

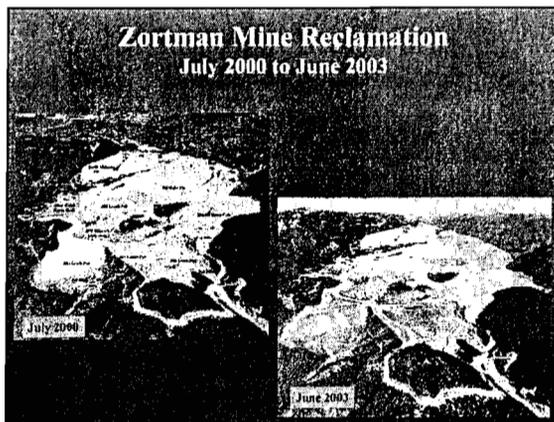
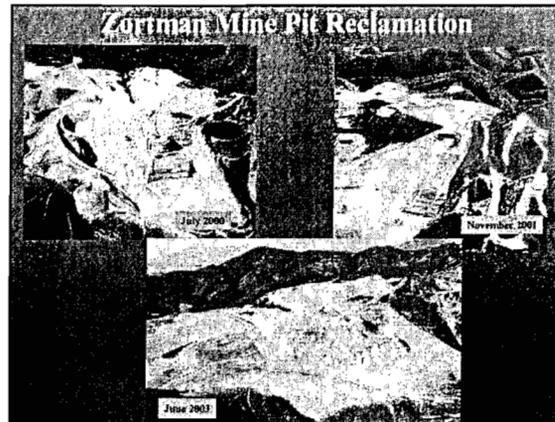
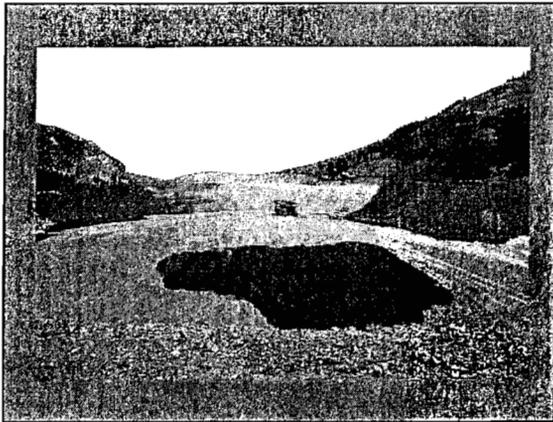
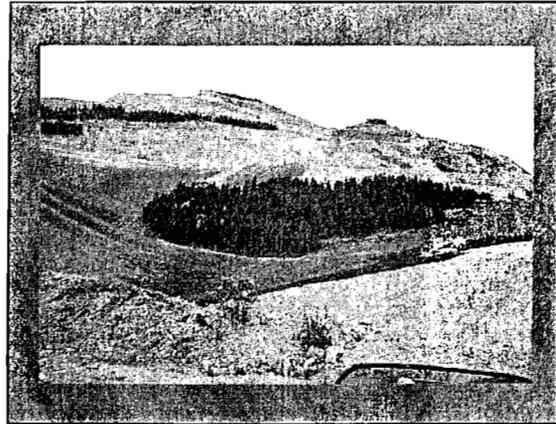
Zortman – Landusky Status Report

Reclamation Progress and Water Quality Concerns

Presented to the Environmental Quality Council,
October 9, 2003 by Wayne Jepson, DEQ

