EXHIBIT 1
AMEC DETAILED COST SHEETS
FOR CORRECTIVE ACTION ALTERNATIVES

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

Interceptor Trench - Conventional Method
January 11, 2011

Estimated Trench Dimensions		
D	W	L
55	4	150
No. of Pumping Wells		
3		

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Interceptor Trench						
Mobilization/Demobilization	1	LS	$75,000	$75,000		AMEC Estimate
Excavation	60	Days	$3,535	$212,100	3-1/2 CY Excavator with operator and laborer	Crew B-12D, RS MEANS Heavy Construction 2010, p487, incl O&P
Articulated Truck & Loader	60	Days	$2,133	$127,980	Articulated dump truck, front end loader, and crew	Crew A-3B, RS Means, P481, incl O&P
Trench Boxes/Sidewall Stabilization	60	Days	$500	$30,000	7' x 16' x 8'	RS Means 31 52 16.10 4600
80 mil HDPE Geomembrane	8250	SF	$3.31	$27,266	GSE CurtainWall, 13 Panels including sealant and shipping	GSE Verbal Quote
Pea Gravel	1,200	CY	$34	$40,800	Well sorted and washed pea gravel drain filter	RS Means 33 46 26.10
Non-woven geotextile	600	SF	$5	$3,000	Installed at base of trench	AMEC Estimate
Compacted Bentonite	300	CF	$20	$6,000	Tremie in Bentonite to create seal	Matl: Environmental Drilling Supply and Services Inc. + install. and hydrate labor
6-inch ID Sch 40 PVC Well Screen	315	LF	$42	$13,230		RS Means 33 21 13.10 8360
Well Completion Materials	3	Ea	$1,000	$3,000		AMEC Estimate
Pump vault with Cover	3	LS	$5,000	$15,000	5 ft x 3ft, precast concrete w/ bilco cover installed	Colorado Precast(vault), Dalco(cover) + Installation
Interceptor Trench Subtotal				**$553,376**		
Pumping Equipment						
Submersible Pump	3	Ea	$4,225	$12,675	5 hp 4" submersible pump	RS Means 33 21 13.10 2000
Transformer	1	Ea	$17,500	$17,500	277/480v liquid-filled transformer	RS Means 26 12 19.10 0100
Electrical breakers, switchgears, panels	1	LS	$10,000	$10,000		AMEC Estimate
Controls, Telemetry and Level Alarms	1	LS	$10,000	$10,000		AMEC Estimate
2 inch ID schd 80 Polyethylene pipe	0	LF	$2.00	$0		RS Means 33 11 13.25 2120 (rounded up)
48 inch depth pipe trench	0	LF	$4.23	$0	2'w x 4'd trench, 3/8cy excavator, including compaction and backfill	RS Means G1030 807 1330
Sand Bedding	0	LF	$3.00	$0	Pipe bedding to 12" over pipe	RS Means G1030 815 1460
Power Line Extension	12,690	LF	$15.00	$190,350	Copper, XLP shielded 5kV 4/0 in 2" PVC 36" Deep with handholes @ 500'	RS Means 26 05 13.16 0800, 26 05 33.65 2350, 31 23 16.14 2200, 33 71 19.15 1050
Communications Line Extension	12,690	LF	$10.00	$126,900	Sheathed copper cable #10, 3 wire, in 2" PVC 36" deep with handholes @ 500 ft	RS Means 26 05 19.55 1700, 26 05 33.65 2350, 31 23 16.14 2200, 33 71 19.15 1050
Pumping Equipment Subtotal				**$367,425**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	10%	%	$920,801	$92,080	10% of Construction Costs	AMEC Estimate
Construction Management	10%	%	$920,801	$92,080	10% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$184,160**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$920,801	$230,200	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$1,335,162**		

Notes: 1. RS Means indicates cost was obtained from RS Means Heavy Construction 2010 Cost Data
2. Assumes surplus excavated material can be reused onsite and no off-site disposal will be required.

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Monthly Electrical usage	97985	kw-Hr	$0.15	$14,698	Assumes pumps run 24 hours/day	AMEC Estimate
Maintenance Costs	5%	%	$50,175.0	$2,509	5% of Equipment Costs	AMEC Estimate
Annual Inspection	40	Hrs	$100	$4,000	2 person crew, 2 days in field/travel	AMEC Estimate
Annual Water Quality Analyses	3	Ea	$1,000	$3,000	1 annual sample per well	AMEC Estimate
Annual Report	60	Hrs	$100	$6,000	Letter report transmitting data.	AMEC Estimate
Annual O&M Cost Subtotal				**$30,206**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$30,206	$3,021	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$33,227**		

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
Equipment Capital Life	15	Years	$32,675	$2,178	Mechanical Equipment
Utilities Capital Life	50	Years	$334,750	$6,695	Water, electrical and communications lines
Barrier Capital Life	100	Years	$553,376	$5,534	Interceptor trench cost

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

ZVI Permeable Reactive Barrier
January 11, 2011

Estimated Barrier Dimensions		
D	W	L
55	5	150
No. of Wells		
3		

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Mobilization/Demobilization	1	LS	$150,000	$150,000		AMEC Estimate
Site Preparation/Restoration	1	LS	$100,000	$100,000	Construct work platform & control points, regrade/restore surface	AMEC Estimate
PRB Construction	9075	SF	$100	$907,500	1 part ZVI:4 parts sand within 20 ft of surface, upper 20' backfill with soil, spoils disposed on-site	WRS Compass Budgetary Estimate, 2008; increased for doubled thickness and 2010 rates
Well Installation - 4 inch	165	LF	$100	$16,500	Including drilling and all well materials	AMEC Estimate
Well Completion Materials	3	Ea	$1,000	$3,000		AMEC Estimate
Well vault with Cover	3	LS	$5,000	$15,000	5 ft x 3ft, precast concrete w/ bilco cover installed	Colorado Precast(vault), Dalco(cover) + Installation
Construction Subtotal				**$1,192,000**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	10%	%	$1,192,000	$119,200	10% of Construction Costs	AMEC Estimate
Construction Management	10%	%	$1,192,000	$119,200	10% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$238,400**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$1,192,000	$298,000	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$1,728,400**		

Notes: 1. RS Means indicates cost was obtained from RS Means Heavy Construction 2010 Cost Data

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Quarterly Samples	12	Ea	$1,000	$12,000	1 quarterly sample per well	AMEC Estimate
Quarterly Sampling	160	Hrs	$100	$16,000	2 person crew, 2 days in field/travel	AMEC Estimate
Annual Inspection	40	Hrs	$100	$4,000	2 person crew, 2 days in field/travel	AMEC Estimate
Annual Water Quality Analyses	3	Ea	$1,000	$3,000	1 annual sample per well	AMEC Estimate
Annual Report	60	Hrs	$100	$6,000	Letter report transmitting data.	AMEC Estimate
Annual O&M Cost Subtotal				**$41,000**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$41,000	$4,100	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$45,100**		

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
PRB Replacement Costs - New Wall	15	Years	$1,169,000	$77,933	Full replacement at 15 years, including 1 well in PRB
PRB Replacement Costs - Wall Destruction	15	Years	$50,000	$3,333	Destroy during replacement, additional cost to move ZVI to on-site disposal location
Well Capital Life	50	Years	$23,000	$460	Groundwater Wells outside PRB

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

GW Pumping Wells
January 11, 2011

Well Depth	No. of Pumping Wells
50	9

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Mobilization/Demobilization	1	LS	$5,000	$5,000		AMEC Estimate
Well Installation - 4 inch	450	Ft	$100	$45,000	Including drilling and all well materials	AMEC Estimate
Well Development	9	Ea	$2,000	$18,000		AMEC Estimate
Mechanical Conduit and Connection Piping	1	LS	$10,000	$10,000	Conduit for wiring to each well plus distribution piping from well to	RS Means 33 21 13.10 8360
Well Completion Materials	9	Ea	$1,000	$9,000		AMEC Estimate
Pump vault with Cover	9	LS	$5,000	$45,000	5 ft x 3ft, precast concrete w/ bilco cover installed	Colorado Precast(vault), Dalco(cover) + Installation
Submersible Pump	9	Ea	$3,525	$31,725	3 hp 4" submersible pump	RS Means 33 21 13.10 1900
Transformer	1	Ea	$17,500	$17,500	277/480v liquid-filled transformer	RS Means 26 12 19.10 0100
Electrical breakers, switchgears, panels	1	LS	$10,000	$10,000		AMEC Estimate
Controls, Telemetry and Level Alarms	1	LS	$100,000	$100,000	Includes cost of power and control extensions to each well.	AMEC Estimate
2 inch ID schd 80 Polyethylene pipe	4,500	LF	$2.00	$9,000		RS Means 33 11 13.25 2120 (rounded up)
48 inch depth pipe trench	4,500	LF	$4.23	$19,035	2'w x 4'd trench, 3/8cy excavator, including compaction and backfill	RS Means G1030 807 1330
Sand Bedding	4,500	LF	$3.00	$13,500	Pipe bedding to 12" over pipe	RS Means G1030 815 1460
Power Line Extension	12,690	LF	$15.00	$190,350	Copper, XLP shielded 5kV 4/0 in 2" PVC 36" Deep with handholes @ 500'	RS Means 26 05 13.16 0800, 26 05 33.65 2350, 31 23 16.14 2200, 33 71 19.15 1050
Communications Line Extension	12,690	LF	$10.00	$126,900	Sheathed copper cable #10, 3 wire, in 2" PVC 36" deep with handholes @ 500 ft	RS Means 26 05 19.55 1700, 26 05 33.65 2350, 31 23 16.14 2200, 33 71 19.15 1050
Pumping Equipment Subtotal				**$650,010**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	10%	%	$650,010	$65,001	10% of Construction Costs	AMEC Estimate
Drilling Oversight/Construction Management	10%	%	$650,010	$65,001	10% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$130,002**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$650,010	$162,503	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$942,515**		

Notes: 1. RS Means indicates cost was obtained from RS Means Heavy Construction 2010 Cost Data
2. All costs assume sandy soil.

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Monthly Electrical usage	176,373	kw-Hr	$0.15	$26,456	Assumes pumps run 24 hours/day	AMEC Estimate
Maintenance Costs	5%	%	$168,225	$8,411	5% of Equipment Costs	AMEC Estimate
Annual Water Quality Analyses	36	Ea	$1,000	$36,000	1 quarterly sample per well	AMEC Estimate
Annual Inspection and Sampling	80	Hrs	$100	$8,000	2 person crew, 4 days in field/travel	AMEC Estimate
Annual Report	60	Hrs	$100	$6,000	Letter report transmitting data.	AMEC Estimate
Annual O&M Cost Subtotal				**$84,867**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$84,867	$8,487	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$93,354**		

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
Equipment Capital Life	15	Years	$141,725	$9,448	Mechanical Equipment
Utilities Capital Life	50	Years	$376,285	$7,526	Water, electrical and communications lines
Well Capital Life	50	Years	$132,000	$2,640	Groundwater Wells

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

ISRM with Injection Wells
January 11, 2011

Well Depth	
50	
No. of Injection Wells	
14	

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Mobilization/Demobilization	1	LS	$7,000	$7,000		AMEC Estimate
Well Installation - 4 inch	700	Ft	$100	$70,000	Including drilling and all well materials	AMEC Estimate
Well Completion Materials	14	Ea	$1,000	$14,000		AMEC Estimate
Well Development	14	Ea	$2,000	$28,000		AMEC Estimate
Well Completion Materials	14	Ea	$1,000	$14,000		AMEC Estimate
Well Vault with Cover	14	LS	$5,000	$70,000	5 ft x 3 ft, precast concrete w/ bilco cover installed	Colorado Precast(vault), Dalco(cover) + Installation
Chemical Injection	1	LS	$10,000	$10,000	2 days, pumps, tanks, hoses, labor	AMEC Estimate
Chemical Purchase	54,000	lb	$1.50	$81,000	Newman Zone delivered	RNAS, Inc.
Pumping Equipment Subtotal				**$294,000**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	10%	%	$294,000	$29,400	10% of Construction Costs	AMEC Estimate
Drilling Oversight/Construction Management	10%	%	$294,000	$29,400	10% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$58,800**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$294,000	$73,500	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$426,300**		

Notes: 1. RS Means indicates cost was obtained from RS Means Heavy Construction 2010 Cost Data
2. All costs assume sandy soil.

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Quarterly Samples	28	Ea	$1,000	$28,000	1 quarterly sample of every other well	AMEC Estimate
Quarterly Sampling	80	Hrs	$100	$8,000	2 person crew, 1 day in field/travel	AMEC Estimate
Annual Inspection	40	Hrs	$100	$4,000	2 person crew, 2 days in field/travel	AMEC Estimate
Annual Report	60	Hrs	$100	$6,000	Letter report transmitting data.	AMEC Estimate
Chemical Reinjection	1	LS	$98,000	$98,000	Periodic reinjection of electron donor, annual injection due to sulfate concentrations	RNAS, Inc.
Annual O&M Cost Subtotal				**$144,000**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$144,000	$14,400	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$158,400**		

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
Well Capital Life	50	Years	$203,000	$4,060	Groundwater Wells

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

Direct Disposal in Highland Pit Lake
January 11, 2011

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Mobilization/Demobilization	1	LS	$5,000	$5,000		AMEC Estimate
Mechanical Conduit	1	LS	$10,000	$10,000	Conduit for wiring to Monitoring Equipment	RS Means 33 21 13.10 8360
Controls, Telemetry and Level Alarms	1	LS	$25,000	$25,000	Includes cost of power and control extensions to monitoring equipment.	AMEC Estimate
2 inch ID schd 80 Polyethylene pipe	9,500	LF	$2.00	$19,000		RS Means 33 11 13.25 2120 (rounded up)
48 inch depth pipe trench	9,500	LF	$4.23	$40,185	2'w x 4'd trench, 3/8cy excavator, including compaction and backfill	RS Means G1030 807 1330
Sand Bedding	9,500	LF	$3.00	$28,500	Pipe bedding to 12" over pipe	RS Means G1030 815 1460
Subtotal				**$127,685**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	10%	%	$127,685	$12,769	10% of Construction Costs	AMEC Estimate
Construction Management	10%	%	$127,685	$12,769	10% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$25,537**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$127,685	$31,921	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$185,143**		

Notes: 1. RS Means indicates cost was obtained from RS Means Heavy Construction 2010 Cost Data
2. All costs assume sandy soil.

