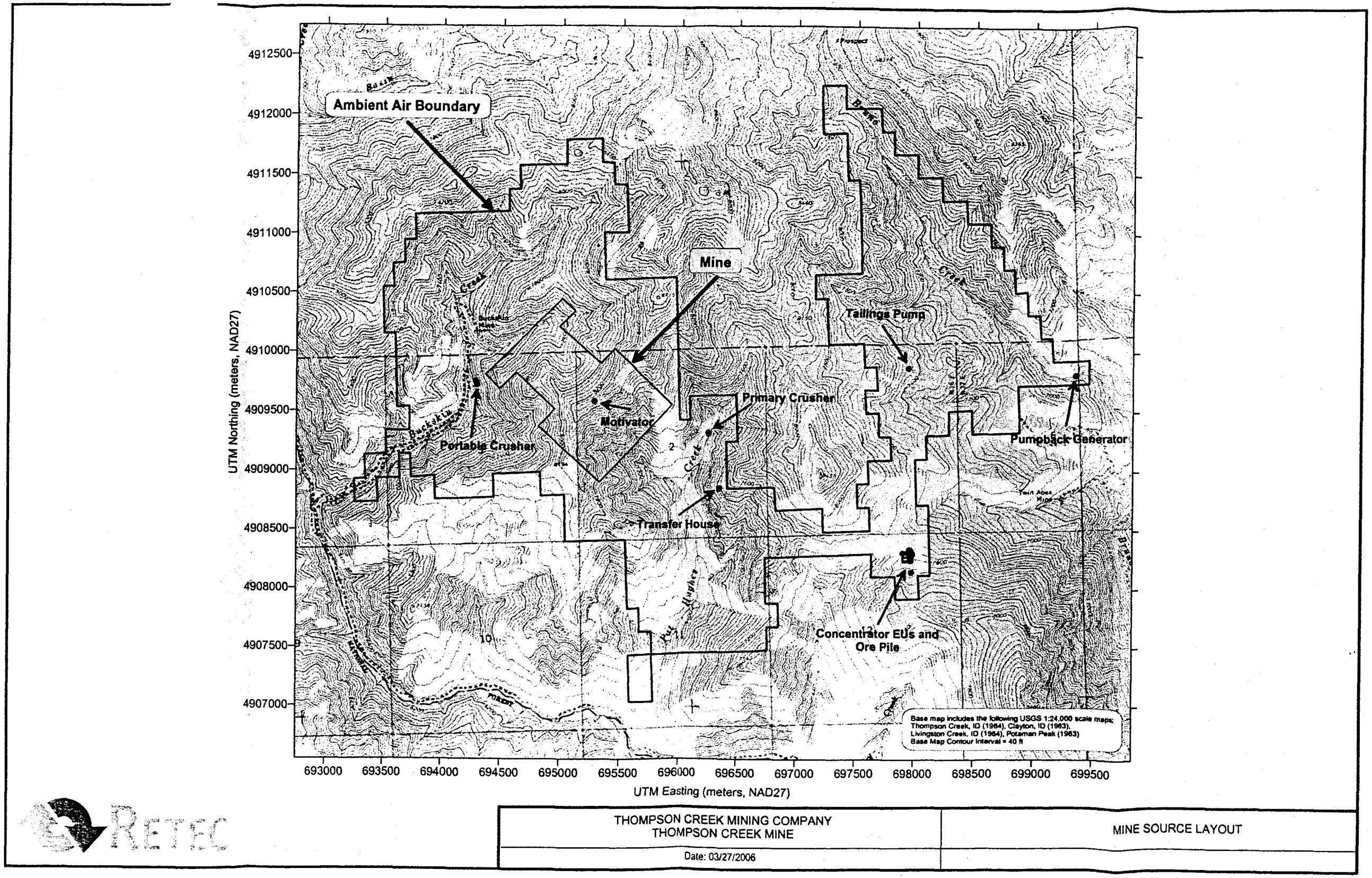

Figure 2 Mine Source Layout

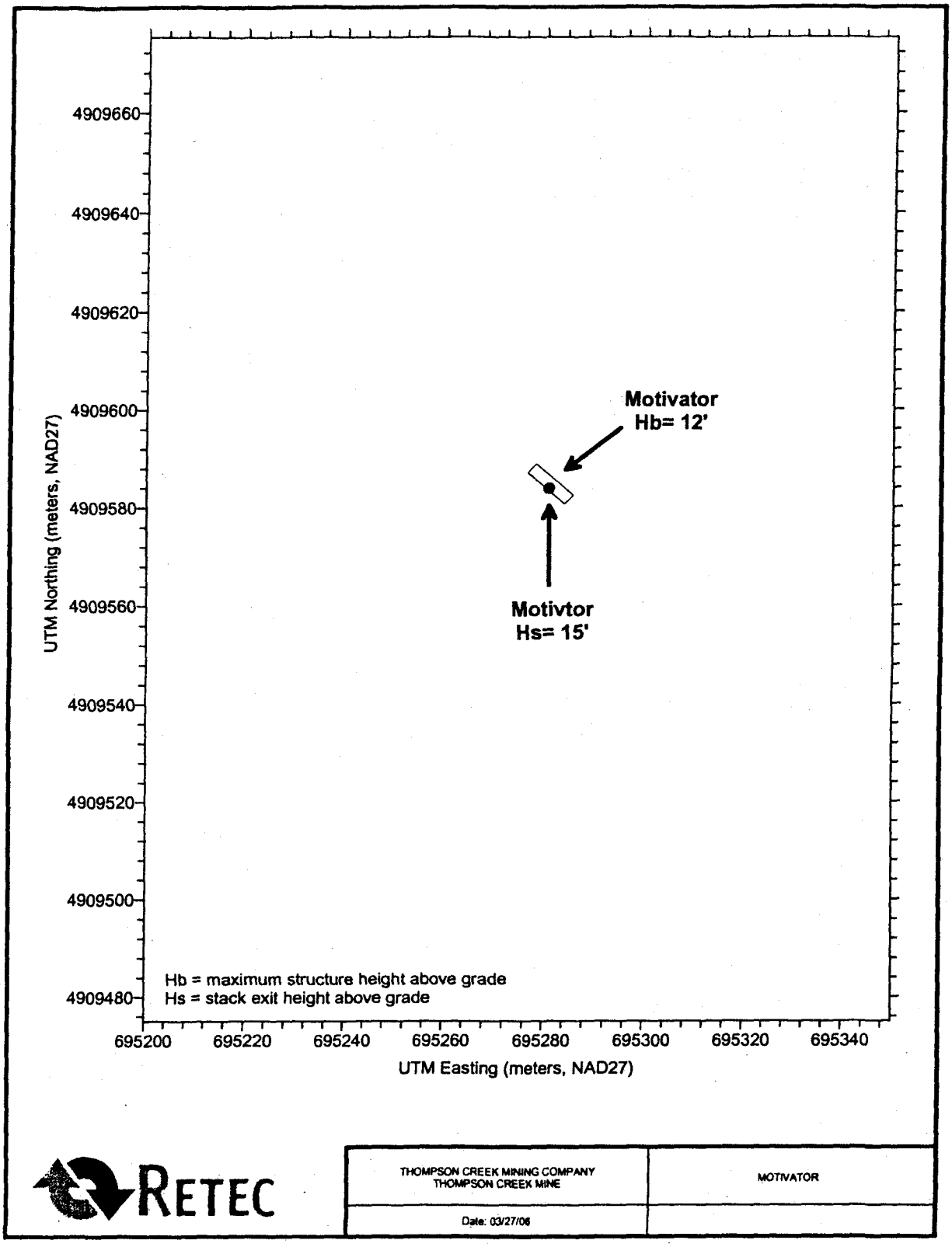

Figure 3 Motivator

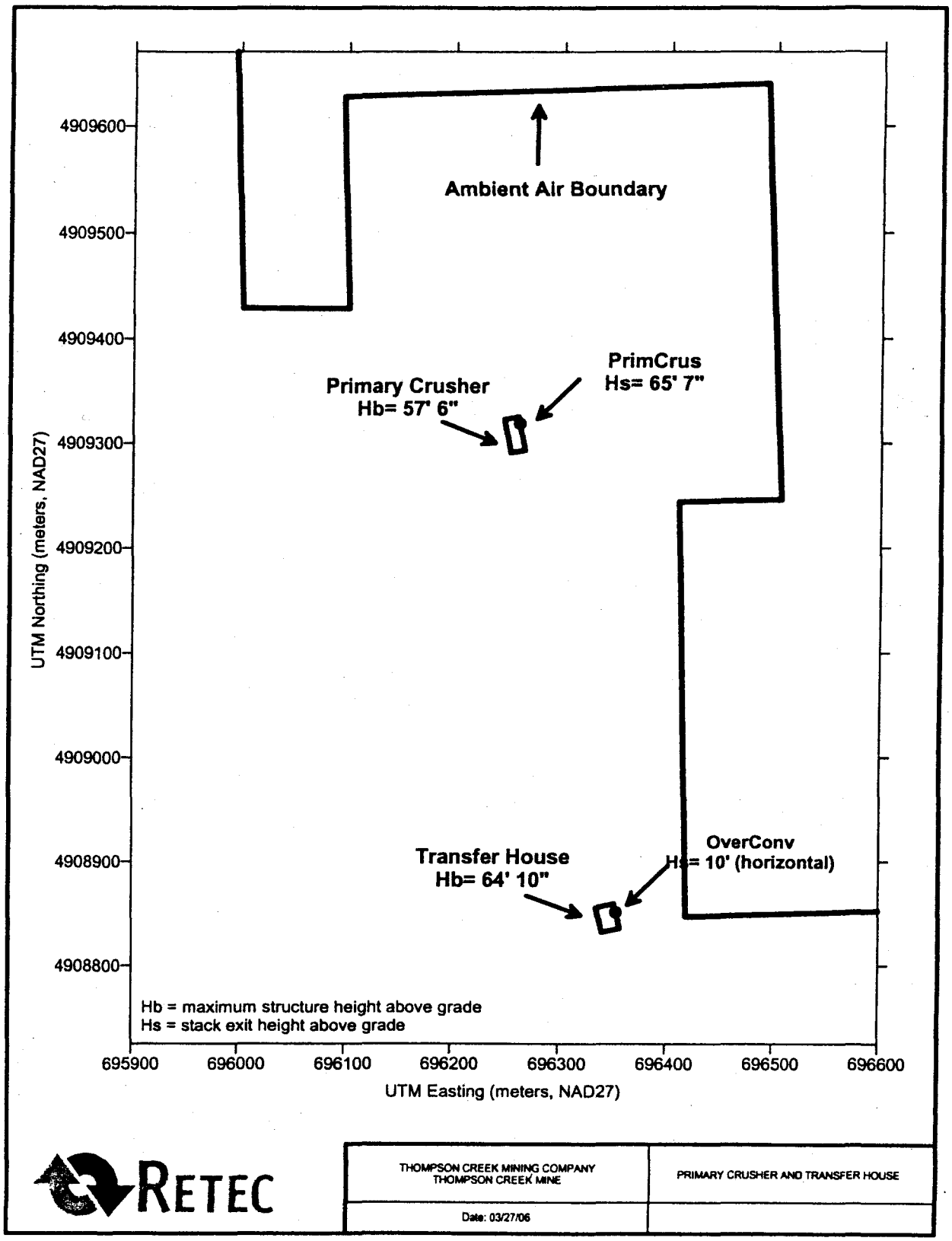

Figure 4 Primary Crusher and Transfer House