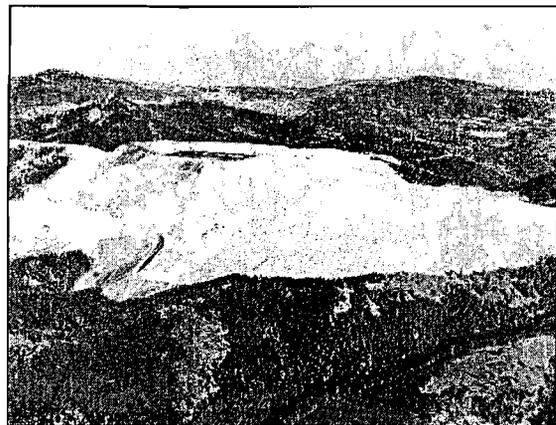
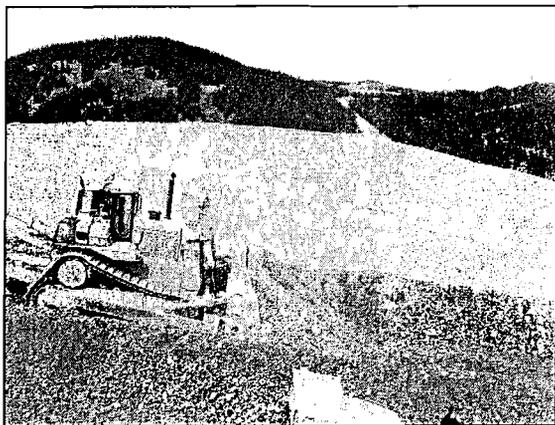
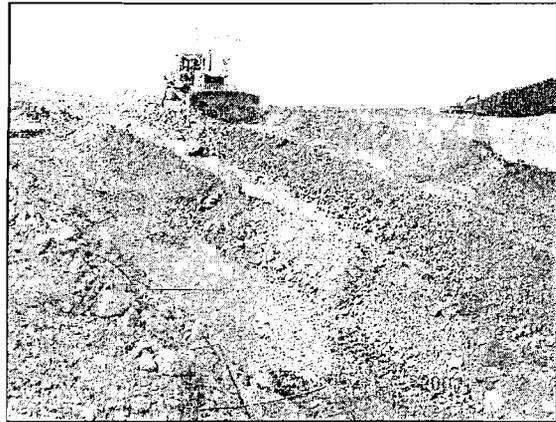
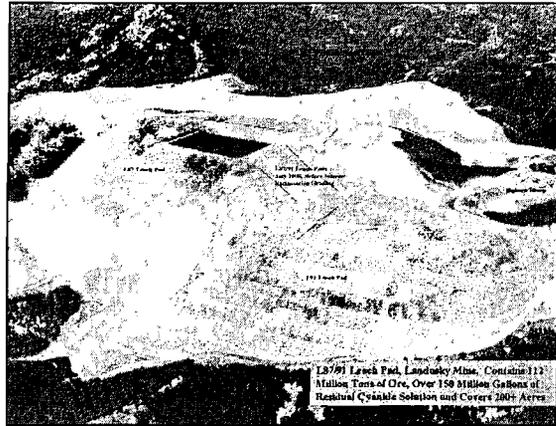
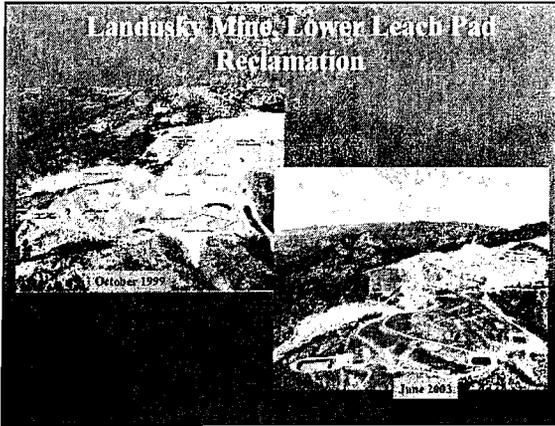
Zortman Mine Reclamation Status

- Reclamation completed per SEIS' Alternative Z6
- Exception. Partial re-location of Alder waste dump to N. Alabama pit has not been initiated.
- Alder waste dump was previously reclaimed by ZMI in 1993, but would benefit from improved reclamation. N. Alabama pit reclamation on hold.
- Re-contouring and seeding of the entire Zortman minesite was completed during 2003
- Vegetation is becoming re-established



Zortman Reclamation Funding:

Fund	Initial amount:	Remaining:
Reclamation Bond	\$10,024,000	\$1,370,000
Bankruptcy settlement	\$450,000	\$0
BLM (Ruby Tailings project)	\$700,000	\$0
RIT (Ruby Tailings project)	\$300,000	\$0





Landusky Reclamation Funding:

Source	Initial amount:	Remainder:
Reclamation Bond	\$19,600,000	\$3,420,000
BLM contribution	\$2,825,000	\$2,825,000
Total:	\$22,825,000	\$6,245,000

Current Project Status-Funding for Reclamation Earthwork



- Need \$1.2 million for Landusky Mine Preferred Reclamation Plans (Alt.L4)
- Removal of L85/86 leach pad from Montana Gulch

Remaining Landusky Projects:

Task:	Estimated cost:
Long term maintenance	\$2,500,000 +
Misc. ongoing projects	\$1,000,000
85/86 pad removal (phase II)	\$3,000,000
85/86 pad removal (phase III)	\$1,500,000
Swift Gulch remediation	unknown
TOTAL:	\$8,000,000 +
Shortfall:	\$1,750,000 +

Zortman – Landusky Water Issues

- Acid rock drainage (ARD) identified, 1992
- Clean Water Act / MWQA lawsuits, 1993-1995
- Consent Decree, 1996, required of Pegasus:
 - Construction of Water Treatment Plants
 - Construction of seepage interception systems
 - Construction Assurance Bonds (\$10,100,000)
 - 20 year Water Treatment O&M bond (\$14,600,000)
 - Long term water treatment trust fund (\$15M in 2017)
- These bond / trust funds are not sufficient

Zortman Mine Water Overview

Mine site located at the headwaters of 3 drainages:

- Ruby Gulch (Missouri River watershed)
 - Alder Gulch (Missouri River watershed)
 - Alder Gulch is a tributary to Ruby Gulch
 - Lodgepole Creek (Milk River watershed)
- Primary capture system is located in Ruby Gulch
 - Two capture systems are located in Alder Gulch tributaries (Alder Spur and Carter Gulch)
 - Lodgepole Creek water quality has not been affected by the Zortman mine

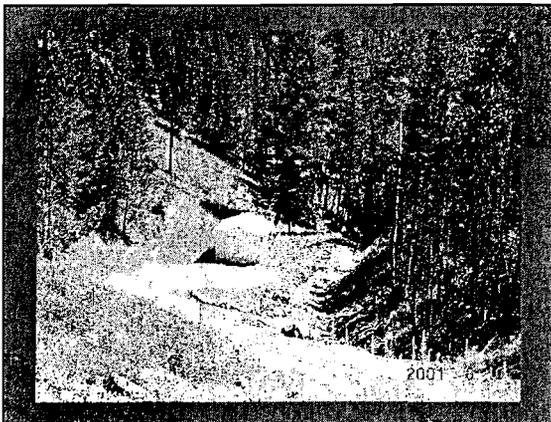


Zortman Water Treatment Plant (ZWTP)

- Lime precipitation plant constructed in 1994
- Modified during 1996-97 per Consent Decree
- Treats acid water (50-75 M gallons/year) from:
 - Ruby Gulch (72%), Alder Spur (13%), Carter (15%)
- Treated water is returned to Ruby Gulch
- ZWTP effluent meets the Consent Decree limits
- ZWTP discharge would meet most MPDES limits, most of the time.