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Monthly Electrical usage	1,000	kw-Hr	$0.15	$150	Assumes pumps from corrective action are sufficiently powered to reach pit lake	AMEC Estimate
Maintenance Costs	5%	%	$54,000	$2,700	5% of Equipment Costs	AMEC Estimate
Quarterly Samples	0	Ea	$1,000	$0	No sampling	AMEC Estimate
Quarterly Sampling	0	Hrs	$100	$0	No Sampling	AMEC Estimate
Annual Inspection	0	Hrs	$100	$0	2 person crew, 2 days in field/travel	AMEC Estimate
Annual Report	0	Hrs	$100	$0	Letter report transmitting data.	AMEC Estimate
Annual O&M Cost Subtotal				**$2,850**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$2,850	$285	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$3,135**		

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
Equipment Capital Life	15	Years	$30,000	$2,000	Mechanical Equipment
Utilities Capital Life	50	Years	$102,685	$2,054	Water, electrical and communications lines

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

Evaporation Pond
January 11, 2011

Pumping Rate	5	gpm
Annual Volume to Evaporate	2,628,000	gallons
	8.1	Ac-Ft
Annual Net Evaporation	30	in/yr
	2.5	ft/yr
Area reqd to evaporate 110% of Q	154,588	sq ft
Area Increase for Liner Materials	5%	%
Number of Ponds:	2	
Approx Dims of Ponds: Width	310	ft
Length	310	ft
Depth	10	ft
Volume of Material Required	32,349	cy

Construction Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Evaporation Pond Construction						
Mobilization	1	lump sum	$25,000	$25,000	Mobilization/Demobilization	AMEC Estimate
Excavation and Transportation of Material	32,349	cy	$8.41	$272,056	Excavating and Transporting Bulk Bank Run Gravel	RS Means 31 23 16.42 0250 + 31 23 23.20 1020
Forming Embankments	32,349	cy	$2.03	$65,669	General fill, spread dump material, no compaction, by dozer	RS Means 31 23 23.17 0020
Finish Grading	155	1,000 sf	$400	$61,835	Finish grading lagoon bottoms	RS Means 31 22 16.10 3500
Compaction	32,349	cy	$0.50	$16,175	Riding vibrating roller, 12" lifts, 4 passes	RS Means 31 23 23.23 5100
Primary Liner	162,318	sq ft	$1.60	$259,708	Primay Liner 60 mil HDPE, installed	Material cost from Colorado Lining International, AMEC estimate of shipping, labor from Means
Drainage Layer	162,318	sq ft	$1.20	$194,781	Geonet, drainage layer	Material cost and shipping from Kaul Corp, Texdrain 200, labor estimated from Means
Leak Detection Liner	162,318	sq ft	$1.40	$227,245	Leak Detection Liner, 40 mil HDPE, installed	Material cost from Colorado Lining International, estimate of shipping, labor from Means
Bentomat base liner, installed	162,318	sq ft	$1.80	$292,172	Bentonite mat seepage mitigation layer	Material cost and shipping from Kaul Corp, Bentomat CL, labor estimated from Means
1 ft subgrade well graded sandy gravel	6,012	cy	$34	$204,400	subgrade, compatible with Bentomat layer	RS Means 31 23 23.17
Leak Detection Piping	1	lump sum	$25,000	$25,000	2 inch pvc monitoring pipes above primary liner and Leak dete	AMEC Estimate
Leak Detection Equip, Instrument. & Telemetr	1	lump sum	$75,000	$75,000	Water level sensors, data logger and phone based comm syst	AMEC Estimate
2 inch ID schd 80 Polyethylene pipe	2,500	LF	$2.00	$5,000		RS Means 33 11 13.25 2120 (rounded up)
48 inch depth pipe trench	2,500	LF	$4.23	$10,575	2'w x 4'd trench, 3/8cy excavator, including compaction and ba	RS Means G1030 807 1330
Sand Bedding	2,500	LF	$3.00	$7,500	Pipe bedding to 12" over pipe	RS Means G1030 815 1460
Power Line Extension	750	lf	$15.00	$11,250	Copper, XLP shielded 5kV 4/0 in 2" PVC 36" Deep with handh	RS Means 26 05 13.16 0800, 26 05 33.65 2350, 31 23 16.14 2200, 33 71 19.15 1050
Communications Line Extension	750	lf	$10.00	$7,500	Sheathed copper cable #10, 3 wire, in 2" PVC 36" deep with h	RS Means 26 05 19.55 1700, 26 05 33.65 2350, 31 23 16.14 2200, 33 71 19.15 1050
Evaporation Pond Subtotal				**$1,760,865**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	10%	%	$1,760,865	$176,087	10% of Construction Costs	AMEC Estimate
Construction Management	10%	%	$1,760,865	$176,087	10% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$352,173**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$1,760,865	$440,216	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$2,553,254**		

Notes: 1. RS Means indicates cost was obtained from RS Means Heavy Construction 2010 Cost Data

Annual O&M Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Monthly Electrical usage	36500	kw-Hr	$0.15	$5,475	Assumes 100 kw-Hr/day	AMEC Estimate
Maintenance Costs	5%	%	$1,073,906	$53,695	5% of Equipment Costs	AMEC Estimate
Annual Inspection	40	Hrs	$100	$4,000	2 person crew, 2 days in field/travel	AMEC Estimate
Annual Report	60	Hrs	$100	$6,000	Letter report transmitting data.	AMEC Estimate
Annual O&M Cost Subtotal				**$69,170**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$69,170	$6,917	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$76,087**		

Estimated Replacement Costs	**Quantity**	**Unit**	**Replac. Cost**	**Cost/Yr**	**Comments/Description**
Liner and Pond Capital Life	50	Years	$1,644,040	$32,881	
Piping Capital Life	50	Years	$51,825	$1,037	
Instrumentation Capital Life	15	Years	$75,000	$5,000	

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

SE Drainage Water Treatment - Surface treatment with IX & Discharge
January 11, 2011

Pumping Rate	5	gpm
Polymer addition rate @ 2ppm	0.12	lbs/day
Ferric Sulfate addition rate @ 4ppm	0.24	lbs/day
Sulfuric Acid @ 93 ppm	5.59	lbs/day
Annual Vol to Treat	2,628,000	Gals
	8.1	Ac-Ft

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Treatment system						
Bench Scale Treatment Study	1	lump sum	$50,000	$50,000	3rd Party Consultant, design, specs & plans	Toby Estimate
Mobilization/Demobilization	1	lump sum	$10,000	$10,000		
Treatment System Skid	1	lump sum	$50,000	$50,000		AMEC Estimate
Process Pumps and VFDs	2	ea	$15,000	$30,000		
Inlet Flow Meter	1	ea	$1,500	$1,500	four, 50 gallon Polyethylene	Toby Estimate
EQ Tank	5000	gal	$3	$15,000	5,000 gallon, double walled, steel	AMEC Estimate
Mixers	4	ea	$250	$1,000		AMEC Estimate
Additive Metering Equipment	4	lump sum	$250	$1,000		AMEC Estimate
Influent Filtration	1	lump sum	$75,000	$75,000	Scaled from AES Full-Scale System	AMEC Estimate
Ion Exchange Vessels and Media	1	lump sum	$200,000	$200,000	Scaled from AES Full-Scale System	AMEC Estimate
IX Storage	1	lump sum	$7,500	$7,500	Scaled from AES Full-Scale System	AMEC Estimate
Coagulation/Filtration Reagents and Metering	1	lump sum	$58,000	$58,000	Scaled from AES Full-Scale System	AMEC Estimate
Media Filters	1	lump sum	$75,000	$75,000	Scaled from AES Full-Scale System	AMEC Estimate
Backwash Tank	1	lump sum	$25,000	$25,000	Scaled from AES Full-Scale System	AMEC Estimate
Clarifier	1	lump sum	$85,000	$85,000	Scaled from AES Full-Scale System	AMEC Estimate
Solids Storage Tank/Thickener	1	lump sum	$45,000	$45,000	Scaled from AES Full-Scale System	AMEC Estimate
Filter Press	1	lump sum	$105,000	$105,000	Scaled from AES Full-Scale System	AMEC Estimate
Sludge Storage Container	2	lump sum	$5,000	$10,000	20-cy Roll-off container	Quote
Recycle System	1	lump sum	$30,000	$30,000	Scaled from AES Full-Scale System	AMEC Estimate
Effluent System	1	lump sum	$30,000	$30,000	Scaled from AES Full-Scale System	AMEC Estimate
Air Compressor System	1	lump sum	$30,000	$30,000	Scaled from AES Full-Scale System	AMEC Estimate
Electrical/Controls/HVAC	5%	%	$874,000	$43,700		AMEC Estimate
Misc Process Piping/Valves	5%	%	$874,000	$43,700		AMEC Estimate
Unidentified Equipment	5%	%	$874,000	$43,700		AMEC Estimate
Equipment Installation	10%	%	$874,000	$87,400		AMEC Estimate
2 inch ID schd 80 Polyethylene pipe	2,500	LF	$2.00	$5,000		RS Means 33 11 13.25 2120
48 inch depth pipe trench	2,500	LF	$4.23	$10,575	2'w x 4'd trench, 3/8cy exc., incl. compact. & backfill	RS Means G1030 807 1330
Sand Bedding	2,500	LF	$3.00	$7,500	Pipe bedding to 12" over pipe	RS Means G1030 815 1460
Transformer & Elec Pannel	1	Lump Sum	$30,000	$30,000		AMEC Estimate
Power Line Extension	200	lf	$15.00	$3,000		AMEC Estimate
Communications Line Extension	200	lf	$10.00	$2,000		AMEC Estimate
Treatment System Subtotal				**$1,210,575**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	10%	%	$1,210,575	$121,058	10% of Construction Costs	AMEC Estimate
Construction Management	10%	%	$1,210,575	$121,058	10% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$242,115**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$1,210,575	$302,644	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$1,755,334**		

Notes: 1. RS Means indicates cost was obtained from RS Means Heavy Construction 2010 Cost Data
2. Costs developed from and based on Advanced Environmental Sciences capital cost estimate included in Attachment 1.

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Monthly Electrical usage	292000	kw-Hr	$0.15	$43,800	Assumes 800 kw-Hr/day	AMEC Estimate
Maintenance Costs	3%	%	$1,005,100	$30,153	5% of Equipment Costs	AMEC Estimate
Full Time Operator	1	Annual Salary	$60,000	$60,000	1 Full-time employees	AMEC Estimate
IX Resin Regeneration	508	cf	$60	$30,480	Assumes one complete changeout per year	AES Estimate
IX Replacement	127	cf	$167	$21,209	Assumes replacement after 4 regenerations	AES Estimate
Polymer addition rate @ 2ppm	43.8	lb	$2.63	$115	Includes freight to Douglas, WY	Beckart Environmental plus freight
Ferric Sulfate addition rate @ 4ppm	87.6	lb	$0.10	$9	Includes freight to Douglas, WY	Beckart Environmental plus freight
Sulfuric Acid @ 93 ppm	2040.4	lb	$0.25	$510	Includes freight to Douglas, WY	BASF, cost plus freight
Sludge Sampling	1.0	Lump Sum	$1,085.00	$1,085		
NPDES Sampling	1.0	Lump Sum	$25,000.00	$25,000	Monthly compliance sampling	
Annual Inspection	40	Hrs	$100	$4,000		
Annual Report	60	Hrs	$100	$6,000		
Annual O&M Cost Subtotal				**$222,361**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$222,361	$22,236	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$244,597**		

Estimated Replacement Costs	Quantity	Unit	Replac. Cost
Utilities	50	Years	$58,075
Equipment Capital Life	25	Years	$1,102,500

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

Highland Pit ISRM Alternatives
January 11, 2011

			Alternative A Anaerobic Treatment		Alternative B Anaerobic Treatment	
Construction Costs	**Unit Price**	**Unit**	**Quantity**	**Cost**	**Quantity**	**Cost**
Mobilization/Demobilization	$50,000	LS	1	$50,000	1.5	$75,000
Improve access road						
Blade Road (20' wide)	$6,000	mi	3.7	$22,200	3.7	$22,200
Place and compact 4" thick road base (3/4-inch rock)	$62,000	mi	3.7	$229,400	3.7	$229,400
Create additional access road & turnaround						
Doze Road (20' wide)	$8,500	mi	2	$17,000	0	$0
Blade Road (20' wide)	$6,000	mi	2	$12,000	0	$0
Place and compact 4" thick road base (3/4-inch rock)	$62,000	mi	2	$124,000	0	$0
30 ft Diameter Turnaround	$1,500	LS	1	$1,500	0	$0
Tank Equipment						
5,000 gal mixing tank	$2	gal	5,000	$10,000	5,000	$10,000
5,000 gal molasses holding tanks	$2	gal	15,000	$30,000	10,000	$20,000
5,000 gal methanol holding tank	$2	gal	15,000	$30,000	7,500	$15,000
5,000 gal macronutrient holding tank	$2	gal	5,000	$10,000	5,000	$10,000
1,000 gallon diesel storage tank (AST)	$2	gal	1,000	$2,000	1000	$2,000
Transfer Pumps & Generator	$12,000	LS	1	$12,000	1	$12,000
Misc. Pump Station Parts	$5,000	ea	2	$10,000	1	$5,000
Labor, Installation (2 laborers)	$3,645	day	10	$36,450	5	$18,225
Labor, Operation at Tanks	$1,430	day	34	$48,620	56	$80,080
Rentals						
Pump Rental, 1000 gpm	$3,100	monthly	8	$24,800	2	$6,200
Fuel (diesel for pumps and boats)	$3.50	gallon	6,400	$22,400	5,500	$19,250
6-inch Pipe, North withdrawal (3,200 LF, HDPE)	$3,800	monthly	2	$7,600	0	$0
6-inch Pipe, East withdrawal (10,600 LF, HDPE)	$12,600	monthly	2	$25,200	0	$0
10-inch Pipe (3,200 LF, aluminum)	$7,775	monthly	2	$15,550	0	$0
Mob/Demob/Install/Maintainance	$49,500	LS	1	$49,500	0	$0
Rail Spur rental	$10,000	monthly	2	$20,000	2	$20,000
Meter for additives	$2,000	ea	3	$6,000	3	$6,000
Floating Barge Facility						
Floating Barge	$7,000	LS	0	$0	1	$7,000
Piping, 3" diameter, Class 150 PVC	$4.31	lf	0	$0	350	$1,509
Installation, Removal	$1,430	day	0	$0	6	$8,580
6-inch HDPE Pipe	$6.50	lf	0	$0	1400	$9,100
Pipe Floats	$300	ea	0	$0	165	$49,500
Boat Rental and Captain	$400	day	0	$0	56	$22,400
Labor, Operation on Boat	$1,430	day	0	$0	56	$80,080
Additives						
Molasses, including rail freight	$0.95	gal	1,500,000	$1,418,919	1,500,000	$1,418,919
Methanol, including rail freight	$1.17	gal	1,000,000	$1,170,000	1,000,000	$1,170,000
Ammonia (liquid 82-0-0), including rail freight	$490	ton	563	$276,073	563	$276,073
o-Phosphate (liquid, 0-54-0), including rail freight	$510	ton	450	$229,736	450	$229,736
Truck Delivery	$60	1000 gal	2,656	$159,368	2,656	$159,368
Security						
Security Guards, 24 hrs/dy (2)	$672	day	68	$45,696	112	$75,264
Spill Prevention, Rail Yard	$20,000	LS	1	$20,000	1	$20,000
Sampling						
Mixing Samples	50	ea	6	$300	6	$300
Confirmation Samples	200	ea	6	$1,200	6	$1,200
Alternative Subtotal				**$4,137,500**		**$4,079,400**
Engineering/Support Costs	**Unit Price**	**Unit**	**Quantity**	**Cost**	**Quantity**	**Cost**
Design	10%	LS	--	$413,750	--	$407,940
Construction Management	10%	LS	--	$413,750	--	$407,940
Engineering/Support Subtotal			--	**$827,500**		**$815,880**
Contingency	**Unit Price**	**Unit**	**Quantity**	**Cost**	**Quantity**	**Cost**
Contingency	30%	LS		$1,241,250		$1,223,820
Capital Cost with Contingency				**$6,206,250**		**$6,119,100**

Highland Pit ISRM Alternatives - Backup Calculations and Assumptions

Volume Calculations	units	Alternative A		Alternative B		Macronutrients	
		Molasses	Methanol	Molasses	Methanol	Ammonia	o-Phosphate
Total Volume	gallons	1,500,000	1,000,000	1,500,000	1,000,000	86,679	69,302
Operational Hours/Day	Hrs/Day	10	10	10	10	10	10
Number of Days of Operation	days	34	34	56	56	34	34
Dosing Rate (gpm)	gpm	75	50	45	30	1.77	1.42
Gallons used per day	gallons	45,000	30,000	27,000	18,000	2,549	2,038
Truck Size (gal)	gallons	5,000	7,500	5,000	7,500	5,000	
Number Truck trips per day	trips	3	3	3	3	1	
Number of Trucks needed per day	trucks	3	2	2	1	1	
Holding Tank Size (gal)	gallons	15,000	15,000	10,000	7,500	5,000	

LAYOUT

Alternative A

Pump water from lake, add nutrients and carbon source, gravity feed back to lake

Mixing tank and materials holding tanks located near buildings on west side of lake.
Withdrawal points located on northern and eastern sides of lake. Road constructed to eastern withdrawal point.
Discharge point (gravity fed) on southern end of lake.