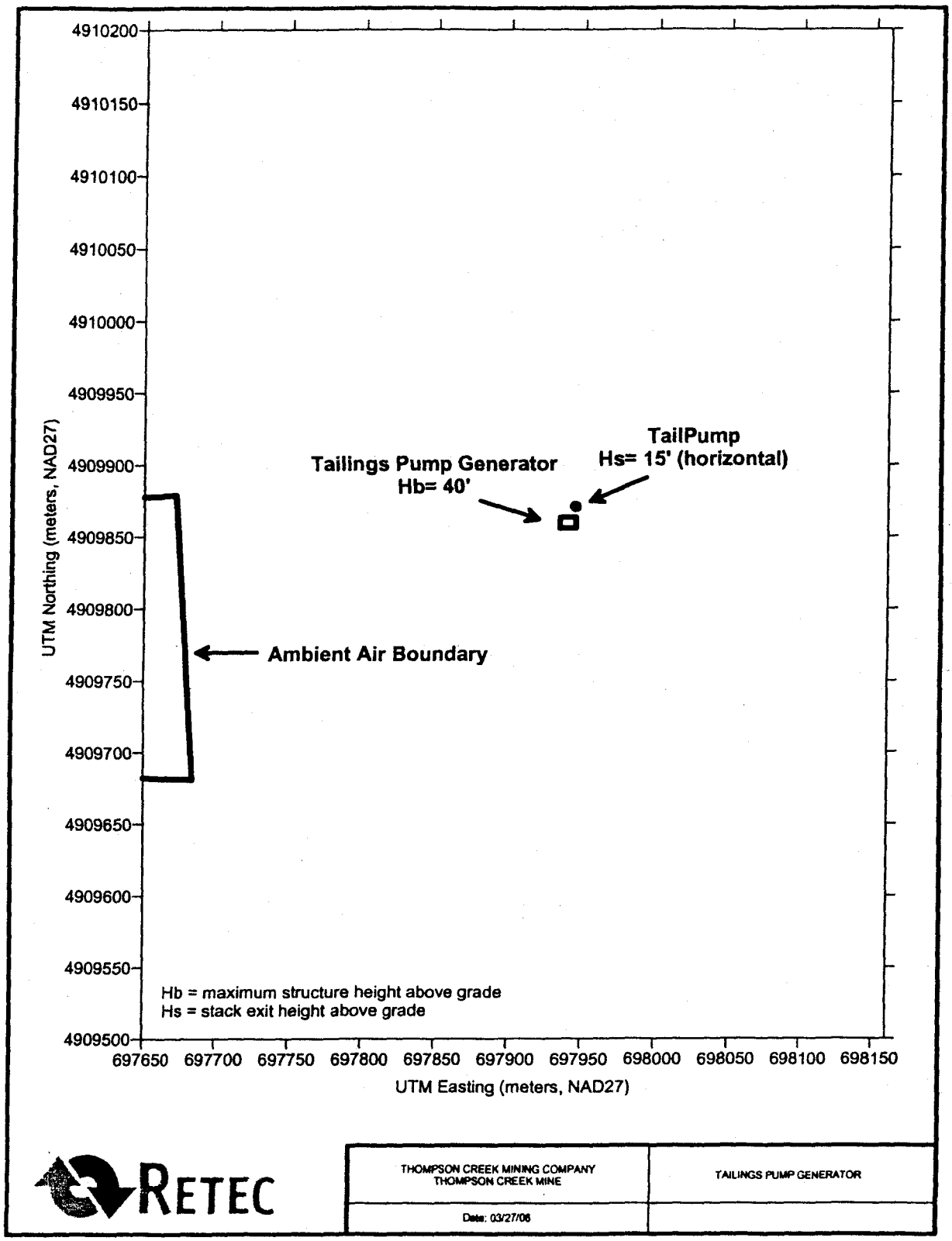

Figure 5 Tailings Pump Generator

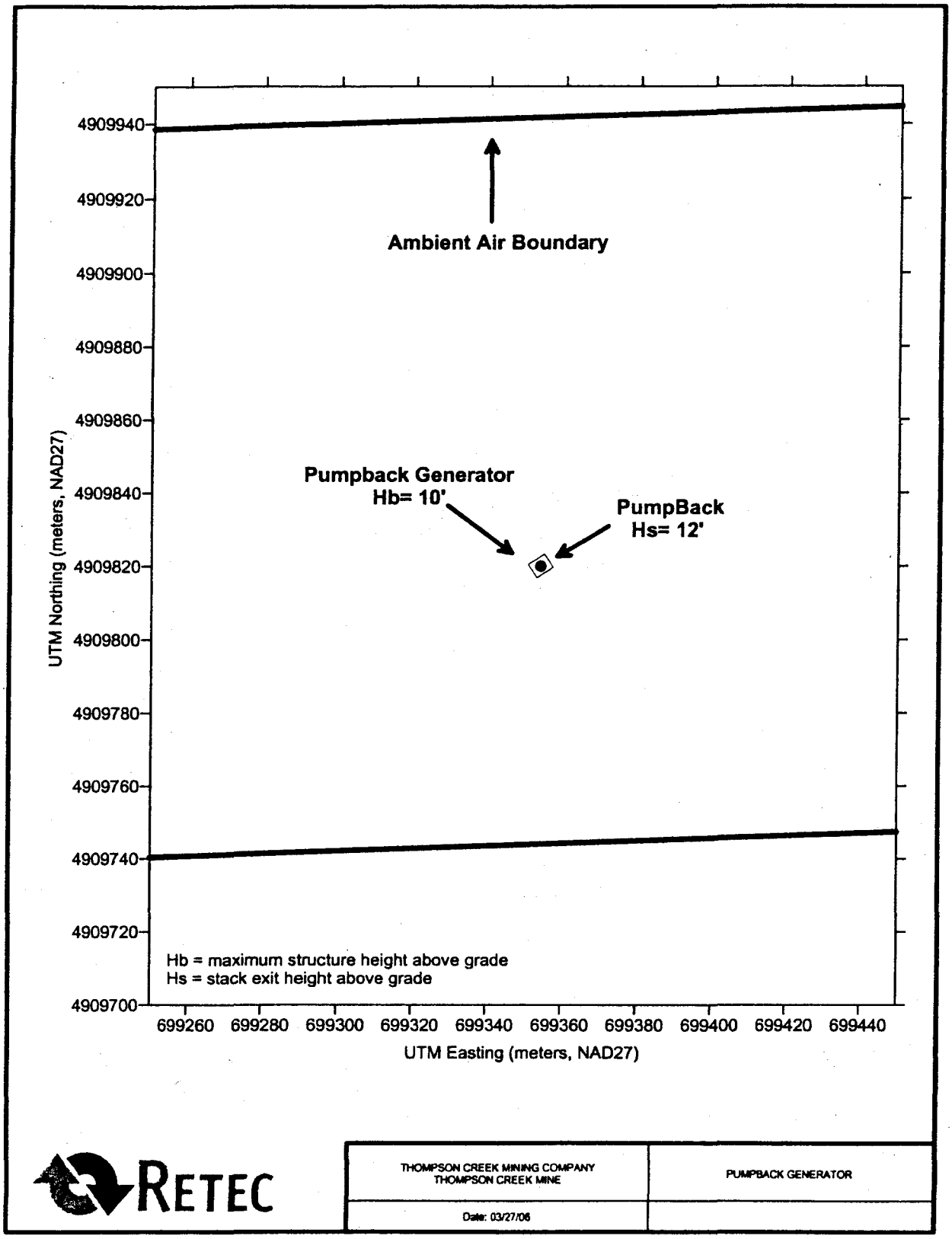

Figure 6 Pumpback Generator

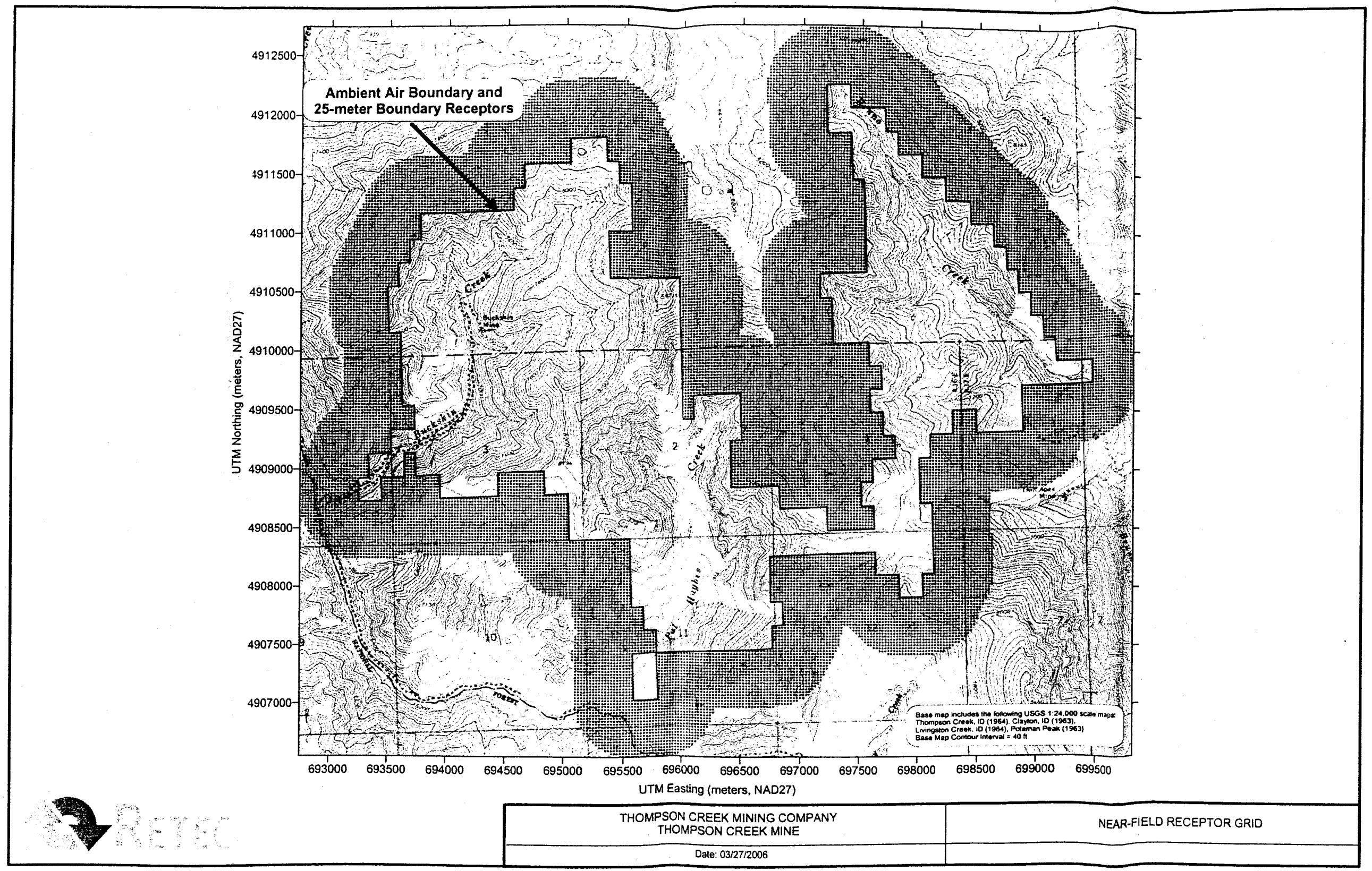

Figure 10 Near-Field Receptor Grid

Table 4 Background Pollutant Concentrations

Pollutant	Averaging Period	Background Concentration [1] ($\mu g/m^3$)
NO_2	Annual	4.3
SO_2	3-hour	34
	24-hour	26
	Annual	8
PM_{10}	24-hour	43
	Annual	9.6
CO	1-hour	3,600
	8-hour	2,300

[1] Provided by IDEQ.

Table 3 Physical and Modeled Release Parameters – Volume Sources

Source Description	Model ID	Physical Parameters				Modeled Parameters		
		Length		Height		Release Hgt	Sigma-y Init	Sigma-z Init
		(ft)	(m)	(ft)	(m)	(m)	(m)	(m)
Portable Crusher	PtC_area	164.0	50.00	0.00	0.0	0.00	11.63	2.13
Truck Dump to Primary Crusher	PtC_load	9.8	3.00	0.00	0.0	0.00	0.70	1.13
Ore drop to Mill Stockpile	Ore_Drop	5.0	1.52	221.50	67.5	67.51	0.35	2.48