ZWTP Typical Chemistry

parameter:	influent	effluent	% removal	Possible MPDES limits
pH	3.5	7.5	----	6.5 to 9.0
arsenic	0.015 ppm	< 0.003 ppm	> 80%	0.018 ppm
cadmium	0.2 ppm	0.004 ppm	98%	0.005 ppm
iron	35 ppm	0.2 ppm	99.7 %	1 ppm
manganese	30 ppm	3 ppm	90%	-----
lead	0.005 ppm	<0.003 ppm	> 50%	0.015 ppm
sulfate	3000 ppm	2400 ppm	20%	-----



Zortman Leach Pad Water

- Collects within spent ore heaps (100 acres)
- Leach pad sumps must be pumped out regularly
 - Water contains nitrate and cyanide, which cannot be removed by the Zortman treatment plant
 - This water is piped to the LAD area for irrigation
 - Zortman pads collected ~30 Mgal/year of precipitation prior to their reclamation
- Reclamation may reduce this to 5-10 Mgal/year
- May cease LAD and pump the water to Landusky

Goshu Flats Land Application of Treated Leach Pad Solution



Landusky Mine – Water Overview

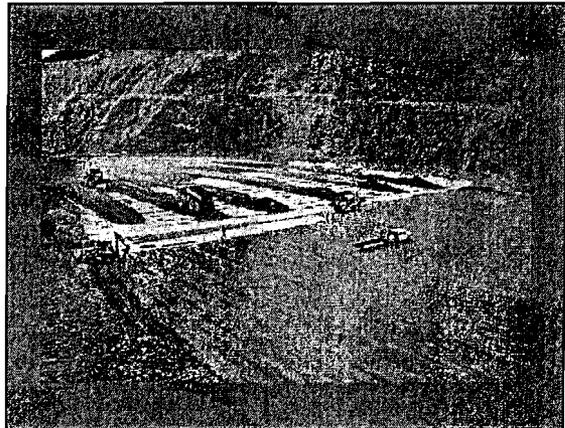
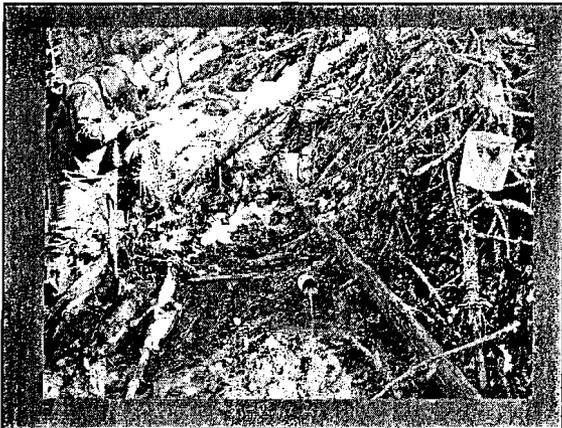
- Mine is located w/in the headwaters of 5 drainages
 - Montana Gulch, Mill Gulch & Sullivan Gulch
 - Tributaries of Rock Creek, Missouri River watershed
 - King Creek and Swift Gulch
 - Tributaries of Little Peoples Creek, Milk River watershed
- Mine Drainage is intercepted at 5 locations in Montana Gulch, and 1 each in Mill and Sullivan
- A King Creek capture system was considered under the Consent Decree, but was not built.
- Contamination in Swift Gulch had not been identified at the time of the Consent Decree.

King Creek impacts

- Water in uppermost King Creek is not acidic, but nitrate and selenium exceed some standards.
- The Consent Decree was amended to allow for passive treatment in King Creek.
- Nothing was constructed prior to the bankruptcy
- There is a \$200,970 Construction Assurance bond which will be used for King Creek remediation.
- DEQ/BLM are awaiting the results of reclamation (source control / waste removal and revegetation) prior to designing passive treatment for King Ck.

Swift Gulch Facts

- Swift Gulch shows evidence of pre-historic, natural ARD
- Water quality was relatively good from 1985 to 1997
- Iron concentration of seeps and springs began rising ~ 1997
- Worsening water quality led to modification of reclamation plans during 2000, Source control measures were initiated
- Pit backfilling and capping during 2001 – 2002 has not yet reduced seepage volumes or improved water quality.
- The pH of Swift Gulch began to decline during 2002.
- A segment of the creek is now acidic (pH 3.5) and coated with iron precipitates.
- Dilution and precipitation of contaminants cause Swift Gulch to return to within acceptable water quality conditions prior to reaching the Fort Belknap Reservation boundary, so far...