Alternative B

Pump additives into lake using a moveable floating platform with pump

Mixing tank and materials holding tanks located near buildings on west side of lake.
Water is pumped from the shore of the lake and additives are added to the pump inlet to mix/disperse additives at the discharge
System consists of a floating pipe with movable outlet to disperse additives.
Crew of 2 to observe mixing/deliveries near tanks and crew of 2 plus boat captain to observe additive injection

ASSUMPTIONS

Rail service will be available for delivery of equipment and supplies
A rail spur will be available for rental for the full duration of the project and will have enough capacity to receive the additives, as needed each day.
Mixing samples will be collected 1/day for the first 3 days, then once per week for up to 4 weeks.
Mixing samples will be analyzed for TOC
Confirmation samples will be analyzed for TOC, uranium, radium, selenium, iron, manganese, sulfate, and sulfide
1.5 hour drive from Douglas, WY to Highland Open Pit Lake, $100/hr for truck and driver
1 ton of molasses = 185 gallons
1 ton of fertilizer = 154 gallons (13 lbs/gal)
Ammonia and o-phosphate are obtained from liquid fertilizer

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

Highland Pit Ex-Situ Treatment with IX
January 11, 2011

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Treatment Building and Site Work	1	lump sum	$409,920	$409,920		AES estimate
Inlet Headworks	1	lump sum	$126,000	$126,000		AES estimate
Influent Filtration	1	lump sum	$367,472	$367,472		AES estimate
Ion Exchange Vessels and Media	1	lump sum	$1,331,620	$1,331,620		AES estimate
IX Storate	1	lump sum	$32,480	$32,480		AES estimate
Coagulation/Filtration Reagents and Metering	1	lump sum	$119,392	$119,392		AES estimate
Media Filters	1	lump sum	$366,800	$366,800		AES estimate
Backwash Tank	1	lump sum	$61,786	$61,786		AES estimate
Clarifier	1	lump sum	$169,104	$169,104		AES estimate
Solids Storage Tank/Thickener	1	lump sum	$91,840	$91,840		AES estimate
Filter Press	1	lump sum	$196,224	$196,224		AES estimate
Recycle System	1	lump sum	$29,570	$29,570		AES estimate
Effluent System	1	lump sum	$64,659	$64,659		AES estimate
Air Compressor System	1	lump sum	$38,360	$38,360		AES estimate
Electrical/Controls/HVAC	1	lump sum	$812,000	$812,000		AES estimate
Misc Process Piping/Valves	1	lump sum	$603,181	$603,181		AES estimate
Unidentified Equipment	1	lump sum	$603,181	$603,181		AES estimate
Equipment Installation	10%	%	$5,423,589	$542,359		AES estimate
Power Line Extension	0	lf	$15.00	$0		AES estimate
Communications Line Extension	0	lf	$10.00	$0		AES estimate
Treatment System Subtotal				**$5,965,948**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	12%	%	$5,965,948	$715,914	12% of Construction Costs	AES estimate
Construction Management	10%	%	$5,965,948	$596,595	10% of Construction Costs	AES estimate
Geotechnical Study	1	lump sum	$65,000	$65,000		AES estimate
Bench- and Pilot-Scale Testing	1	lump sum	$200,000	$200,000		AES estimate
Engineering/Support Subtotal				**$1,577,509**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	25%	%	$5,965,948	$1,491,487	25% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$9,034,943**		

Notes: 1. Costs developed from Advanced Environmental Sciences capital cost estimate included in Attachment 1.

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Monthly Electrical usage	972360	kw-Hr	$0.15	$145,854	111 kw	AES Estimate
IX Regen	6350	cf	$56.55	$359,093	Assume 127cy/vessel, 50 vessels/yr	AES Estimate
IX Replacement	1588	cf	$167.00	$265,113	Assume resin replacement ever 4 regens	AES Estimate
Chemicals	525600	Kgal	$0.24	$126,670	Combined cost for pH adjust, metal salt, and polyelectr.	AES Estimate
Maintenance Costs	3%	%	$5,013,669	$150,410	5% of Equipment Costs	AMEC Estimate
Full Time Operations Labor	4	Salary	$60,000	$240,000	4 Full-time employees	AES Estimate
Sludge Sampling, Handling, T&D	75	Tons	$420	$31,500	Assumes hazardous waste	AES Estimate
NPDES Sampling	1	LS	$25,000	$25,000		AES Estimate
Annual O&M Cost Subtotal				**$1,343,639**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$1,343,639	$134,364	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$1,478,003**		

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
Equipment Capital Life	25	Years	$4,712,937	$188,517	
Piping and Utilities Capital Life	50	Years	$802,099	$16,042	
Building Capital Life	100	Years	$409,920	$4,099	

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

Institutional Controls
January 11, 2011

Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Construction Costs						
Mobilization/Demobilization	1	LS	$10,000	$10,000		AMEC Estimate
Fencing	53,000	LF	$23	$1,219,000	Approximately 10 linear miles, 6-ft high with barbed wire	RSMeans 32 31 13.20 200
Livestock Gates	2	ea	$1,500	$3,000		RSMeans 32 31 13.20 5000
Construction Subtotal				**$1,232,000**		
Engineering/Support Costs	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Design	3%	%	$1,232,000	$36,960	3% of Construction Costs	AMEC Estimate
Construction Management	3%	%	$1,232,000	$36,960	3% of Construction Costs	AMEC Estimate
Engineering/Support Subtotal				**$73,920**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	5%	%	$1,232,000	$61,600	5% of Construction Costs	AMEC Estimate
Capital Cost w/ Contingency				**$1,367,520**		

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Fence Maintenance Costs	2%	%	$1,232,000	$24,640	2% of Construction Costs	AMEC Estimate

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
Equipment Capital Life	50	Years	$1,232,000	$24,640	Fencing

Corrective Action Cost Estimate
Basis of Estimate
Highland Uranium Project

Compliance Monitoring
January 11, 2011

Number of Wells		Pit Lake
Number	Depth	No. Samples
4	55	1

Replacement Construction Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Mobilization/Demobilization	1	LS	$5,000	$5,000		AMEC Estimate
Well Installation - 4 inch	220	LF	$100	$22,000	Including drilling and all well materials	AMEC Estimate
Well Completion Materials	4	Ea	$1,000	$4,000		AMEC Estimate
Well vault with Cover	4	LS	$5,000	$20,000	5 ft x 3ft, precast concrete w/ bilco cover installed	Colorado Precast(vault), Dalco(cover) + Installation
Replacement Construction Subtotal				**$51,000**	**Wells already installed, not paid as capital**	

Estimated Replacement Costs	Quantity	Unit	Replac. Cost	Cost/Yr	Comments/Description
Equipment Capital Life	50	Years	$51,000	$1,020	Wells

Annual O&M Costs	Quantity	Unit	Unit Rate	Est. Subtotal	Comments/Description	Source
Maintenance Costs	5%	%	$51,000	$2,550	5% of Well Costs	AMEC Estimate
Annual Compliance Monitoring	40	Hrs	$100	$4,000	2 person crew, 2 days in field/travel	AMEC Estimate
Annual Water Quality Analyses	5	Ea	$1,000	$5,000	1 annual sample per well	AMEC Estimate
Annual Compliance Reporting	60	Hrs	$100	$6,000	Letter report transmitting data.	AMEC Estimate
Annual O&M Cost Subtotal				**$17,550**		
Contingency	**Quantity**	**Unit**	**Unit Rate**	**Est. Subtotal**	**Comments/Description**	**Source**
Contingency	10%	%	$17,550	$1,755	10% of annual costs	AMEC Estimate
Annual O&M Cost w/ Contingency				**$19,305**		

Appendix E

EXHIBIT 2

2009 AND 2010 GROUNDWATER AND SURFACE WATER QUALITY DATA

Appendix E

Southeast Drainage Groundwater Monitoring Data

Well Number	Sample Date	Arsenic (As)	As	Cadmium (Cd)	Cd	Chloride (Cl)	Cl	Chromium (Cr)	Cr	Gross Alpha-Rn222 & U	GA	Lead (Pb)	Pb	Nickel (Ni)	Ni	Ra226 + Ra228		Selenium (Se)	Se	Sulfate (SO4)	SO4	Thorium 230 (Th230)	Th230	Uranium (U-Nat)	U
BBL-1	07/25/06	0.00067	U	0.000099	U	3.4		0.0004		1	U	0.000047	U	0.0023		1.2	U	0.00051		92.6		0.2	U	0.0003	U
BBL-1	11/20/06					3.4				1	U									85.2					
BBL-1	03/14/07	0.00067	U	0.000099	U	3.2		0.00029		1	U	0.000047	U	0.00098		1.2	U	0.0005	U	97.4		0.2	U	0.0003	U
BBL-1	06/04/07					3.4				1	U					1.2	U			84.9		0.2	U	0.0003	U
BBL-1	08/14/07	0.0007	U	0.000099	U	3.3		0.00042	U	1	U	0.00016		0.0021		1.2	U	0.00053	U	88.1		0.2	U	0.0003	U
BBL-1	11/05/07	0.0007	U	0.000099	U	3.1		0.00042	U	1	U	0.000053		0.0018		1.2	U	0.00056		85.7		0.2	U	0.0003	U
BBL-1	03/13/08	0.0007	U	0.000099	U	3.4		0.0006	U	1	U	0.000063		0.003		1.2	U	0.0007		95.2		0.2	U	0.0003	U
BBL-1	05/12/08	0.0007	U	0.000099	U	3.2		0.0006	U	1.2		0.000069		0.0005	U	1.2	U	0.00035	U	99.6		0.2	U	0.0003	U
BBL-1	08/22/08	0.00095	U	0.00021	U	4.1		0.00068	U	0.8		0.00005	U	0.0005	U	1.63	U	0.0003	U	89.1		0.2	U	0.0003	U
BBL-1	12/12/08	0.00095	U	0.00021	U	8.3		0.00068	U	1.4		0.00005	U	0.0005	U	2.71		0.0003	U	88.7		0.2	U	0.0003	U
BBL-1	03/04/09	0.00095	U	0.00021	U	3.1		0.00068	U	1		0.000057		0.0005	U	2.76		0.00099	U	91.3		0.2	U	0.0003	U
BBL-1	05/28/09	0.00095	U	0.0002	U	3.4		0.0006	U	0.7		0.00005	U	0.0005	U	1.45	U	0.00099	U	101		0.2	U	0.0003	U
BBL-1	08/20/09	0.00095	U	0.0002	U	3.2		0.0006	U	0.9		0.000064		0.0005	U	1.65	U	0.00099	U	88.8		0.2	U	0.0003	U
BBL-1	11/17/09	0.00095	U	0.0002	U	3.2		0.0006	U	0.9		0.00005	U	0.0005	U	1.73	U	0.00099	U	99.3		0.1	U	0.0003	U
BBL-1	03/15/10	0.00095	U	0.0002	U	3.1		0.0006	U	0.9		0.00007		0.0005	U	1.44		0.00099	U	86.3		0.1	U	0.0003	U
BBL-1	05/18/10	0.00095	U	0.0002	U	3.2		0.0006	U	0.4	U	0.00005		0.0005	U	1.8	U	0.00099	U	86.7		0.2	U	0.0003	U
BBL-1	08/17/10	0.00095	U	0.0002	U	2.8		0.0006	U	0.7	U	0.000091		0.0005	U	1.62		0.00025	U	80.6		0.1	U	0.0003	U
BBL-1	10/12/10	0.00095	U	0.0002	U	2.9		0.0006	U	0.7	U	0.000081		0.00071		1.26	U	0.00025	U	93.1		0.2	U	0.0003	U
	min	**0.00067**	U	**0.000099**	U	**2.8**		**0.00029**	U	**0.4**	U	**0.000047**	U	**0.0005**	U	**1.2**	U	**0.00025**	U	**80.6**		**0.1**	U	**0.0003**	U
	max	**0.00095**	U	**0.00021**	U	**8.3**		**0.00068**		**1.4**		**0.00016**		**0.003**		**2.76**		**0.00099**		**101**		**0.2**	U	**0.0003**	U
	mean	**0.00087**	U	**0.00017094**	U	**3.8**		**0.000578**		**0.9**		**0.00007**		**0.00100688**		**1.68**		**0.00065125**		**90.9**		**0.2**	U	**0.0003**	U
	median	**0.00095**	U	**0.0002**	U	**3.2**		**0.0006**	U	**1**		**0.000055**		**0.0005**	U	**1.44**		**0.000545**	U	**89.0**		**0.2**	U	**0.0003**	U
	n	**16**		**16**		**18**		**16**		**18**		**16**		**16**		**17**		**16**		**18**		**17**		**17**	
	%ND	**100**		**100**				**88**		**56**		**38**		**63**		**76**		**81**				**100**		**100**	
BBL-2	07/25/06	0.0034	U	0.0005	U	145		0.0023		1	U	0.000047	U	0.0213		1.2	U	0.0106		1740		0.2	U	0.0624	
BBL-2	11/20/06					133				1	U									1560					
BBL-2	03/14/07	0.0019		0.00028		104		0.00046		1	U	0.0013		0.0322		1.2	U	0.0387		1460		0.2	U	0.0554	
BBL-2	06/04/07					109				2.1						1.7	U			1400		0.2	U	0.0594	
BBL-2	08/14/07	0.0017		0.000099	U	118		0.00043		1.3		0.0014		0.0173		1.2	U	0.0357		1330		0.2	U	0.0595	
BBL-2	11/05/07	0.0043		0.00016		104		0.00042	U	1	U	0.002		0.0188		1.2	U	0.0489		1380		0.2	U	0.0629	
BBL-2	03/13/08	0.0015		0.00015		97.7		0.0006	U	1		0.0003		0.0739		1	U	0.0501		1420		0.2	U	0.0567	
BBL-2	05/12/08	0.0007	U	0.00016		90.1		0.0006	U	1.9		0.0011		0.0137		1.2		0.0449		1350		0.2	U	0.0589	
BBL-2	08/21/08	0.00095	U	0.00021	U	114		0.00068	U	0.6	U	0.0019		0.014		1.61	U	0.0512		1610		0.2	U	0.0529	
BBL-2	12/12/08	0.00095	U	0.00021	U	82.7		0.00068	U	1.2		0.0021		0.0113		1.8		0.0538		1260		0.2	U	0.0528	
BBL-2	03/04/09	0.00095	U	0.00021	U	70.3		0.00068	U	1.1		0.0018		0.0116		1.97		0.0596		1180		0.1	U	0.0479	
BBL-2	05/28/09	0.00095	U	0.0002	U	71.9		0.0006	U	0.6		0.0016		0.0098		1.35	U	0.0553		1400		0.2	U	0.0481	
BBL-2	08/20/09	0.00095	U	0.0002	U	70.8		0.0006	U	0.8	U	0.0014		0.0105		1.4	U	0.0598		1280		0.2	U	0.0509	
BBL-2	11/17/09	0.00095	U	0.0002	U	72.3		0.0006	U	0.7	U	0.0023		0.0085		1.66	U	0.0777		1060		0.1	U	0.0468	
BBL-2	03/15/10	0.00095	U	0.0002	U	64.5		0.0006	U	0.6		0.00036		0.0069		1.53		0.0596		998		0.2	U	0.0482	
BBL-2	05/25/10	0.00095	U	0.0002	U	66.8		0.0006	U	0.4	U	0.00043		0.0072		1.67	U	0.0713		1020		0.2	U	0.0491	
BBL-2	08/17/10	0.00095	U	0.0002	U	64.7		0.0006	U	0.7	U	0.00026		0.0098		1.34		0.0722		941		0.2	U	0.0532	
BBL-2	10/12/10	0.00095	U	0.0002	U	60.4		0.0006	U	0.8		0.00022		0.0091		1.5		0.0718		1010		0.2	U	0.045	
	min	**0.0007**	U	**0.000099**	U	**60.4**		**0.00042**	U	**0.4**	U	**0.000047**	U	**0.0069**		**1**	U	**0.0106**		**941**		**0.1**	U	**0.045**	
	max	**0.0043**	U	**0.00028**		**145**		**0.0023**		**2.1**		**0.0023**		**0.0739**		**1.97**		**0.0777**		**1740**		**0.2**	U	**0.0629**	
	mean	**0.00142**	U	**0.00018613**	U	**84.6**		**0.000688**	U	**1.0**		**0.001220**		**0.01895**		**1.46**		**0.0562625**		**1245**		**0.2**	U	**0.05255**	
	median	**0.00095**	U	**0.0002**	U	**86.4**		**0.0006**	U	**1**	U	**0.00135**		**0.01145**		**1.40**	U	**0.05455**		**1340**		**0.2**	U	**0.0529**	
	n	**16**		**16**		**18**		**16**		**18**		**16**		**16**		**17**		**16**		**18**		**17**		**17**	
	%ND	**75**		**75**				**81**		**50**		**6**		**0**		**65**		**0**				**100**		**0**	