Table 1 Facility Emission Unit Inventory

Source Description	Pollutant	hr/yr	Short-Term Emission Rates		Annual Emission Rates		Stack Exhaust Parameters						
							Height (ft)	Diameter (ft)	Flow (acfm)	Velocity (ft/sec)	Temp. (F °)	Orientation Vert/Horiz	Covered (Y/N)
Portable Crusher	PM_{10}	3,500 hr/yr	14.96 lb/hr	1.8852 g/s	26.18 ton/yr	0.7532 g/s	Volume Source				ambient	NA	NA
Truck Dump to Primary Crusher	PM_{10}	3,500 hr/yr	0.71 lb/hr	0.0892 g/s	1.24 ton/yr	0.0356 g/s	Volume Source				ambient	NA	NA
Primary Crusher	PM_{10}	3,650 hr/yr	2.23 lb/hr	0.2803 g/s	4.06 ton/yr	0.1168 g/s	65.58	2.33	18,000.0	70.16	ambient	Vertical	No
Overland Conveyor	PM_{10}	3,650 hr/yr	2.67 lb/hr	0.3364 g/s	4.87 ton/yr	0.1402 g/s	10.00	1.50	5,000.0	47.16	ambient	Horizontal	No
Ore drop to Mill Stockpile	PM_{10}	3,650 hr/yr	6.79 lb/hr	0.8552 g/s	12.39 ton/yr	0.3563 g/s	Volume Source				ambient	NA	NA
East Ore Feeder	PM_{10}	8,760 hr/yr	0.50 lb/hr	0.0630 g/s	2.19 ton/yr	0.0630 g/s	85.33	1.54	6,540	58.39	55.0	Vertical	No
West Ore Feeder	PM_{10}	8,760 hr/yr	0.50 lb/hr	0.0630 g/s	2.19 ton/yr	0.0630 g/s	85.33	1.54	6,540	58.39	55.0	Vertical	No
Holoflite Dryer #1	PM_{10}	8,760 hr/yr	0.02 lb/hr	0.0023 g/s	0.08 ton/yr	0.0023 g/s	81.00	0.98	650	14.39	80.0	Vertical	No
Leach Plant	HCl	8,760 hr/yr	0.003 lb/hr	0.0004 g/s	0.01 ton/yr	0.0004 g/s	90.25	1.33	5,400	64.46	60.0	Vertical	No
Holoflite Dryer #2	Common vent to Lube Grade Dryer Stack						90.25	0.67	500	23.87	70.0	Vertical	No
Rotary Kiln													
Lube Grade Dryer Stack	PM_{10}	7,200 hr/yr	0.001 lb/hr	0.0001 g/s	0.004 ton/yr	0.0001 g/s							
Jet Mill Baghouse Stack[1]	PM_{10}	7,200 hr/yr	0.016 lb/hr	0.0020 g/s	0.058 ton/yr	0.0017 g/s	37.50	1.25	2,300	31.45	78.0	Vertical	Yes
Tech Fine Packaging Baghouse	PM_{10}	7,200 hr/yr	0.013 lb/hr	0.0016 g/s	0.047 ton/yr	0.0013 g/s	38.00	0.50	150	12.73	80.0	Horizontal	No
Pancake Mill Feed Bin Baghouse	PM_{10}	3,412 hr/yr	0.001 lb/hr	0.0001 g/s	0.002 ton/yr	0.0000 g/s	14.75	0.69	1,500	67.34	78.0	Horizontal	No