Swift Gulch Challenges

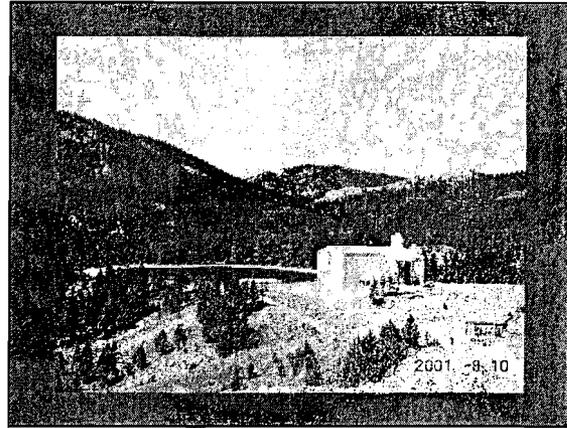
Several factors make remediation of Swift Gulch difficult.

- The bedrock is rich in sulfides, and can produce acid drainage in response to climate change alone, without the added influences of mining
- The acid formation process may be occurring several hundred feet down in the bedrock beneath the mine pits
- The springs surface where an extensive fault zone beneath the mine pits intersects the creek.
- No vehicle access within a mile of the seeps because they occur at the bottom of a deep, narrow bedrock canyon.
- The seeps are not located at the head of the creek; they enter where the watershed is already large and subject to high peak flows. This makes capture of the water difficult



Landusky Water Treatment Plant (LWTP)

- Lime precipitation plant constructed during 1997
- Treats 250 to 275,000,000 gallons per year
- Achieves the Consent Decree Standards
- Would likely meet most MPDES permit standards
- The capture systems which feed the LWTP were improved during 1997.
- Surface water downstream of the capture systems and treatment plant now meet water quality standards.



LWTP Typical Chemistry

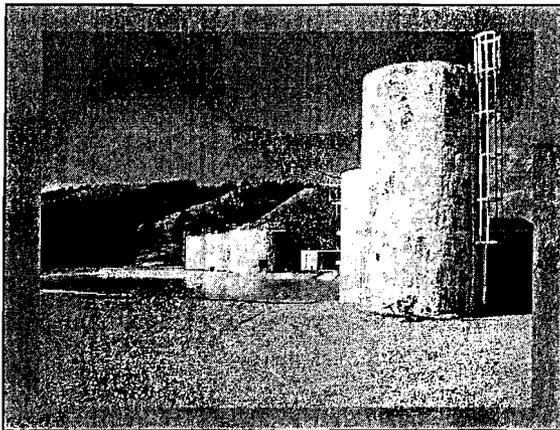
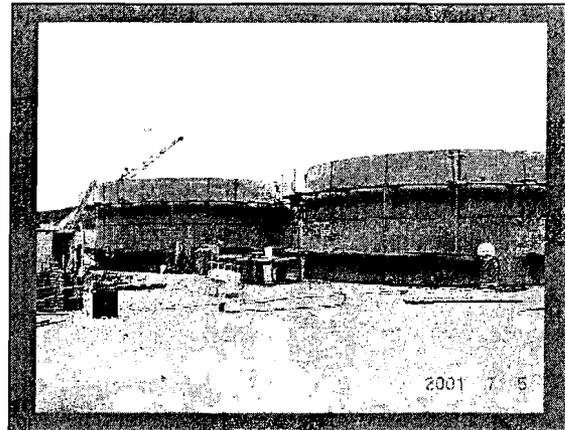
Parameter	Influent	Effluent	% removal	possible MPDES limit.
pH	6.0	7.5	----	6.5 to 9
Arsenic	0.150 ppm	0.025 ppm	83%	0.018 ppm
Cadmium	0.010 ppm	0.001 ppm	90%	0.005 ppm
Iron	10 ppm	0.3 ppm	97%	1.0 ppm
Manganese	3.0 ppm	1.5 ppm	50%	----
Lead	0.004 ppm	<0.003 ppm	> 50%	0.015 ppm
Sulfate	600 ppm	500 ppm	17%	----

Landusky Leach Pad Water

- Collects within the spent ore heaps (280 acres)
- Leach pad sumps must be pumped out regularly
- This water contains nitrate, selenium, and cyanide, which cannot be removed by the LWTP.
- ~ 80,000,000 gallons per year of precipitation collected within the Landusky leach pads prior to their reclamation.
- Reclamation may reduce this to 15 to 30 Mgal/yr.
- This water is routed via pipeline through the Zortman mine to the LAD area for irrigation.

Landusky Bio-Treatment Plant

- Designed to treat nitrate, selenium, and cyanide
- Designed in 2000, construction began in 2001
- Further construction and start-up during 2002
- Used for reducing contaminant load prior to LAD
- Further operational refinements during 2003
- In the future, effluent from the bio-reactor may be discharged to Montana Gulch after blending with the LWTP effluent.
- This may eliminate the need for an LAD area