Appendix E

Southeast Drainage Groundwater Monitoring Data (continued)

Well Number	Sample Date	Arsenic (As)	As	Cadmium (Cd)	Cd	Chloride (Cl)	Cl	Chromium (Cr)	Cr	Gross Alpha-Rn222 & U	GA	Lead (Pb)	Pb	Nickel (Ni)	Ni	Ra226 + Ra228		Selenium (Se)	Se	Sulfate (SO4)	SO4	Thorium 230 (Th230)	Th230	Uranium (U-Nat)	U
BBL-3	07/26/06	0.0034	U	0.0005	U	196		0.0025		2.2		0.000047	U	0.0093		2.8		0.0025	U	1800		0.2	U	0.0513	
BBL-3	11/20/06					210				2.2										1670					
BBL-3	03/14/07	0.002		0.000099	U	206		0.00045		1.6		0.000047	U	0.0205		3.1		0.0017		1890		0.2	U	0.051	
BBL-3	06/04/07					227				2.9						4.2				1660		0.2	U	0.0508	
BBL-3	08/14/07	0.002		0.000099	U	222		0.00042	U	3.1		0.00046		0.0068		3.9		0.0025		1650		0.2	U	0.0482	
BBL-3	11/05/07	0.0026		0.000099	U	224		0.00042	U	1.8		0.00016		0.0078		8.9		0.0035		1860		0.2	U	0.0525	
BBL-3	03/13/08	0.0025		0.000099	U	240		0.0006	U	2.3		0.00012		0.0533		4.1		0.0031		1890		0.2	U	0.0476	
BBL-3	05/12/08	0.0019		0.000099	U	245		0.0006	U	3.1		0.0001		0.0034		5.2		0.00035	U	1770		0.2	U	0.0517	
BBL-3	08/22/08	0.0019		0.00021	U	307		0.00068	U	2.6		0.00008		0.0032		4.21		0.0003	U	2190		0.2	U	0.0473	
BBL-3	12/15/08	0.0019		0.00021	U	202		0.00068	U	3.1		0.00005	U	0.0028		7.24		0.0003	U	1760		0.2	U	0.0499	
BBL-3	03/04/09	0.0022		0.00021	U	222		0.00068	U	2.1		0.00005	U	0.0037		5.81		0.00099	U	1680		0.1	U	0.0476	
BBL-3	05/28/09	0.0016		0.0002	U	229		0.0006	U	2.1		0.00014		0.0051		4.59		0.00099	U	1900		0.1	U	0.0495	
BBL-3	08/18/09	0.0018		0.0002	U	235		0.0006	U	1.1		0.00005	U	0.0033		5.2		0.00099	U	1820		0.2	U	0.05	
BBL-3	11/17/09	0.0019		0.0002	U	251		0.0006	U	2.2		0.00005	U	0.0049		5		0.00099	U	1690		0.1	U	0.0547	
BBL-3	03/16/10	0.0016		0.0002	U	232		0.0006	U	3.3		0.00011		0.0027		5.3		0.00099	U	1680		0.2	U	0.0485	
BBL-3	05/25/10	0.0016		0.0002	U	254		0.0006	U	0.7		0.00016		0.0026		4.77		0.00099	U	1940		0.1	U	0.0589	
BBL-3	08/17/10	0.0016		0.0002	U	241		0.0006	U	1		0.00012		0.002		5.44		0.00025	U	1550		0.1	U	0.0548	
BBL-3	10/12/10	0.0015		0.0002	U	241		0.0006	U	1.3		0.00011		0.0032		5.9		0.00025	U	1680		0.2	U	0.0496	
	min	**0.0015**	**U**	**0.000099**	**U**	**196**		**0.00042**	**U**	**0.7**		**0.000047**	**U**	**0.002**		**2.8**		**0.00025**	**U**	**1550**		**0.1**	**U**	**0.0473**	
	max	**0.0034**	**U**	**0.0005**	**U**	**307**		**0.0025**		**3.3**		**0.00046**		**0.0533**		**8.9**		**0.0035**		**2190**		**0.2**	**U**	**0.0589**	
	mean	**0.00197**	**U**	**0.000189**	**U**	**241**		**0.0007**		**2.1**		**0.000142**		**0.0100063**		**5.45**		**0.001265**		**1800**		**0.2**	**U**	**0.051063**	
	median	**0.0019**	**U**	**0.0002**	**U**	**231**		**0.0006**	**U**	**2.2**		**0.000105**		**0.00355**		**5.00**		**0.00099**	**U**	**1765**		**0.2**	**U**	**0.05**	
	n	**16**		**16**		**18**		**16**		**18**		**16**		**16**		**17**		**16**		**18**		**17**		**17**	
	%ND	**6.25**		**100**				**88**		**0**		**38**		**0**		**0**		**75**				**100**		**0**	
BBL-4	07/26/06	0.0034	U	0.0005	U	175		0.0029		1	U	0.0004		0.0083		1.2	U	0.0148		1500		0.2	U	0.0662	
BBL-4	11/20/06					167				1	U									1460					
BBL-4	03/14/07	0.00067	U	0.000099	U	151		0.00058		1	U	0.00019		0.0198		1.2	U	0.0046		1490		0.2	U	0.0494	
BBL-4	06/04/07					160				1	U					1.2	U			1180		0.2	U	0.0411	
BBL-4	08/14/07	0.0007	U	0.000099	U	156		0.00042	U	1	U	0.00072		0.0106		1.2	U	0.0025		1160		0.2	U	0.0396	
BBL-4	11/05/07	0.0007	U	0.000099	U	152		0.00042	U	1	U	0.0002		0.0125		1.2	U	0.0032		1360		0.2	U	0.0451	
BBL-4	03/24/08	0.0007	U	0.000099	U	175		0.0006	U	1.3		0.00011		0.0095		1	U	0.0014		1340		0.2	U	0.0365	
BBL-4	05/12/08	0.0007	U	0.000099	U	175		0.0006	U	1.7		0.00019		0.0079		1.1	U	0.0012		1370		0.2	U	0.0383	
BBL-4	08/22/08	0.00095	U	0.00021	U	213		0.00068	U	0.6	U	0.00015		0.0076		1.51	U	0.0012		1220		0.2	U	0.0381	
BBL-4	12/15/08	0.00095	U	0.00021	U	123		0.00068	U	1.7		0.00005	U	0.0112		1.77		0.0012		1210		0.2	U	0.0394	
BBL-4	03/04/09	0.00095	U	0.00021	U	170		0.00068	U	0.9		0.00017		0.0102		1.74		0.0011		1300		0.2	U	0.0343	
BBL-4	06/18/09	0.00095	U	0.0002	U	283		0.0006	U	0.7	U	0.00014		0.0072		1.71	U	0.0013		1500		0.1	U	0.0367	
BBL-4	08/18/09	0.00095	U	0.0002	U	174		0.0006	U	0.8	U	0.000078		0.0082		1.4		0.0023		1450		0.2	U	0.0414	
BBL-4	11/17/09	0.00095	U	0.0002	U	178		0.0006	U	1.1		0.000098		0.0092		1.65	U	0.0019		1290		0.2	U	0.0379	
BBL-4	03/17/10	0.00095	U	0.0002	U	135		0.0006	U	2.1		0.00024		0.0019		1.17		0.00099	U	1180		0.3		0.0373	
BBL-4	05/26/10	0.00095	U	0.0002	U	213		0.0006	U	0.4	U	0.00016		0.0011		1.43	U	0.00099	U	1130		0.1	U	0.0408	
BBL-4	08/18/10	0.00095	U	0.0002	U	177		0.0006	U	0.7	U	0.000088		0.00071		1.39		0.0015		1430		0.1	U	0.0458	
BBL-4	10/13/10	0.00095	U	0.0002	U	157		0.0006	U	0.7	U	0.00011		0.0013		1.69		0.001		1310		0.1	U	0.0389	
	min	**0.00067**	**U**	**0.000099**	**U**	**123**		**0.00042**	**U**	**0.4**	**U**	**0.00005**	**U**	**0.00071**		**1**	**U**	**0.00099**	**U**	**1130**		**0.1**	**U**	**0.0343**	
	max	**0.0034**	**U**	**0.0005**	**U**	**283**		**0.0029**		**2.1**		**0.00072**		**0.0198**		**1.77**		**0.0148**		**1500**		**0.3**		**0.0662**	
	mean	**0.00102**	**U**	**0.000189**	**U**	**180**		**0.000725**		**1.1**		**0.000205**		**0.0074763**		**1.42**		**0.002348**		**1305**		**0.2**	**U**	**0.040663**	
	median	**0.00095**	**U**	**0.0002**	**U**	**172**		**0.0006**	**U**	**1**	**U**	**0.000155**		**0.00825**		**1.39**	**U**	**0.00135**		**1325**		**0.2**	**U**	**0.0394**	
	n	**16**		**16**		**18**		**16**		**18**		**16**		**16**		**17**		**16**		**18**		**17**		**17**	
	%ND	**100**		**100**				**88**		**67**		**6**		**0**		**65**		**13**				**94**		**0**	

Appendix E

Southeast Drainage Groundwater Monitoring Data (continued)