Super Fine Packaging Bin Baghouse	PM_{10}	8,760 hr/yr	0.024 lb/hr	0.0030 g/s	0.105 ton/yr	0.0030 g/s	25.00	0.50	594	50.39	73.0	Horizontal	No
Pebble Lime Baghouse	PM_{10}	417 hr/yr	0.106 lb/hr	0.0133 g/s	0.022 ton/yr	0.0006 g/s	68.88	1.00	2,000	42.44	ambient	Vertical	No
Boiler #1	PM_{10}	8,760 hr/yr	0.0001 lb/hr	0.0000 g/s	0.29 ton/yr	0.0083 g/s	84.00	1.00	408	8.66	500.0	Vertical	Yes
	NO_x		0.66 lb/hr	0.0832 g/s	2.89 ton/yr	0.0832 g/s							
	SO_2		2.34 lb/hr	0.2952 g/s	10.26 ton/yr	0.2952 g/s							
	CO		0.17 lb/hr	0.0208 g/s	0.72 ton/yr	0.0208 g/s							
Hot Oil Boiler	PM_{10}	8,760 hr/yr	0.00 lb/hr	0.0000 g/s	0.12 ton/yr	0.0034 g/s	84.00	1.00	936	19.87	500.0	Vertical	Yes
	NO_x		0.27 lb/hr	0.0340 g/s	1.18 ton/yr	0.0340 g/s							
	SO_2		0.96 lb/hr	0.1208 g/s	4.20 ton/yr	0.1208 g/s							
	CO		0.07 lb/hr	0.0085 g/s	0.30 ton/yr	0.0085 g/s							
Motivator	PM_{10}	3,000 hr/yr	3.28 lb/hr	0.4130 g/s	4.92 ton/yr	0.1414 g/s	15.00	0.33	2,325	444.13	900.0	Vertical	No
	NO_x		46.19 lb/hr	5.8198 g/s	69.29 ton/yr	1.9931 g/s							
	SO_2		3.05 lb/hr	0.3849 g/s	4.58 ton/yr	0.1318 g/s							
	CO		10.13 lb/hr	1.2766 g/s	15.20 ton/yr	0.4372 g/s							
Mill Auxiliary Generator	PM_{10}	500 hr/yr	0.58 lb/hr	0.0735 g/s	0.15 ton/yr	0.0042 g/s	20.00	0.50	1,570	133.27	1,200.0	Vertical	Yes
	NO_x		8.22 lb/hr	1.0351 g/s	2.05 ton/yr	0.0591 g/s							
	SO_2		0.54 lb/hr	0.0684 g/s	0.14 ton/yr	0.0039 g/s							
	CO		1.80 lb/hr	0.2270 g/s	0.45 ton/yr	0.0130 g/s							
Pumpback Generator	PM_{10}	500 hr/yr	0.99 lb/hr	0.1247 g/s	0.25 ton/yr	0.0071 g/s	12.00	0.50	2,430	206.26	900.0	Vertical	No
	NO_x		13.95 lb/hr	1.7577 g/s	3.49 ton/yr	0.1003 g/s							
	SO_2		0.92 lb/hr	0.1162 g/s	0.23 ton/yr	0.0066 g/s							
	CO		3.06 lb/hr	0.3856 g/s	0.77 ton/yr	0.0220 g/s							
Tailings Pump Generator	PM_{10}	500 hr/yr	2.80 lb/hr	0.3526 g/s	0.70 ton/yr	0.0201 g/s	15.00	0.83	1,985	60.66	900.0	Horizontal	No
	NO_x		39.43 lb/hr	4.9683 g/s	9.86 ton/yr	0.2836 g/s							
	SO_2		2.61 lb/hr	0.3286 g/s	0.65 ton/yr	0.0188 g/s							
	CO		8.65 lb/hr	1.0898 g/s	2.16 ton/yr	0.0622 g/s							