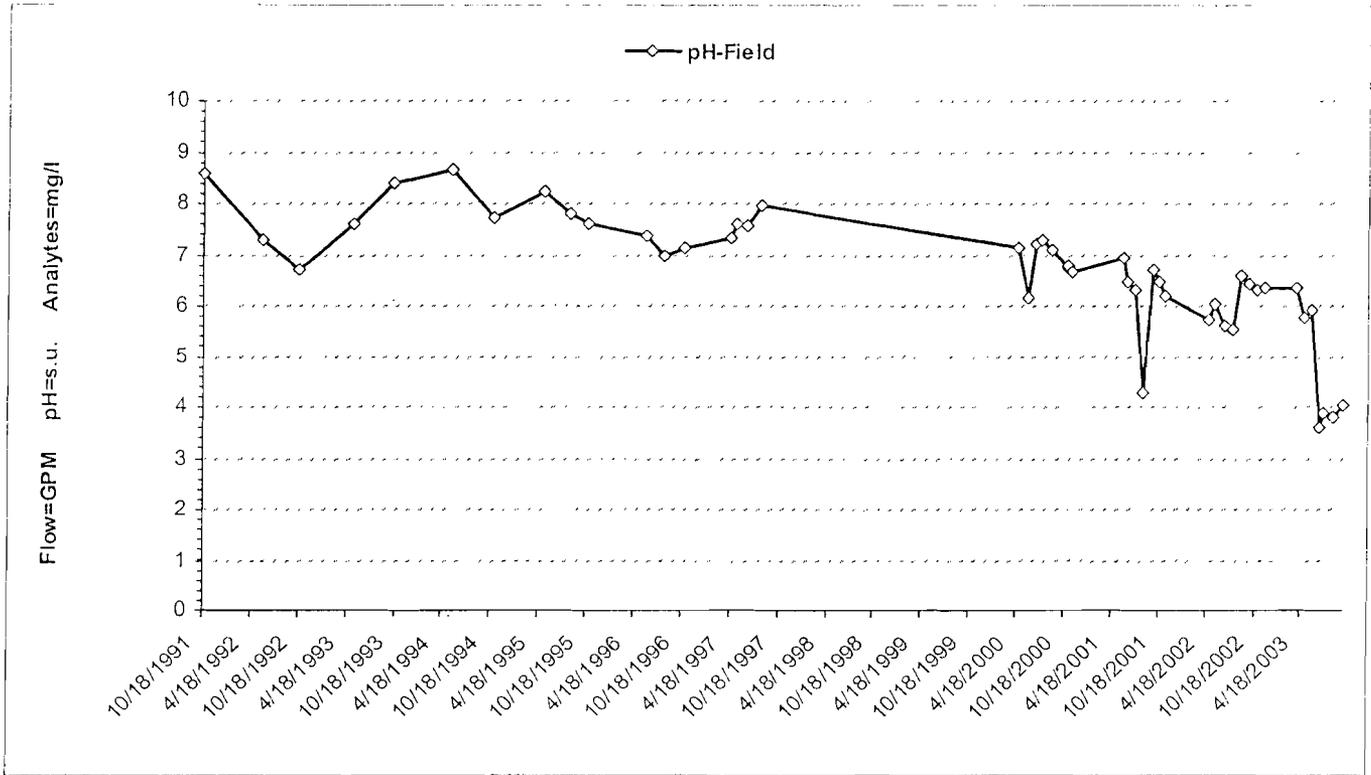
Annual WTP O&M Costs

Year	1999	2000	2001	2002	2003 (est.)
Bond amount	\$731,321	\$731,321	\$731,321	\$731,321	\$731,321
Actual costs	\$-1,200,000	\$843,000	\$880,000	\$906,000	\$800,000