Well Number	Sample Date	Arsenic (As)	As	Cadmium (Cd)	Cd	Chloride (Cl)	Cl	Chromium (Cr)	Cr	Gross Alpha-Rn222 & U	GA	Lead (Pb)	Pb	Nickel (Ni)	Ni	Ra226 + Ra228		Selenium (Se)	Se	Sulfate (SO4)	SO4	Thorium 230 (Th230)	Th230	Uranium (U-Nat)	U
MFG-1	02/24/05	0.00531		0.0005	U	300		0.00109		1	U	0.001	U	0.0139		1.5	U	0.001	U	2020		0.2	U	0.362	
MFG-1	05/27/05					300				1.9						1.9	U			2090		0.2	U		
MFG-1	10/03/05	0.002	U	0.001	U	300		0.002	U			0.002	U	0.0132				0.002	U	2560				0.372	
MFG-1	12/19/05					280														2300					
MFG-1	03/14/06	0.00148		0.0005	U	300		0.001	U	1	U	0.001	U	0.0118		2.3	U	0.001	U	2370		0.2		0.358	
MFG-1	06/22/06					326														2320					
MFG-1	08/18/06	0.00067	U	0.00027		310		0.00089		1	U	0.00061		0.0344		3.3		0.0017		2240		0.2	U	0.146	
MFG-1	11/22/06					313														2020					
MFG-1	03/22/07	0.0007		0.00027		363		0.00052		1.6		0.00079		0.0286		2.5		0.0022		2370		0.2	U	0.298	
MFG-1	05/30/07					337														1940					
MFG-1	08/15/07	0.0007	U	0.00025		341		0.00051		1.9		0.0025		0.0256		2.9		0.0039		2040		0.2	U	0.133	
MFG-1	11/06/07					341														2110					
MFG-1	03/17/08	0.0007	U	0.00023		364		0.0006	U	2		0.00034		0.0234		2		0.0018		2270		0.2	U	0.355	
MFG-1	04/30/08	0.0007	U	0.00019		330		0.0006	U	2.3		0.00052		0.0105		1.9		0.00035	U	2240		0.2	U	0.395	
MFG-1	08/21/08	0.00095	U	0.00021	U	417		0.00068	U	0.6	U	0.00054		0.0091		3.59		0.0003	U	2540		0.2	U	0.344	
MFG-1	12/11/08	0.00095	U	0.00021		356		0.00068	U	2.5		0.00066		0.0082		3.68		0.00069		1890		0.2	U	0.364	
MFG-1	02/23/09	0.00095	U	0.00021	U	326		0.00068	U	1.4		0.00089		0.0078		2.68		0.0029		2040		0.2	U	0.358	
MFG-1	06/16/09	0.00095	U	0.0002	U	411		0.0006	U	1.1		0.0013		0.0076		3.44		0.0085		2520		0.1	U	0.362	
MFG-1	08/19/09	0.00095	U	0.00021		386		0.0006	U	0.8		0.00046		0.0079		2.56		0.0138		1860		0.2	U	0.352	
MFG-1	11/16/09	0.00095	U	0.0002	U	443		0.0006	U	0.7	U	0.00053		0.0071		4.1		0.0052		2050		0.2	U	0.388	
MFG-1	03/03/10	0.00095	U	0.0002	U	327		0.0006	U	1.5		0.0003		0.007		2.53		0.0036		2100		0.2	U	0.358	
MFG-1	06/08/10	0.00095	U	0.0002	U	367		0.0006	U	0.7		0.00029		0.007		4.26		0.0031		2120		0.1	U	0.367	
MFG-1	08/19/10	0.00095	U	0.00053		359		0.0006	U	0.7	U	0.00051		0.0111		4.14		0.0146		2160		0.1	U	0.371	
MFG-1	10/11/10	0.00095	U	0.00021		334		0.0006	U	1.2		0.00039		0.0085		3.57		0.0019		2150		0.1	U	0.367	
	min	**0.00067**	U	**0.00019**	U	**280**		**0.00051**	U	**0.6**	U	**0.00029**	U	**0.007**		**1.5**	U	**0.0003**	U	**1860**		**0.1**	U	**0.133**	
	max	**0.00531**		**0.001**		**443**		**0.002**		**2.5**		**0.0025**		**0.0344**		**4.26**		**0.0146**		**2560**		**0.2**		**0.395**	
	mean	**0.00121**		**0.00031**		**343**		**0.000747**		**1.3**		**0.00081**		**0.0135**		**2.94**		**0.0038**		**2180**		**0.2**	U	**0.336**	
	median	**0.00095**	U	**0.00021**		**335.5**		**0.0006**		**1.15**		**0.00058**		**0.0098**		**2.79**		**0.0021**		**2135**		**0.2**	U	**0.36**	
	n	**18**		**18**		**24**		**18**		**18**		**18**		**18**		**18**		**18**		**24**		**18**		**18**	
	%ND	**83**		**50**		**0**		**78**		**33**		**17**		**0**		**17**		**28**		**0**		**94**		**0**	
TT-4	02/17/09	0.00095	U	0.00021	U	21		0.00068	U	1.5		0.00043		0.00092		1.57	U	0.00099	U	545		0.1	U	0.0269	
TT-4	05/27/09	0.00095	U	0.0002	U	23.6		0.0006	U	1.2		0.00005	U	0.00065		1.38	U	0.00099	U	656		0.1	U	0.0284	
TT-4	08/18/09	0.00095	U	0.0002	U	24		0.0006	U	0.7	U	0.00005	U	0.0005	U	1.4	U	0.00099	U	548		0.2	U	0.029	
TT-4	11/18/09	0.00095	U	0.0002	U	21.7		0.0006	U	0.8		0.00005	U	0.00088		1.69	U	0.00099	U	539		0.1	U	0.0264	
TT-4	03/18/10	0.00095	U	0.0002	U	19.9		0.0006	U	1.3		0.00013		0.0015		1.4	U	0.00099	U	509		0.2	U	0.0303	
TT-4	05/26/10	0.00095	U	0.0002	U	66.3		0.0006	U	0.5	U	0.000084		0.0012		1.39	U	0.00099	U	592		0.2	U	0.0326	
TT-4	08/10/10	0.00095	U	0.0002	U	21		0.0006	U	0.6	U	0.0001		0.001		1.13	U	0.00025	U	535		0.2	U	0.034	
TT-4	10/20/10	0.00095	U	0.0002	U	19.3		0.0006	U	0.7	U	0.00012		0.0011		1.6	U	0.00025	U	476		0.2	U	0.0309	
	min	**0.00095**	U	**0.0002**	U	**19.3**		**0.0006**	U	**0.5**	U	**0.00005**	U	**0.0005**	U	**1.13**	U	**0.00025**	U	**476**		**0.1**	U	**0.0264**	
	max	**0.00095**	U	**0.00021**	U	**66.3**		**0.00068**	U	**1.5**		**0.00043**		**0.0015**		**1.69**	U	**0.00099**	U	**656**		**0.2**	U	**0.034**	
	mean	**0.00095**	U	**0.00020**	U	**30.2**		**0.000616**	U	**0.93**		**0.00015**		**0.000975**		**1.438**	U	**0.000768**	U	**553**		**0.2**	U	**0.02989**	
	median	**0.00095**	U	**0.0002**	U	**21.4**		**0.0006**	U	**0.75**		**0.000092**		**0.00096**		**1.4**	U	**0.00099**	U	**542**		**0.2**	U	**0.02965**	
	n	**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**	
	%ND	**100**		**100**		**0**		**100**		**50**		**38**		**13**		**100**		**100**		**0**		**100**		**0**	

Appendix E

Southeast Drainage Groundwater Monitoring Data (continued)

Well Number	Sample Date	Arsenic (As)	As	Cadmium (Cd)	Cd	Chloride (Cl)	Cl	Chromium (Cr)	Cr	Gross Alpha-Rn222 & U	GA	Lead (Pb)	Pb	Nickel (Ni)	Ni	Ra226 + Ra228		Selenium (Se)	Se	Sulfate (SO4)	SO4	Thorium 230 (Th230)	Th230	Uranium (U-Nat)	U
TT-5	02/17/09	0.002		0.00021	U	7.5		0.00068	U	0.6	U	0.00016		0.0005	U	1.63	U	0.00099	U	281		0.2	U	0.0093	
TT-5	05/27/09	0.0025		0.0002	U	23.2		0.0006	U	0.8		0.00005	U	0.00071		1.42	U	0.00099	U	760		0.2	U	0.0246	
TT-5	08/18/09	0.0021		0.0002	U	18.1		0.0006	U	0.7	U	0.00005	U	0.0005	U	1.52	U	0.00099	U	613		0.2	U	0.0163	
TT-5	11/19/09	0.0021		0.0002	U	9.5		0.0006	U	1		0.00005	U	0.0005	U	1.78	U	0.00099	U	396		0.1	U	0.0135	
TT-5	03/17/10	0.0022		0.0002	U	12		0.0006	U	0.9		0.00013		0.0009		1.74	U	0.00099	U	397		0.1	U	0.0143	
TT-5	05/26/10	0.0021		0.0002	U	29.9		0.0006	U	0.5	U	0.00029		0.00091		1.28	U	0.00099	U	756		0.2	U	0.0363	
TT-5	08/11/10	0.002		0.0002	U	17.1		0.0006	U	0.6	U	0.00014		0.00099		1.16	U	0.00025	U	539		0.2	U	0.0227	
TT-5	10/20/10	0.0021		0.0002	U	9.1		0.0006	U	0.7	U	0.000052		0.00074		2.01		0.00025	U	365		0.1	U	0.0157	
	min	**0.002**		**0.0002**	U	**7.5**		**0.0006**	U	**0.5**	U	**0.00005**	U	**0.0005**	U	**1.16**	U	**0.00025**	U	**281**		**0.1**	U	**0.0093**	
	max	**0.0025**		**0.00021**	U	**29.9**		**0.00068**	U	**1**		**0.00029**		**0.00099**		**2.01**		**0.00099**	U	**760**		**0.2**	U	**0.0363**	
	mean	**0.00216**		**0.00020**	U	**16.4**		**0.000616**	U	**0.7**		**0.00013**		**0.000724**		**1.57**		**0.000768**	U	**515**		**0.2**	U	**0.01983**	
	median	**0.0021**		**0.0002**	U	**14.6**		**0.0006**	U	**0.7**	U	**0.000091**		**0.000725**		**1.58**	U	**0.00099**	U	**468**		**0.2**	U	**0.016**	
	n	**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**	
	%ND	**0**		**100**		**0**		**100**		**63**		**38**		**38**		**88**		**100**		**0**		**100**		**0**	
TT-6	02/17/09	0.0046		0.00021	U	28.9		0.00068	U	0.6	U	0.0001		0.0012		1.79	U	0.00099	U	984		0.2	U	0.0199	
TT-6	05/27/09	0.0035		0.0002	U	14.7		0.0006	U	0.5		0.00005	U	0.00067		1.27	U	0.00099	U	612		0.2	U	0.015	
TT-6	08/17/09	0.0036		0.0002	U	23.3		0.0006	U	0.7	U	0.00005	U	0.0005	U	1.46	U	0.00099	U	729		0.1	U	0.0146	
TT-6	11/19/09	0.0043		0.0002	U	32.8		0.0006	U	1.2		0.00005	U	0.00095		1.81	U	0.00099	U	885		0.1	U	0.017	
TT-6	03/17/10	0.0039		0.0002	U	22.3		0.0006	U	0.8		0.000053		0.0011		1.21	U	0.00099	U	784		0.2	U	0.0211	
TT-6	05/26/10	0.0037		0.0002	U	16.6		0.0006	U	0.5	U	0.000067		0.0007		1.27	U	0.00099	U	573		0.2	U	0.015	
TT-6	08/11/10	0.0037		0.0002	U	16.9		0.0006	U	0.6	U	0.000076		0.0011		1.17	U	0.00025	U	498		0.1	U	0.0136	
TT-6	10/20/10	0.0048		0.0002	U	22.2		0.0006	U	0.9		0.000052	U	0.0014		1.16	U	0.00025	U	703		0.1	U	0.0174	
	min	**0.0035**		**0.0002**	U	**14.7**		**0.0006**	U	**0.5**	U	**0.00005**	U	**0.0005**	U	**1.16**	U	**0.00025**	U	**498**		**0.1**	U	**0.0136**	
	max	**0.0048**		**0.00021**	U	**32.8**		**0.00068**	U	**1.2**		**0.0001**		**0.0014**		**1.81**	U	**0.00099**	U	**984**		**0.2**	U	**0.0211**	
	mean	**0.00404**		**0.00020**	U	**22.5**		**0.000616**	U	**0.8**		**0.00006**		**0.000952**		**1.41**	U	**0.000768**	U	**725**		**0.2**	U	**0.01683**	
	median	**0.0038**		**0.0002**	U	**22.3**		**0.0006**	U	**0.65**		**0.000053**		**0.001025**		**1.27**	U	**0.00099**	U	**716**		**0.15**	U	**0.016**	
	n	**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**	
	%ND	**0**		**100**		**0**		**100**		**50**		**50**		**13**		**100**		**100**		**0**		**100**		**0**	
TT-7	02/17/09	0.00095	U	0.00021	U	97.7		0.00068	U	0.7		0.00067		0.0019		1.67	U	0.0025		964		0.1	U	0.0442	
TT-7	06/18/09	0.00095	U	0.0002	U	103		0.0006	U	1.7		0.00014		0.0016		2.35		0.0016		1160		0.1	U	0.0524	
TT-7	08/17/09	0.00095	U	0.0002	U	73.6		0.0006	U	2.8		0.00005	U	0.0013		1.3	U	0.00099	U	1000		0.1	U	0.0463	
TT-7	11/19/09	0.00095	U	0.0002	U	72.7		0.0006	U	1		0.0003		0.0014		1.6	U	0.00099		991		0.1	U	0.0405	
TT-7	03/16/10	0.00095	U	0.0002	U	54.5		0.0006	U	2		0.0011		0.0047		1.49	U	0.0019		841		0.1	U	0.0402	
TT-7	05/25/10	0.00095	U	0.0002	U	62.4		0.0006	U	0.7		0.00039		0.0026		1.16	U	0.0019		1020		0.2	U	0.0518	
TT-7	08/11/10	0.00095	U	0.0002	U	53.5		0.0006	U	0.6	U	0.00025		0.0017		1.18	U	0.00025	U	770		0.08	U	0.0483	
TT-7	10/22/10	0.00095	U	0.0002	U	53.4		0.001	U	0.7	U	0.000063		0.0051		1.31	U	0.0007		780		0.1	U	0.0495	
	min	**0.00095**	U	**0.0002**	U	**53.4**		**0.0006**	U	**0.6**	U	**0.00005**	U	**0.0013**		**1.16**	U	**0.00025**	U	**770**		**0.08**	U	**0.0402**	
	max	**0.00095**	U	**0.00021**	U	**103**		**0.001**	U	**2.8**		**0.0011**		**0.0051**		**2.35**		**0.0025**		**1160**		**0.2**	U	**0.0524**	
	mean	**0.00095**	U	**0.00020**	U	**72.7**		**0.000688**	U	**1.4**		**0.00041**		**0.00267**		**1.56**		**0.001358**		**946**		**0.12**	U	**0.04658**	
	median	**0.00095**	U	**0.0002**	U	**67.6**		**0.0006**		**0.85**		**0.000275**		**0.0018**		**1.4**		**0.001295**		**977.5**		**0.1**	U	**0.0473**	
	n	**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**	
	%ND	**100**		**100**		**0**		**100**		**25**		**13**		**0**		**88**		**25**		**0**		**100**		**0**	

Southeast Drainage Groundwater Monitoring Data (continued)

Well Number	Sample Date	Arsenic (As)	As	Cadmium (Cd)	Cd	Chloride (Cl)	Cl	Chromium (Cr)	Cr	Gross Alpha-Rn222 & U	GA	Lead (Pb)	Pb	Nickel (Ni)	Ni	Ra226 + Ra228		Selenium (Se)	Se	Sulfate (SO4)	SO4	Thorium 230 (Th230)	Th230	Uranium (U-Nat)	U
TT-8	02/16/09	0.0017		0.00021	U	267		0.00068	U	2.2		0.00024		0.0262		4.03		0.004		1760		0.1	U	0.117	
TT-8	05/28/09	0.0013		0.0002	U	259		0.0006	U	1.3		0.00006		0.0235		2.88		0.0019		1920		0.2	U	0.114	
TT-8	08/20/09	0.0012		0.0002	U	382		0.0006	U	1.1		0.00013		0.0273		2.78		0.0021		1810		0.2	U	0.116	
TT-8	11/19/09	0.0013		0.0002	U	258		0.0006	U	1		0.00012		0.028		3.8		0.0022		1950		0.1	U	0.127	
TT-8	03/15/10	0.0015		0.0002	U	242		0.0006	U	2.6		0.00019		0.0277		3.81		0.0017		1770		0.2	U	0.113	
TT-8	05/18/10	0.0014		0.0002	U	228		0.0006	U	0.6		0.00019		0.0283		3.25		0.0018		1590		0.2	U	0.117	
TT-8	08/11/10	0.0016		0.0002	U	230		0.0006	U	0.7		0.00019		0.0279		2.48		0.0017		1590		0.2	U	0.117	
TT-8	10/22/10	0.0016		0.0002	U	217		0.0006	U	1.9	U	0.00024		0.0292		3.94		0.0017		1470		0.2	U	0.118	
	min	**0.0012**		**0.0002**	U	**217**		**0.0006**	U	**0.6**		**0.00006**		**0.0235**		**2.48**		**0.0017**		**1470**		**0.1**	U	**0.113**	
	max	**0.0017**		**0.00021**	U	**382**		**0.00068**	U	**2.6**		**0.00024**		**0.0292**		**4.03**		**0.004**		**1950**		**0.2**	U	**0.127**	
	mean	**0.00145**		**0.00020**	U	**268**		**0.000616**	U	**1.5**		**0.00017**		**0.02708**		**3.35**		**0.00228**		**1728**		**0.2**	U	**0.1179**	
	median	**0.00145**		**0.0002**	U	**250**		**0.0006**	U	**1.2**		**0.00019**		**0.0278**		**3.53**		**0.00185**		**1765**		**0.2**	U	**0.117**	
	n	**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**		**8**	
	%ND	**0**		**100**		**0**		**100**		**13**		**0**		**0**		**0**		**0**		**0**		**100**		**0**	