[1] stack dimensions are 9" x 19.5". Diameter (feet) = [(sqrt ((4) * (9) * (19.5) / PI)) / (12)

Table 2 Physical and Modeled Release Parameters – Point Sources

Source Description	Model ID	Physical Stack Exit Parameters								Modeled Stack Exit Parameters			
		Height		Temperature		Velocity		Diameter		Height	Temperature	Velocity	Diameter
		(ft)	(m)	(F)	(K)	(ft/s)	(m/s)	(in)	(m)	(m)	(K)	(m/s)	(m)
Primary Crusher	PrimCrus	65.6	19.99	ambient	ambient	70.16	21.384	28.00	0.711	19.99	0	21.384	0.711
Overland Conveyor	OverConv	10.0	3.05	ambient	ambient	47.16	14.373	18.00	0.457	3.05	0	0.001	0.001
East Ore Feeder	EastOre	85.3	26.01	55	286	58.39	17.798	18.50	0.470	26.01	286	17.798	0.470
West Ore Feeder	WestOre	85.3	26.01	55	286	58.39	17.798	18.50	0.470	26.01	286	17.798	0.470
Holoflite Dryer #1	HoloDryr	81.0	24.69	80	300	14.39	4.385	11.75	0.298	24.69	300	4.385	0.298
Leach Plant	Leach	90.3	27.51	60	289	64.46	19.647	16.00	0.406	27.51	289	19.647	0.406
Holoflite Dryer #2, Rotary Kiln, Lube Grade Dryer Stack	LubeDryr	90.3	27.51	70	294	23.87	7.277	8.00	0.203	27.51	294	7.277	0.203
Jet Mill Baghouse Stack	JetMill	37.5	11.43	78	299	31.45	9.587	14.95	0.380	11.43	299	0.001	0.380
Pancake Mill Feed Bin Baghou	PanMill	14.8	4.50	78	299	67.34	20.527	8.25	0.210	4.50	299	0.001	0.001
Pebble Lime Baghouse	PebbleLm	68.9	20.99	ambient	ambient	42.44	12.936	12.00	0.305	20.99	0	12.936	0.305
Boiler #1	Boiler#1	84.0	25.60	500	533	8.66	2.639	12.00	0.305	25.60	533	0.001	0.305
Hot Oil Boiler	HotOil	84.0	25.60	500	533	19.87	6.057	12.00	0.305	25.60	533	0.001	0.305
Motivator	Motivatr	15.0	4.57	900	755	444.13	135.371	4.00	0.102	4.57	755	135.371	0.102
Mill Auxiliary Generator	MillAux	20.0	6.10	1200	922	133.27	40.619	6.00	0.152	6.10	922	0.001	0.152
Pumpback Generator	PumpBack	12.0	3.66	900	755	206.26	62.870	6.00	0.152	3.66	755	62.870	0.152
Tailings Pump Generator	TailPump	15.0	4.57	900	755	60.66	18.490	10.00	0.254	4.57	755	0.001	0.001
Tech Fine Packaging	PackBin	38.0	11.58	80	300	12.73	3.881	6.00	0.152	11.58	300	0.001	0.001
Super Fine Packaging Bin Baghouse	SFStor	25.0	7.62	73	296	50.39	15.360	6.00	0.152	7.62	296	0.001	0.001