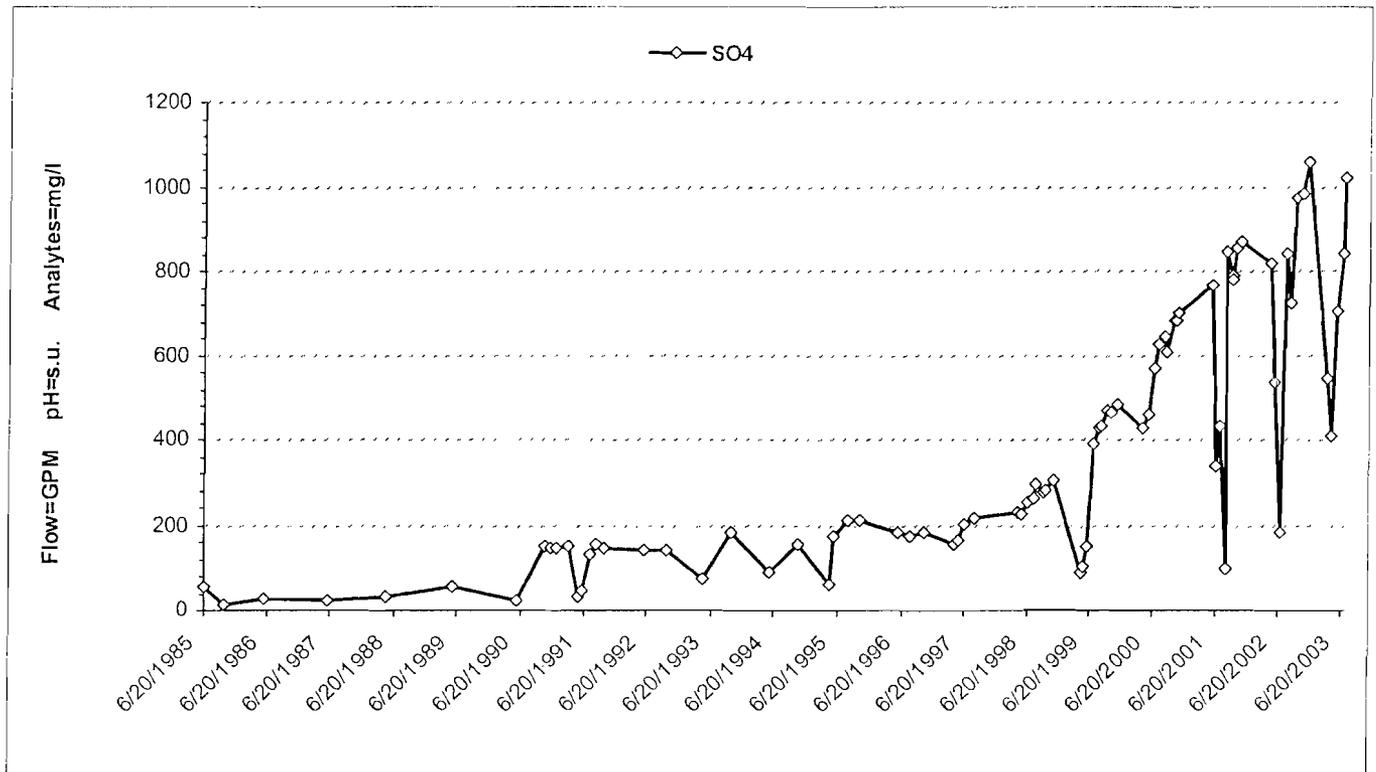
Funding Needed for Water Treatment

- The annual O&M bond (\$731,321) is inadequate. The shortfall increases annually due to inflation, and also to increases in the acidity of the water which is being collected for treatment. Investment of \$4,200,000 is needed now to cover costs through 2017.
- The Long Term Water Treatment Trust Fund will have a value of \$14,800,000 in 2017, given investments to date.
- Additional investment of \$12,400,000 needs to be placed in this trust now to cover anticipated water treatment expenses beyond 2017.
- BLM has provided the State with \$550,000, which has covered water treatment shortfalls between 2000 and 2003.
- This BLM fund may be depleted before the end of this year. Maintenance funds in the reclamation bonds will cover anticipated LAD and Bio-treatment costs for 3-5 more years; how long these systems will actually need to be operated remains undetermined.