Appendix E

North Fork Box Creek Surface Water Quality Data

Well Name	Sample Date	Alkalinity, Bicarbonate	Alkalinity, Carbonate		Calcium (Ca)	Chloride (Cl)	Alpha-Rn222 & U		Magnesium (Mg)	Potassium (K)	Ra226 + Ra228		Selenium (Se)		Sodium (Na)	Sulfate (SO4)	TDS	Thorium 230 (Th230)		Uranium (U-Nat)	pH-Field	Conductivity-Field	Temp (degC)
Box Creek 1	8/19/2008	11.4	51.4		43.5	8.1	0.8	--	37	11.2	1.74	U	0.0003	U	199	681	976	0.2	U	0.0097	10.18	1418	23.1
Box Creek 1	5/27/2009	60.3	26.1		79.1	11.2	1.1	--	61.5	7.48	1.41	U	0.00099	U	342	1080	1550	0.2	U	0.0367	9.05	2090	20.4
Box Creek 1	8/17/2009	30.4	36.9		86	18.9	0.5	U	77	12.4	1.7	U	0.00099	U	430	1220	2030	0.3	U	0.0188	9.57	2780	20.2
Box Creek 1	5/25/2010	166	5.4		158	15.7	0.5	U	82.9	9.42	1.14	U	0.00099	U	374	1360	2140	0.2	U	0.0301	8.08	4130	14.3
Box Creek 1	8/10/2010	76	9.9		179	26.8	0.7	--	119	16	1.28	U	0.00025	U	653	2070	3150	2.6	U	0.006	7.11	3920	22.3
	min	11.4	5.4		43.5	8.1	0.5	U	37	7.48	1.14	U	0.00025	U	199	681	976	0.2	U	0.006	7.11	1418	14.3
	max	166	51.4		179	26.8	1.1		119	16	1.74	U	0.00099	U	653	2070	3150	2.6	U	0.0367	10.18	4130	23.1
	mean	68.82	25.94		109.12	16.14	0.72		75.48	11.3	1.454	U	0.000704	U	399.6	1282.2	1969.2	0.7	U	0.02026	8.798	2867.6	20.06
	median	60.3	26.1		86	15.7	0.7		77	11.2	1.41	U	0.00099	U	374	1220	2030	0.2	U	0.0188	9.05	2780	20.4
	n	5	5		5	5	5		5	5	5		5		5	5	5	5		5	5	5	5
	%ND	0	0		0	0	40		0	0	100		100		0	0	0	100		0	0	0	0
Box Creek 2	8/19/2008	468	0.46	U	39.9	23.1	1.1	--	31	16.7	1.8	U	0.00052	J	179	141	772	0.2	U	0.0324	7.83	1174	23.7
Box Creek 2	5/27/2009	391	0.46	U	270	86.2	0.9	U	62.6	9.94	2.6		0.00099	U	353	1130	2150	0.6	U	0.0735	7.5	2730	23.3
Box Creek 2	5/25/2010	451	0.46	U	133	11.9	0.7	--	43.1	3.49	1.35	U	0.00099	U	228	554	1250	0.2	U	0.0886	7.58	1747	17.1
	min	391	0.46	U	39.9	11.9	0.9	U	31	3.49	1.35	U	0.00099	U	179	141	772	0.2	U	0.0324	7.5	1174	17.1
	max	468	0.46	U	270	86.2	1.1		62.6	16.7	2.6		0.00052		353	1130	2150	0.6	U	0.0886	7.83	2730	23.7
	mean	436.6667	0.46	U	147.6333	40.4	0.9		45.56667	10.04333	1.916667	U	0.000833		253.3333	608.3333	1390.667	0.333333	U	0.064833	7.636667	1883.667	21.36667
	median	451	0.46	U	133	23.1	0.9		43.1	9.94	1.8	U	0.00099	U	228	554	1250	0.2	U	0.0735	7.58	1747	23.3
	n	3	3		3	3	3		3	3	3		3		3	3	3	3		3	3	3	3
	%ND	0	100		0	0	33.33333		0	0	66.66667		66.66667		0	0	0	100		0	0	0	0
Box Creek 3	8/19/2008	390	62.1		29.7	37.1	1.8	--	40.3	13.4	1.53	U	0.00032	J	420	678	1470	0.2	U	0.05	8.83	2.08	22.9
Box Creek 3	5/27/2009	260	16		72.7	24.2	0.9	U	48.5	3.72	1.3	U	0.00099	U	345	824	1340	0.3	U	0.036	8.5	1922	20.1
Box Creek 3	8/17/2009	293	99.5		19.4	64.2	1	--	45.8	15.1	2.6	U	0.00099	U	376	702	1440	0.3	U	0.0241	9.13	2140	21.2
Box Creek 3	5/25/2010	413	3.7		127	83.8	0.5	U	54.4	4.79	1.84	U	0.00099	U	327	769	1530	0.1	U	0.0676	8.22	2110	17.7
Box Creek 3	8/10/2010	244	117		19.4	44.5	2	--	49.2	17	1.28	U	0.00032	J	425	725	1620	0.2	U	0.0197	9.37	2250	22.6
	min	244	3.7		19.4	24.2	0.5	U	40.3	3.72	1.28	U	0.00099	U	327	678	1340	0.1	U	0.0197	8.22	2.08	17.7
	max	413	117		127	83.8	2		54.4	17	2.6	U	0.00032		425	824	1620	0.3	U	0.0676	9.37	2250	22.9
	mean	320	59.66		53.64	50.76	1.24		47.64	10.802	1.71	U	0.000722		378.6	739.6	1480	0.22	U	0.03948	8.81	1684.816	20.9
	median	293	62.1		29.7	44.5	1		48.5	13.4	1.53	U	0.00099	U	376	725	1470	0.2	U	0.036	8.83	2110	21.2
	n	5	5		5	5	5		5	5	5		5		5	5	5	5		5	5	5	5
	%ND	0	0		0	0	40		0	0	100		60		0	0	0	100		0	0	0	0
Box Creek 4	8/19/2008	176	0.46	U	157	98.8	1.2	--	101	9.68	1.5	U	0.0003	U	367	1380	2170	0.2	U	0.004	7.39	2.68	22.7
Box Creek 4	5/27/2009	269	0.46	U	132	44.1	1.1	--	62.1	4.74	1.3	U	0.00099	U	303	905	1540	0.5	U	0.0251	7.51	2070	20
Box Creek 4	8/17/2009	149	0.46	U	128	82.6	0.5	U	75.9	5.64	3.1	U	0.00099	U	265	1110	1630	0.2	U	0.0074	7.95	2230	19.6
Box Creek 4	5/25/2010	387	0.46	U	139	31.8	0.5	U	60.3	4.81	1.25	U	0.00099	U	307	770	1560	0.2	U	0.0627	8.08	2130	19.4
Box Creek 4	8/10/2010	105	0.46	U	145	80.2	0.8	--	92.3	9.43	1.29	U	0.00025	U	360	1280	2110	0.1	U	0.0046	7.9	2630	21.3
	min	105	0.46	U	128	31.8	0.5	U	60.3	4.74	1.25	U	0.00025	U	265	770	1540	0.1	U	0.004	7.39	2.68	19.4
	max	387	0.46	U	157	98.8	1.2		101	9.68	3.1	U	0.00099	U	367	1380	2170	0.5	U	0.0627	8.08	2630	22.7
	mean	217.2	0.46	U	140.2	67.5	0.82		78.32	6.86	1.688	U	0.000704	U	320.4	1089	1802	0.24	U	0.02076	7.766	1812.536	20.6
	median	176	0.46	U	139	80.2	0.8		75.9	5.64	1.3	U	0.00099	U	307	1110	1630	0.2	U	0.0074	7.9	2130	20
	n	5	5		5	5	5		5	5	5		5		5	5	5	5		5	5	5	5
	%ND	0	100		0	0	40		0	0	100		100		0	0	0	100		0	0	0	0
Box Creek 5	8/19/2008	260	0.46	U	31.3	8	1	--	19.2	6.67	1.52	U	0.0003	U	146	263	604	0.2	U	0.0044	7.67	920	22.3
Box Creek 5	5/27/2009	281	0.46	U	221	81.8	0.9	U	88.5	6.4	1.87	U	0.00099	U	328	1180	2130	0.4	U	0.0288	8.05	2650	25
Box Creek 5	5/25/2010	347	0.46	U	195	126	0.5	U	80.6	5.46	1.25	U	0.00099	U	293	1010	1850	0.2	U	0.0478	7.85	2330	19.3
	min	260	0.46	U	31.3	8	0.5	U	19.2	5.46	1.25	U	0.0003	U	146	263	604	0.2	U	0.0044	7.67	920	19.3
	max	347	0.46	U	221	126	1		88.5	6.67	1.87	U	0.00099	U	328	1180	2130	0.4	U	0.0478	8.05	2650	25
	mean	296	0.46	U	149.1	71.93333	0.8		62.76667	6.176667	1.546667	U	0.00076	U	255.6667	817.6667	1528	0.266667	U	0.027	7.856667	1966.667	22.2
	median	281	0.46	U	195	81.8	0.9	U	80.6	6.4	1.52	U	0.00099	U	293	1010	1850	0.2	U	0.0288	7.85	2330	22.3
	n	3	3		3	3	3		3	3	3		3		3	3	3	3		3	3	3	3
	%ND	0	100		0	0	66.66667		0	0	100		100		0	0	0	100		0	0	0	0
Box Creek 6	8/19/2008	242	6.4		51.8	31.6	1.4	--	30	8.74	1.51	U	0.0003	U	163	376	792	0.2	U	0.0053	8.27	1155	23.7
Box Creek 6	5/27/2009	255	8.6		66.3	36.4	0.9	U	36.3	5.91	1.41	U	0.00099	U	215	442	927	1.7	U	0.0163	8.38	1382	21
Box Creek 6	8/17/2009	262	2.2		48.2	44.1	0.5	U	42.6	7.39	2.59	U	0.00099	U	226	444	1040	0.1	U	0.0061	8.17	1589	22.4
Box Creek 6	5/25/2010	278	0.46	U	64.3	40.1	0.5	U	37	5.68	1.14	U	0.00099	U	194	419	923	0.2	U	0.0119	8.2	1359	15.7
Box Creek 6	8/10/2010	270	5.6		45.3	42.6	1.3	--	39.5	7.17	1.18	U	0.00025	U	229	430	998	0.2	U	0.0051	8.2	1466	22.5
	min	242	0.46	U	45.3	31.6	0.5	U	30	5.68	1.14	U	0.00025	U	163	376	792	0.1	U	0.0051	8.17	1155	15.7
	max	278	8.6		66.3	44.1	1.4		42.6	8.74	2.59	U	0.00099	U	229	444	1040	1.7	U	0.0163	8.38	1589	23.7
	mean	261.4	4.652		55.18	38.96	0.92		37.08	6.978	1.566	U	0.000704	U	205.4	422.2	936	0.48	U	0.00894	8.244	1390.2	21.06
	median	262	5.6		51.8	40.1	0.9	U	37	7.17	1.41	U	0.00099	U	215	430	927	0.2	U	0.0061	8.2	1382	22.4
	n	5	5		5	5	5		5	5	5		5		5	5	5	5		5	5	5	5
	%ND	0	20		0	0	60		0	0	100		100		0	0	0	100		0	0	0	0

Appendix E

Highland Uranium Project 2009-20019 Groundwater Quality Data

Well Number	Well Name	Sample Date	As (mg/l)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Gross Alpha (pCi/L)	Pb (mg/l)	Ni (mg/l)	NO2 +NO3 (mg/l)	pH-Field (s.u.)	Ra226 (pCi/L)	Ra228 (pCi/L)	Ra226 +228 (pCi/L)	Se (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	Th230 (pCi/L)	Unat (mg/l)
Groundwater Protection Standards:			**0.05**	**0.01**		**0.1**	**15**	**0.05**	**0.1**					**5**	**0.05**				**0.55**	**0.03**
Backfill Monitor																				
170		3/6/2009			39.9		8.7				7.73	7.8	2	**9.8**	<0.00099	104	475	855	0.2	**0.526**
		8/13/2009			79.1		9.8				7.47	8.2	0.9	**9.1**	<0.00099	107	511	831	0.2	**0.561**
		11/9/2009									7.06									
		2/11/2010			47.8		9.7				7.37	7.8	3.6	**11.4**	<0.00099	113	527	853	0.2	**0.595**
		8/16/2010			46.6		8.6				7.23	6.9	1.6	**8.5**	<0.00025	100	460	855	0.1	**0.584**
	mean/median				53.4		9.2				7.37	7.7	2.0	**9.7**	<0.00099	106	493	849	0.175	**0.567**
171	TDM XXXVI	3/2/2009	<0.00095	<0.00021	30.5	<0.00068	0.8	0.00031	0.0022	0.04	6.58	0.46	1.4	1.86	<0.00099	106	484	857	<0.2	0.001
		5/18/2009			63.9					0.04	6.28					99.1	559	854		
		8/13/2009	<0.00095	<0.0002	33.9	<0.0006	0.9	0.000072	0.0012	0.064	6.24	0.34	1.2	1.54	<0.00099	107	598	860	<0.2	0.0011
		11/9/2009			34.1					0.04	6.48					105	497	858		
		2/12/2010	<0.00095	<0.0002	60.5	<0.0006	1.1	0.00005	0.00062	<0.04	6.46	0.2	2	2.2	<0.00099	108	544	833	<0.2	0.0011
		5/14/2010			33.7					<0.04	6.96					105	494	885		
		8/18/2010	<0.00095	<0.0002	37	<0.0006	0.3	0.0024	0.0012	0.058	6.88	0.22	1.2	1.42	<0.00025	98	552	869	<0.1	0.0012
		11/1/2010			34.7					<0.04	6.71					99.9	477	850		
	mean/median		<0.00095	<0.0002	*39.5*	<0.0006	0.8	0.00071	0.0013	*0.04*	*6.53*	0.31	1.5	1.76	<0.00099	104	*521*	858	<0.2	0.001
173	TDM XXXIX	2/23/2009	<0.00095	<0.00021	92.4	<0.00068	2.3	0.00018	<0.0005	<0.04	7.09	0.81	1.5	2.3	<0.00099	90.3	406	884	<0.2	0.0029
		5/18/2009			114					<0.04	7.55					91.7	462	891		
		8/10/2009	<0.00095	<0.0002	126	<0.0006	0.8	0.000064	<0.0005	<0.04	7.61	0.49	1.2	1.69	<0.00099	90.2	438	890	<0.2	0.0029
		11/11/2009			98.1					<0.04	7.63					97.7	419	883		
		2/12/2010	<0.00095	<0.0002	93.7	<0.0006	1.1	0.00005	<0.0005	<0.04	7.31	0.42	2.2	2.62	<0.00099	91.5	452	869	<0.1	0.0031
		5/10/2010			109					<0.04	7.36					94.2	410	901		
		8/18/2010	<0.00095	<0.0002	102	<0.0006	0.8	0.001	<0.0005	<0.04	7.01	0.47	1.3	1.77	<0.00025	85.1	454	884	<0.1	0.0032
		11/3/2010			83.4					<0.04	7.39					85.9	392	870		
	mean/median		<0.00095	<0.0002	*100*	<0.0006	1.3	0.00032	<0.0005	*<0.04*	*7.38*	0.55	1.6	2.1	<0.00099	*90.7*	429	884	<0.2	0.0030
180	TDM XLVI	3/13/2009	Dry																	
		5/20/2009	Dry																	
		8/31/2009	Dry																	
		11/20/2009	Dry																	
		3/3/2010	Dry																	
		5/14/2010	Dry																	
		8/20/2010	Dry																	
		11/5/2010	Dry																	