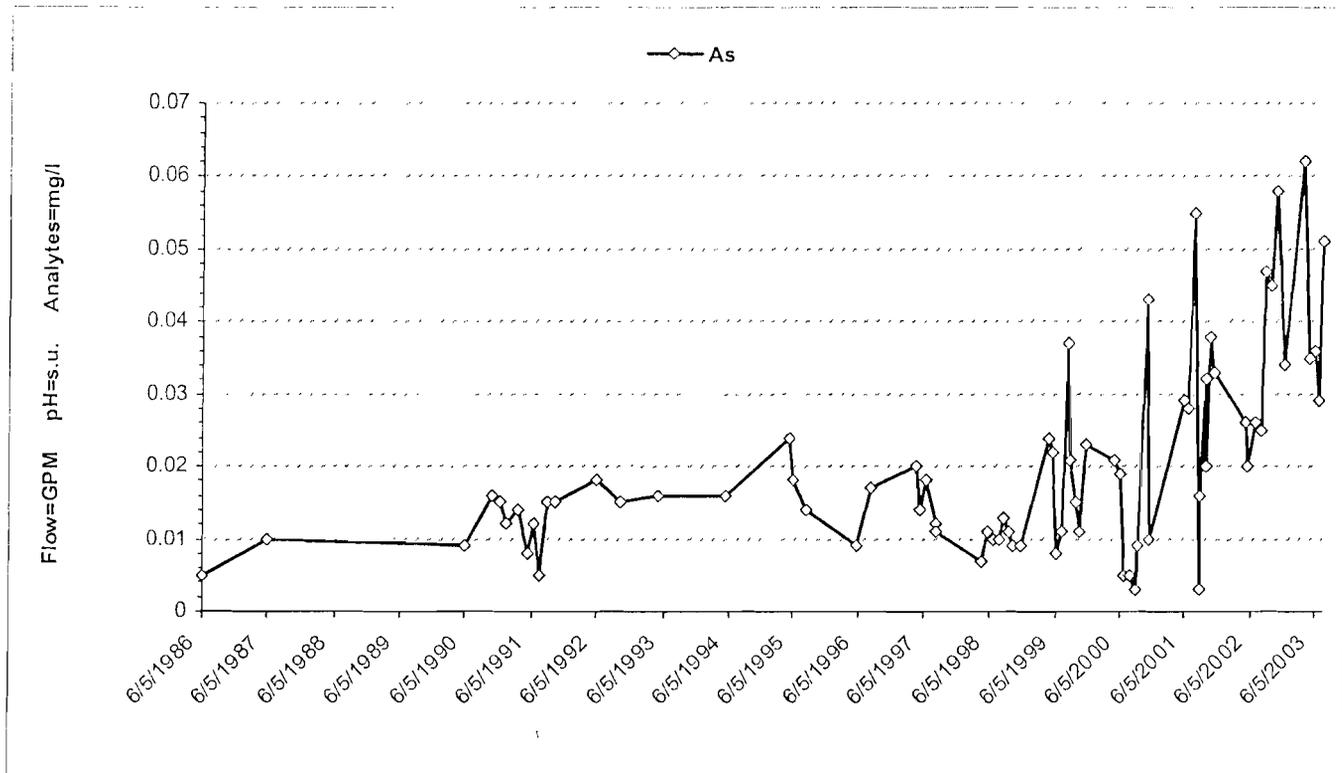
pH-Field



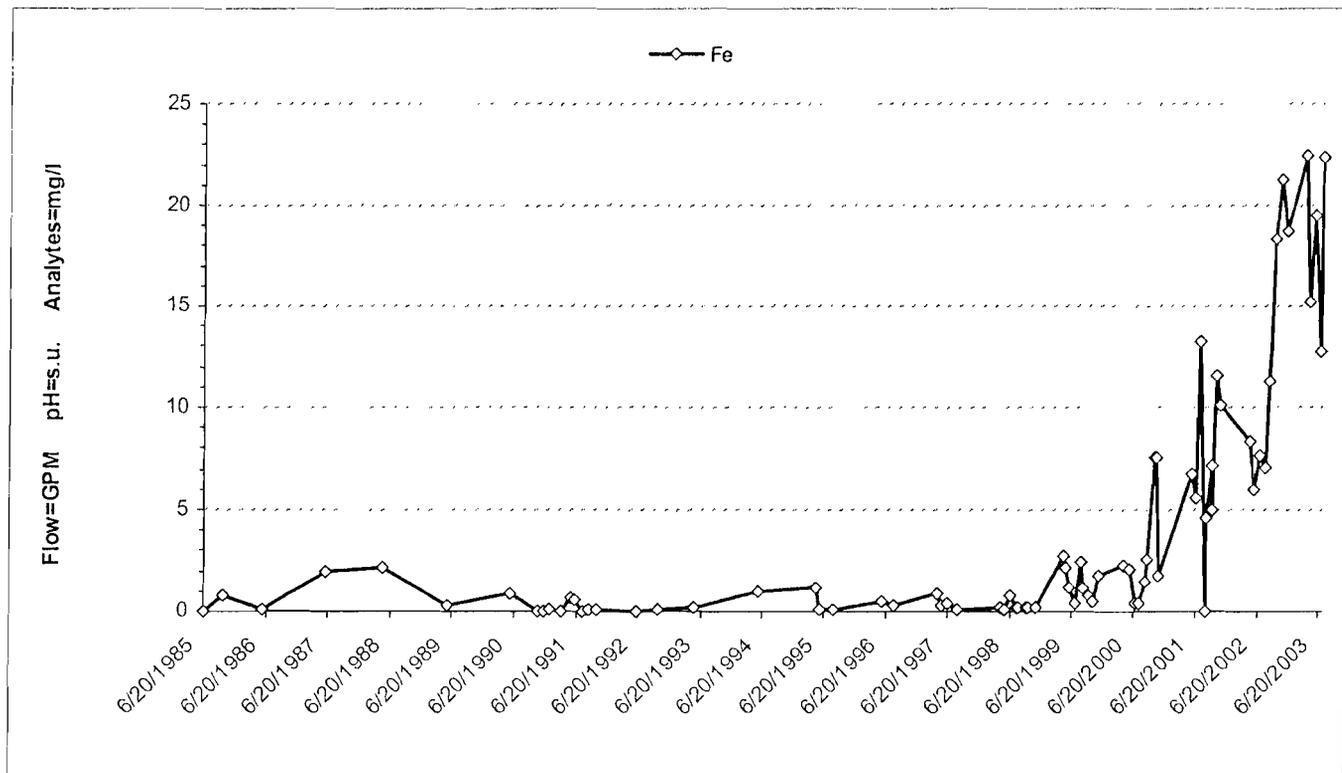
Sulfate



Arsenic



Iron



ZORTMAN AND LANDUSKY WATER TREATMENT PLANT COSTS YEAR 2000 THROUGH YEAR 2002 COMPARISON

Cost Category	----- YEAR 2002 -----				----- YEAR 2001 -----				----- YEAR 2000 -----			
	Cost By Category	Total Gallons	Cost Per 1000 Gallons	Total Cost	Cost By Category	Total Gallons	Cost Per 1000 Gallons	Total Cost	Cost By Category	Total Gallons	Cost Per 1000 Gallons	Total Cost
Zortman WTP Water Treated		70,075,200				51,325,290				52,591,030		
Landusky WTP Water Treated		252,240,000				266,250,000				273,710,324		
Entire Year		322,315,200	\$2.811	\$905,899.03		317,575,290	\$2.770	\$879,727.73		326,301,354	\$2.585	\$843,387.18
COST BREAKDOWN												
POWER AND FUEL												
Zortman Power												
Water Treatment Plant	\$44,428.41	70,075,200	\$0.634		\$40,950.48	51,325,290	\$0.798		\$36,465.95	52,591,030	\$0.693	
Alder Spur Capture System	\$11,975.22	8,732,850	\$1.371		\$11,019.85	5,260,811	\$2.095		\$9,958.49	4,798,611	\$2.075	
Carter Gulch Capture System	\$8,818.97	10,537,070	\$0.837		\$14,266.05	7,212,980	\$1.978		\$12,888.38	6,340,760	\$2.033	
Ruby Gulch Capture System	\$35,150.24	48,202,510	\$0.729		\$35,793.44	28,902,900	\$1.238		\$35,344.46	24,527,000	\$1.441	
Zortman Fuel (Propane)	\$3,109.75	70,075,200	\$0.044		\$6,225.30	51,325,290	\$0.121		\$4,779.44	52,591,030	\$0.091	
Landusky Power												
Water Treatment Plant	\$51,729.85	252,240,000	\$0.205		\$53,247.28	266,250,000	\$0.200		\$52,175.85	273,710,324	\$0.191	
Lower MT Capture System	\$18,656.41	701,100	\$26.610		\$22,845.47	923,060	\$24.750		\$17,496.94	51,631,570	\$0.339	
Upper MT Capture System	\$16,018.75	148,255,700	\$0.108		\$13,952.99	143,041,040	\$0.098		\$14,332.02	115,062,990	\$0.125	
Milil Gulch Capture System	\$6,259.85	19,130,440	\$0.327		\$5,181.08	15,119,070	\$0.343		\$6,539.70	13,441,700	\$0.487	
Sullivan Park Capture System	\$4,687.94	5,830,190	\$0.804		\$4,173.67	2,936,150	\$1.421		\$3,580.56	2,553,470	\$1.402	
Landusky Fuel (Propane)	\$4,304.30	252,240,000	\$0.017		\$6,374.10	266,250,000	\$0.024		\$5,860.80	273,710,324	\$0.021	
ZMI Capital Credit	\$0.00				\$390.00				\$88.45			
Lab	\$2,668.05				\$2,962.36				\$3,123.64			
Zortman Backup Generator	\$1,174.44				\$1,290.57				\$1,268.50			
Landusky Backup Generator	\$1,352.73				\$1,958.99				\$1,714.36			