Highland Uranium Project 2009-20019 Groundwater Quality Data (continued)

Well Number	Well Name	Sample Date	As (mg/l)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Gross Alpha (pCi/L)	Pb (mg/l)	Ni (mg/l)	NO2 +NO3 (mg/l)	pH-Field (s.u.)	Ra226 (pCi/L)	Ra228 (pCi/L)	Ra226 +228 (pCi/L)	Se (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	Th230 (pCi/L)	Unat (mg/l)
Groundwater Protection Standards:			**0.05**	**0.01**		**0.1**	**15**	**0.05**	**0.1**					**5**	**0.05**				**0.55**	**0.03**
OBSS Monitor																				
116	TDM XI	2/18/2009	<0.00095	<0.00021	81.9	<0.00068	1.4	<0.00005	<0.0005	<0.04	7.22	0.97	5.3	**6.27**	<0.00099	109	731	1470	<0.2	0.0137
		5/19/2009			78.1					<0.04	7.21					98.7	840	1510		
		8/31/2009	<0.00095	<0.0002	78.1	<0.0006	2.1	<0.00005	<0.0005	<0.04	7.15	1.4	4.7	**6.1**	<0.00099	106	720	1530	<0.1	0.015
		11/3/2009			68.1					<0.04	7.13					106	723	1510		
		2/6/2010	<0.00095	<0.0002	75.6	<0.0006	2.4	<0.00005	<0.0005	<0.04	7.01	1.9	4.2	**6.1**	<0.00099	106	860	1500	<0.1	0.0148
		4/29/2010			66.6					<0.04	7.22					109	733	1490		
		7/30/2010	<0.00095	<0.0002	69.6	<0.0006	1.7	<0.00005 2	<0.0005	<0.04	7.32	0.91	2.8	3.71	<0.00025	113	739	1550	0.2	0.0156
		10/30/2010			85.3					<0.04	7.24					97.2	751	1560		
mean/median			<0.00095	<0.0002	*76.9*	<0.0006	1.9	<0.00005	<0.0005	***<0.04***	***7.22***	1.3	4.3	**5.5**	<0.00099	***106***	*736*	1515	<0.1	0.015
128	TDM XXIX	4/1/2009	<0.00095	<0.00021	2.3	<0.00068	1.4	0.00025	0.003	<0.04		<0.25	<1.4	<1.65	<0.00099	102	36	463	<0.1	0.0048
		6/17/2009			6.6					<0.04	7.27					104	179	469		
		8/25/2009	<0.00095	<0.0002	9.3	<0.0006	0.7	0.00023	0.0027	<0.04	6.90	<0.18	<1.1	<1.28	<0.00099	93.3	150	466	<0.2	0.0042
		11/6/2009			7.5					<0.04	7.10					106	177	462		
		2/8/2010	<0.00095	<0.0002	7	<0.0006	0.8	0.0019	0.0043	<0.04	7.09	0.42	<1.2	<1.62	<0.00099	103	161	462	<0.2	0.005
		5/3/2010			6.8					0.049	7.47					95.9	123	434		
		8/2/2010	<0.00095	<0.0002	7.1	<0.0006	0.7	0.002	0.0044	<0.04	7.14	<0.17	<1	<1.17	<0.00025	99.7	134	453	<0.2	0.0041
		11/1/2010			6.8					<0.04	7.55					91.3	128	444		
mean/median			<0.00095	<0.0002	*6.9*	<0.0006	0.9	0.00110	0.0036	***<0.04***	***7.14***	<0.18	<1.4	<1.28	<0.00099	***99***	*142*	*462*	<0.2	0.0045
129	TDM XXX	2/19/2009	<0.00095	<0.00021	52	0.00068	1.5	0.000056	0.0059	0.04	7.11	0.17	1.7	<1.87	0.0017	166	597	1140	<0.2	0.0012
		5/21/2009			35.1					14.5	7.12					187	1160	1880		
		9/1/2009	<0.00095	<0.0002	61.7	0.0007	0.7	0.000076	0.0118	2.8	6.92	0.17	<1.1	<1.27	**0.272**	183	964	1670	<0.2	0.0024
		11/9/2009			65.1					0.5	7.30					168	737	1420		
		2/10/2010	0.0012	<0.0002	64	0.0006	0.8	0.00009	0.003	0.047	6.96	0.45	<1.1	<1.55	0.0016	164	547	967	<0.2	0.0011
		5/3/2010			42.8					4.3	7.29					166	491	1090		
		8/2/2010	<0.00095	<0.0002	20	0.0006	0.7	0.00013	0.0216	5.2	6.79	0.23	<0.96	<1.19	**0.864**	195	1200	1880	<0.1	0.0044
		11/1/2010			42.8					0.38	7.10					174	946	1710		
mean/median			<0.00095	<0.0002	*47.4*	0.0006	0.9	0.00009	0.0106	***1.7***	***7.11***	0.34	<1.1	<1.27	**0.285**	***175***	830	1470	<0.2	0.0023
148	TDM XXXII	3/13/2009	Dry																	
		6/17/2009	Dry																	
		8/24/2009	Dry																	
		11/17/2009	Dry																	
		3/3/2010	Dry																	
		5/14/2010	Dry																	
		8/20/2010	Dry																	
		11/5/2010	Dry																	
150*		5/17/2002	<0.001		29.5							0.5			0.00112		512	1130		**1.35**
		10/11/2002	<0.001	<0.01	16.48	<0.05		<0.05	<0.02	<0.1	6.7	0.4			0.001	157.5	413.2	871.99		0.0003
mean/median			<0.001	<0.01	23.0	<0.05		<0.05	<0.02	<0.1	6.7	0.5			0.0011	158	463	1001		**0.6752**
152*		10/11/2002	<0.001	<0.01	120.8	<0.05		<0.05	0.02	0.79	7.3	0.9			0.001855	130.6		2784.73		0.02
mean/median			<0.001	<0.01	120.8	<0.05		<0.05	0.02	0.79	7.3	0.9			0.001855	130.6		2784.73		0.02

Appendix E

Highland Uranium Project 2009-20019 Groundwater Quality Data (continued)

Well Number	Well Name	Sample Date	As (mg/l)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Gross Alpha (pCi/L)	Pb (mg/l)	Ni (mg/l)	NO2 +NO3 (mg/l)	pH-Field (s.u.)	Ra226 (pCi/L)	Ra228 (pCi/L)	Ra226 +228 (pCi/L)	Se (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	Th230 (pCi/L)	Unat (mg/l)
Groundwater Protection Standards:			**0.05**	**0.01**		**0.1**	**15**	**0.05**	**0.1**					**5**	**0.05**				**0.55**	**0.03**
TDSS Background																				
134	RM-4	3/2/2009	<0.00095	<0.00021	16.2	<0.00068	<0.8	<0.00005	<0.0005	<0.04	7.49	0.17	<0.96	<1.13	<0.00099	219	581	1150	<0.2	0.0009
		5/18/2009			20.5					<0.04	7.41					197	675	1160		
		8/10/2009	<0.00095	<0.0002	18.6	<0.0006	<0.7	<0.00005	<0.0005	<0.04	7.55	0.43	<1.2	<1.63	<0.00099	191	648	1130	<0.1	0.001
		11/6/2009			19.5					<0.04	7.54					213	611	1170		
		2/11/2010	<0.00095	<0.0002	16.8	<0.0006	1.3	<0.00005	<0.0005	<0.04	7.32	0.2	2.1	<2.3	<0.00099	218	653	1130	<0.1	0.001
		5/4/2010			17.7					<0.04	7.30					217	551	1130		
		8/16/2010	<0.00095	<0.0002	18.1	<0.0006	<0.7	<0.001	<0.0005	<0.04	7.56	0.41	1	1.41	<0.00025	199	521	1180	<0.1	0.0013
		11/1/2010			20.6					<0.04	7.39					197	576	1150		
	mean/median		<0.00095	<0.0002	*18.4*	<0.0006	<0.7	<0.00005	<0.0005	*<0.04*	7.45	0.30	<1.2	<1.63	<0.00099	*206*	*596*	*1150*	<0.1	0.001
172	EM-5	2/18/2009	<0.00095	<0.00021	8.2	<0.00068	1.3	<0.00005	<0.0005	<0.04	7.77	0.98	1.5	2.48	<0.00099	110	296	575	<0.1	<0.0003
		5/19/2009			10.2					<0.04	7.79					112	326	582		
		8/12/2009	<0.00095	<0.0002	175	<0.0006	1.6	<0.00005	<0.0005	<0.04	7.82	0.67	1.6	2.27	<0.00099	123	386	564	<0.2	<0.0003
		11/11/2009			6.1					<0.04	7.62					118	292	572		
		2/15/2010	<0.00095	<0.0002	7	<0.0006	1.1	<0.00005	<0.0005	<0.04	7.59	0.6	2	2.6	<0.00099	118	327	574	<0.09	<0.0003
		5/10/2010			8.7					<0.04	7.55					119	287	596		
		8/13/2010	<0.00095	<0.0002	9.1	<0.0006	1.3	<0.000052	<0.0005	<0.04	7.89	0.92	1.2	2.12	<0.00025	118	315	604	<0.1	0.0003
		11/2/2010			8.2					<0.04	7.54					109	284	577		
	mean/median		<0.00095	<0.0002	*8.5*	<0.0006	1.3	<0.00005	<0.0005	*<0.04*	*7.70*	0.79	1.6	2.37	<0.00099	116	*306*	*576*	<0.1	<0.0003
174	TDM XL	2/18/2009	<0.00095	<0.00021	5.4	<0.00068	1	0.00005	<0.0005	<0.04	7.86	0.29	1.2	1.49	<0.00099	76.4	100	306	<0.2	<0.0003
		5/19/2009			6.3					<0.04	7.81					71.2	106	311		
		9/2/2009	<0.00095	<0.0002	5.3	<0.0006	1	0.000066	<0.0005	<0.04	7.82	0.17	1.3	<1.47	<0.00099	64	108	311	<0.2	<0.0003
		11/12/2009			5					<0.04	7.75					73.5	105	311		
		2/15/2010	<0.00095	<0.0002	4.6	<0.0006	0.9	<0.00005	<0.0005	<0.04	7.51	0.29	1.2	<1.49	<0.00099	68	91.5	309	<0.2	<0.0003
		4/30/2010			4.6					<0.04	7.62					65.9	94.2	307		
		8/13/2010	<0.00095	<0.0002	5.8	<0.0006	0.6	<0.000052	<0.0005	<0.04	8.08	0.16	0.9	<1.06	<0.00025	73.6	106	318	<0.1	<0.0003
		11/2/2010			5.3					<0.04	7.83					67.2	94.8	312		
	mean/median		<0.00095	<0.0002	*5.3*	<0.0006	0.9	<0.00005	<0.0005	*<0.04*	*7.82*	0.23	1.2	<1.49	<0.00099	*70*	*103*	*311*	<0.2	<0.0003
182	TDM XLVIII	3/5/2009	<0.00095	<0.00021	11.1	<0.00068	1	0.00005	<0.0005	<0.04	8.11	0.21	<1.1	<1.31	<0.00099	112	188	418	<0.2	<0.0003
		5/21/2009			12					<0.04	7.94					117	203	426		
		8/11/2009	<0.00095	<0.0002	97.3	<0.0006	0.7	0.000091	<0.0005	<0.04	8.11	0.23	<1.3	<1.53	<0.00099	129	203	426	<0.2	<0.0003
		11/5/2009			12.2					<0.04	7.93					114	206	437		
		2/16/2010	<0.00095	<0.0002	8.9	<0.0006	0.6	0.000093	<0.0005	<0.04	7.93	0.46	1.7	2.16	<0.00099	121	189	426	<0.1	<0.0003
		5/4/2010			13.1					<0.04	7.79					114	176	422		
		8/13/2010	<0.00095	<0.0002	12.6	<0.0006	0.6	0.000094	0.00084	<0.04	7.71	0.39	<1.4	<1.79	<0.00025	113	204	432	<0.2	<0.0003
		11/4/2010			12.5					<0.04	8.01					90	186	422		
	mean/median		<0.00095	<0.0002	*12.4*	<0.0006	0.7	0.00008	<0.0005	*<0.04*	*7.94*	0.32	<1.3	<1.53	<0.00099	*113*	*196*	426	<0.2	<0.0003

Appendix E

Highland Uranium Project 2009-20019 Groundwater Quality Data (continued)