SUBTOTAL POWER COSTS	23.22%	322,315,200	\$0.653	\$210,334.91	25.08%	317,575,290	\$0.695	\$220,631.62	24.38%	326,301,354	\$0.630	\$205,617.55
LABOR												
Operations	\$232,436.70				\$232,436.70				\$232,436.70			
Maintenance	\$115,357.60				\$115,357.60				\$115,357.60			
Sludge Removal	\$26,344.30				\$26,344.30				\$26,344.30			
SUBTOTAL LABOR COSTS	41.30%	322,315,200	\$1.161	\$374,138.60	42.53%	317,575,290	\$1.178	\$374,138.60	44.36%	326,301,354	\$1.147	\$374,138.60
MONITORING AND ANALYSES												
SUBTOTAL LAB ANALYSES	5.34%	322,315,200	\$0.150	\$48,398.40	7.56%	317,575,290	\$0.209	\$66,522.60	7.82%	326,301,354	\$0.202	\$65,949.39
GENERAL, INDIRECT, PARTS, ENG.												
SUBTOTAL PUMPS, SUPPLIES	15.08%	322,315,200	\$0.424	\$136,633.52	15.43%	317,575,290	\$0.427	\$135,744.07	16.59%	326,301,354	\$0.429	\$139,911.66
REAGENTS												
Hydrated Lime												
Landusky Water Treatment Plant	\$8,723.57	252,240,000	\$0.035		\$8,412.62	266,250,000	\$0.032		\$6,881.71	273,710,324	\$0.025	
Zortman Water Treatment Plant	\$46,977.20	70,075,200	\$0.670		\$36,240.94	51,325,290	\$0.706		\$19,203.35	52,591,030	\$0.365	
Fernic Sulfate and Flocc											\$0.602	
Landusky Water Treatment Plant	\$22,178.54	50,000,000	\$0.444		\$0.00				\$0.00			
Zortman Water Treatment Plant	\$58,514.29	70,075,200	\$0.835		\$38,037.28	51,325,290	\$0.741		\$31,684.92	52,591,030		
SUBTOTAL REAGENTS	15.06%	322,315,200	\$0.423	\$136,393.60	9.40%	317,575,290	\$0.260	\$82,690.84	6.85%	326,301,354	\$0.177	\$57,769.98
SUMMARY BY CATEGORY												
POWER AND FUEL COSTS	23.22%	322,315,200	\$0.653	\$210,334.91	25.08%	317,575,290	\$0.695	\$220,631.62	24.38%	326,301,354	\$0.630	\$205,617.55
LABOR COSTS	41.30%	322,315,200	\$1.161	\$374,138.60	42.53%	317,575,290	\$1.178	\$374,138.60	44.36%	326,301,354	\$1.147	\$374,138.60
LAB ANALYSES	5.34%	322,315,200	\$0.150	\$48,398.40	7.56%	317,575,290	\$0.209	\$66,522.60	7.82%	326,301,354	\$0.202	\$65,949.39
PUMPS, SUPPLIES	15.08%	322,315,200	\$0.424	\$136,633.52	15.43%	317,575,290	\$0.427	\$135,744.07	16.59%	326,301,354	\$0.429	\$139,911.66
REAGENTS	15.06%	322,315,200	\$0.423	\$136,393.60	9.40%	317,575,290	\$0.260	\$82,690.84	6.85%	326,301,354	\$0.177	\$57,769.98
YEARLY TOTAL	100.00%	322,315,200	\$2.811	\$905,899.03	100.00%	317,575,290	\$2.770	\$879,727.73	100.00%	326,301,354	\$2.585	\$843,387.18
% INCREASE FROM PREVIOUS YR				2.97%				4.31%				