Well Number	Well Name	Sample Date	As (mg/l)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Gross Alpha (pCi/L)	Pb (mg/l)	Ni (mg/l)	NO2 +NO3 (mg/l)	pH-Field (s.u.)	Ra226 (pCi/L)	Ra228 (pCi/L)	Ra226 +228 (pCi/L)	Se (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	Th230 (pCi/L)	Unat (mg/l)
Groundwater Protection Standards:			**0.05**	**0.01**		**0.1**	**15**	**0.05**	**0.1**					**5**	**0.05**				**0.55**	**0.03**
TDSS Compliance Monitor Well																				
125	TDM XXVI	2/19/2009	<0.00095	<0.00021	14.2	0.001	3.7	0.00005	0.0029	0.31	7.19	0.17	0.94	1.11	0.0038	90.6	630	819	0.2	0.015
		5/22/2009			13					1.1	7.23					78.3	374	768		
		8/24/2009	<0.00095	<0.0002	12.6	0.0006	2.1	0.00019	0.0015	1	7.03	0.8	2.8	3.6	0.0103	77.2	356	757	**0.7**	0.0173
		11/11/2009			10.2					1.2	7.22					86.8	333	765		
		2/8/2010	<0.00095	<0.0002	12.3	0.0006	2.8	0.000076	0.002	1.4	7.12	1.2	1.8	3	0.0142	81.9	403	754	0.5	0.0167
		5/3/2010			10.8					1.5	7.27					84	322	799		
		8/2/2010	<0.00095	<0.0002	11.7	0.0006	4.1	0.00005	0.0015	1.6	7.29	0.77	1.6	2.37	0.0151	82.4	328	803	**0.6**	0.0161
		10/30/2010			13.8					1.6	7.20					82.1	366	812		
mean/median			<0.00095	<0.0002	*12.5*	0.0007	3.2	0.00009	0.0020	*1.3*	*7.21*	0.7	1.8	2.5	0.0109	*82.3*	*361*	*784*	0.5	0.016
175	TDM XLI	2/19/2009	<0.00095	<0.00021	280	<0.00068	2.4	0.00055	0.808	0.4	6.35	1.4	7.4	8.8	<0.00099	307	3090	5100	<0.2	0.0284
		5/20/2009			300					0.04	6.39					308	3330	3980		
		8/31/2009	<0.00095	<0.0002	296	<0.0006	1.3	0.000054	0.797	0.042	6.37	0.8	9.4	10.21	<0.005	290	2840	5070	<0.2	0.0289
		11/12/2009			295					0.04	6.39					282	3140	4950		
		2/16/2010	<0.00095	<0.0002	371	<0.0006	2.3	0.00026	0.766	<0.04	6.34	1.5	9.1	10.6	<0.00099	281	2850	4640	<0.5	0.0065
		5/10/2010			275					0.045	6.48					300	2880	4880		
		8/3/2010	<0.00095	<0.0002	281	<0.0006	1	0.00022	0.703	<0.04	6.39	0.6	6.7	7.3	0.00032	290	2720	4780	<0.1	**0.0325**
		11/3/2010			269					<0.04	6.52					266	2820	4740		
mean/median			<0.00095	<0.0002	*288*	<0.0006	1.8	0.00027	0.769	*0.04*	*6.39*	1.1	8.2	9.2	<0.005	*290*	*2865*	4768	<0.2	0.024
176	TDM XLII	3/3/2009	<0.00095	<0.00021	231	<0.00068	2.1	0.00005	<0.0005	0.04	7.01	0.95	3.3	4.25	<0.00099	246	2310	4150	<0.2	<0.0003
		5/21/2009			241					0.043	6.84					248	2840	4020		
		8/12/2009	<0.00095	<0.0002	217	<0.0006	1.1	0.000056	<0.0005	0.04	7.02	0.83	4.4	**5.23**	<0.00099	241	1990	4100	<0.2	<0.0003
		11/6/2009			264					0.04	6.87					212	2180	4100		
		2/23/2010	<0.00095	<0.0002	235	<0.0006	1.2	0.00005	<0.0005	<0.04	6.81	1.4	5.7	**7.1**	<0.00099	228	2100	3970	<0.2	<0.0003
		5/5/2010			237					<0.04	6.89					224	1990	4040		
		8/3/2010	<0.00095	<0.0002	257	<0.0006	1.1	0.000067	0.0015	<0.04	6.79	0.8	3.8	4.6	<0.00025	230	2020	4060	<0.2	<0.0003
		11/3/2010			254					<0.04	6.87					211	2070	3890		
mean/median			<0.00095	<0.0002	*239*	<0.0006	1.4	0.00006	<0.0005	*0.04*	*6.87*	1.00	4.3	**5.30**	<0.00099	*230*	2188	*4050*	<0.2	<0.0003
177*	TDM XLIII	1/26/1996	0.002	<0.01	272	<0.05	3.2	<0.05	0.03		7.00	0.9	<1	<1.9	<0.001	250	2348	4179	<0.2	0.076
		7/10/1996	0.001	<0.01	240	<0.05	1	<0.05	0.02	3.03	7.40	0.9	<1	<1.9	<0.001	262	2470	4299	<0.2	0.085
mean/median			0.002	<0.01	256	<0.05	2.1	<0.05	0.03	3.03	7.20	0.9	<1	<1.9	<0.001	256	2409	4239	<0.2	0.081

Appendix E

Highland Uranium Project 2009-20019 Groundwater Quality Data (continued)

Well Number	Well Name	Sample Date	As (mg/l)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Gross Alpha (pCi/L)	Pb (mg/l)	Ni (mg/l)	NO2 +NO3 (mg/l)	pH-Field (s.u.)	Ra226 (pCi/L)	Ra228 (pCi/L)	Ra226 +228 (pCi/L)	Se (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	Th230 (pCi/L)	Unat (mg/l)
Groundwater Protection Standards:			**0.05**	**0.01**		**0.1**	**15**	**0.05**	**0.1**					**5**	**0.05**				**0.55**	**0.03**
TDSS Monitor																				
		3/13/2009	Dry																	
15	TDM DR	5/22/2009	Dry																	
		8/13/2009	Dry																	
		11/18/2009	Dry																	
		5/3/2010	Dry																	
		8/20/2010	Dry																	
		2/19/2009	<0.00095	<0.00021	121	<0.00068	1.3	0.00018	0.0038	<0.04	7.08	0.56	0.96	1.52	<0.00099	237	1760	3080	<0.1	**0.0358**
112	TDM VII	5/22/2009			144					<0.04	7.04					240	1860	3080		
		8/19/2009	<0.00095	<0.0002	156	<0.0006	0.6	0.00011	0.0035	<0.04	7.06	0.29	4.6	4.89	<0.00099	225	1890	2980	<0.2	**0.0365**
		11/3/2009			107					<0.04	7.10					242	1760	3180		
		2/5/2010	<0.00095	<0.0002	108	<0.0006	1.6	0.00005	0.0031	<0.04	7.12	1.1	2.7	3.8	<0.00099	248	1730	2950	<0.1	**0.0363**
		4/29/2010			103					<0.04	7.11					244	1560	2960		
		7/30/2010	<0.00095	<0.0002	102	<0.0006	0.8	0.00014	0.0031	<0.04	7.20	0.28	2	2.28	<0.00025	243	1460	2870	<0.1	**0.0376**
		10/29/2010			100					<0.04	7.18					214	1550	2840		
mean/median			<0.00095	<0.0002	*116*	<0.0006	1.1	0.00012	0.0034	*<0.04*	*7.11*	0.56	2.6	3.12	<0.00099	*241*	*1745*	*2970*	<0.1	**0.0366**
		2/18/2009	<0.00095	0.00021	307	<0.00068	0.8	0.00005	**0.876**	0.4	5.83	0.29	1.6	1.89	<0.00099	289	3670	5380	<0.2	<0.0003
114	TDM IX	5/20/2009			326					0.18	5.94					320	3970	5530		
		8/31/2009	<0.00095	0.00054	357	<0.0006	0.8	0.0031	**0.984**	0.04	6.53	0.43	6.6	**7.03**	<0.005	306	3220	5300	<0.1	<0.0003
		11/3/2009			297					0.044	6.24					299	3300	5370		
		2/5/2010	<0.00095	<0.0002	292	<0.0006	7.8	0.00005	**0.541**	<0.04	6.33	2	3.3	**5.3**	<0.00099	303	3620	5210	<0.2	<0.0003
		4/29/2010			308					<0.04	6.43					295	3230	5220		
		7/29/2010	<0.00095	<0.0002	279	<0.0006	2.8	0.000096	**0.667**	<0.04	5.73	0.19	3.6	3.79	<0.00025	296	3030	5180	0.4	0.0003
		10/29/2010			343					<0.04	6.13					273	3240	5110		
mean/median			<0.00095	0.00038	*313*	<0.0006	3.1	0.0008	**0.767**	*0.11*	6.15	0.73	3.8	4.50	<0.00099	*297*	3410	*5260*	<0.2	<0.0003
		3/13/2009	Dry																	
117	TDM XII	5/20/2009	Dry																	
		9/1/2009	Dry																	
		11/20/2009	Dry																	
		3/15/2010	Dry																	
		5/3/2010	Dry																	
		8/20/2010	Dry																	
		11/4/2010	Dry																	
		2/19/2009	<0.00095	<0.00021	435	<0.00068	1.9	<0.00005	0.0021	<0.4	6.62	0.64	3.3	3.94	<0.00099	298	1930	4160	<0.2	0.0005
120	TDM XXI	5/21/2009			432					<0.04	6.80					317	2130	4260		
		8/25/2009	<0.0048	<0.001	550	<0.003	1.2	<0.00025	0.0027	<0.04	6.78	0.16	2.5	<2.66	<0.005	279	1830	4110	<0.2	0.0005
		11/9/2009			475					<0.04	6.78					299	1900	4210		
		2/6/2010	<0.00095	<0.0002	455	<0.0006	2.3	<0.00005	0.0049	<0.04	6.77	0.72	0.96	<1.68	<0.00099	310	2170	4210	<0.2	0.0005
		5/3/2010			378					<0.04	6.87					325	1670	4190		
		8/2/2010	<0.00095	<0.0002	403	<0.0006	1.1	0.00015	0.0066	<0.04	6.78	0.28	1.7	<1.98	0.00029	342	1840	4320	<0.2	0.0006
		10/30/2010			478					<0.04	6.86					290	1970	4220		
mean/median			<0.0048	<0.001	*445*	<0.0006	1.6	<0.00015	0.0041	*<0.04*	*6.78*	0.45	2.1	<1.98	<0.00099	*305*	1930	*4210*	<0.2	0.0005
		3/13/2009	Dry																	
127	TDM XXVIII	6/17/2009	Dry																	
		8/24/2009	Dry																	
		11/18/2009	Dry																	
		2/8/2010	Dry																	
		5/3/2010	Dry																	
		8/20/2010	Dry																	
		11/1/2010	Dry																	

Appendix E

Highland Uranium Project 2009-20019 Groundwater Quality Data (continued)

Well Number	Well Name	Sample Date	As (mg/l)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Gross Alpha (pCi/L)	Pb (mg/l)	Ni (mg/l)	NO2 +NO3 (mg/l)	pH-Field (s.u.)	Ra226 (pCi/L)	Ra228 (pCi/L)	Ra226 +228 (pCi/L)	Se (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	Th230 (pCi/L)	Unat (mg/l)
Groundwater Protection Standards:			**0.05**	**0.01**		**0.1**	**15**	**0.05**	**0.1**					**5**	**0.05**				**0.55**	**0.03**
178	TDM XLIV	4/1/2009	<0.00095	0.0018	254	<0.00068	2.3	0.0034	**0.399**	1.4	7.25	0.6	<1.1	<1.7	<0.00099	271	2290	4240	<0.3	0.0026
		6/17/2009			370					1.9	7.48					270	2850	4300		
		9/10/2009	<0.00095	0.0012	277	<0.0006	0.7	0.0013	**0.221**	1.7	6.75	0.42	<1	<1.42	<0.00099	272	2230	4130	<0.2	0.0021
		11/12/2009			264					1.5	6.99					269	2130	4100		
		2/12/2010	<0.00095	0.0014	303	<0.0006	1.6	0.0024	**0.236**	1.4	6.53	0.6	1.3	1.9	<0.00099	268	2440	4080	<0.1	0.0027
		5/14/2010			237					1	6.99					265	2180	4180		
		8/3/2010	<0.00095	0.0013	255	0.0013	NA	0.0078	**0.236**	1.3	6.81	NA	NA		0.002	255	2050	4150	NA	NA
		11/4/2010			253					1.4	7.13					255	2150	3990		
mean/median			<0.00095	0.0014	*260*	<0.0006	1.5	0.0037	**0.273**	*1.4*	*6.99*	0.54	<1.1	<1.7	<0.00099	*269*	*2205*	*4140*	<0.3	0.0025
179	TDM XLV	3/3/2009	<0.00095	<0.00021	159	<0.00068	1.7	<0.00005	0.00077	<0.04	7.31	0.46	1.9	2.36	<0.00099	289	1460	2570	<0.2	<0.0003
		5/20/2009			163					<0.04	7.33					299	1710	2640		
		8/12/2009	<0.00095	<0.0002	203	<0.0006	0.9	<0.00005	0.0005	<0.04	7.43	0.54	2.9	3.44	<0.00099	323	1710	2680	<0.1	<0.0003
		11/5/2009			203					<0.04	7.25					278	1790	2680		
		2/23/2010	<0.00095	<0.0002	172	<0.0006	0.8	<0.00005	0.0005	<0.04	7.17	0.84	2.3	3.14	<0.00099	286	1540	2740	<0.2	<0.0003
		5/5/2010			173					<0.04	7.19					284	1510	2690		
		8/13/2010	<0.00095	<0.0002	183	<0.0006	1.8	0.000097	0.00093	<0.04	7.13	1.5	2.3	3.8	<0.00025	287	1590	2740	0.09	0.0007
		11/5/2010			167					<0.04	7.20					278	1560	2670		
mean/median			<0.00095	<0.0002	*173*	<0.0006	1.3	<0.00005	0.0007	*<0.04*	*7.23*	0.84	2.4	3.19	<0.00099	291	1609	*2680*	<0.2	<0.0003
181	TDM XLVII	3/4/2009	<0.00095	<0.00021	58.4	<0.00068	1.3	<0.00005	<0.0005	<0.04	7.35	0.46	1.1	<1.56	<0.00099	220	554	1320	<0.3	<0.0003
		5/21/2009			75.2					<0.04	7.29					237	661	1330		
		8/11/2009	<0.00095	<0.0002	72.6	<0.0006	0.7	<0.00005	<0.0005	<0.04	7.43	0.52	1.8	2.32	<0.00099	241	503	1330	<0.2	<0.0003
		11/5/2009			72.1					<0.04	7.11					215	630	1320		
		2/16/2010	<0.00095	<0.0002	58.8	<0.0006	0.8	<0.00005	<0.0005	<0.04	7.24	0.77	1.4	<2.17	<0.00099	225	661	1290	<0.2	<0.0003
		5/4/2010			67.5					<0.04	7.09					220	600	1310		
		8/11/2010	<0.00095	<0.0002	73	<0.0006	<0.6	0.000099	0.00082	<0.04	6.94	0.19	1.8	<1.99	<0.00025	219	673	1340	<0.09	<0.0003
		11/4/2010			70					<0.04	7.22					208	653	1330		
mean/median			<0.00095	<0.0002	*71*	<0.0006	0.9	<0.00005	<0.0005	*<0.04*	*7.23*	0.49	1.5	<1.99	<0.00099	*220*	617	*1325*	<0.2	<0.0003
183	TDM XLIX	3/3/2009	<0.00095	<0.00021	137	<0.00068	1.5	<0.00005	0.0005	<0.04	7.22	0.4	1.6	2	<0.00099	229	1080	2020	<0.2	<0.0003
		5/20/2009			137					<0.04	7.28					246	1110	1980		
		8/12/2009	<0.00095	<0.0002	367	<0.0006	0.9	<0.00005	0.00052	<0.04	7.39	0.14	1.7	1.84	<0.00099	241	1110	2030	<0.1	<0.0003
		11/6/2009			152					<0.04	7.33					241	1100	2070		
		2/23/2010	<0.00095	<0.0002	131	<0.0006	0.7	<0.00005	0.0005	<0.04	7.20	1	2	3	<0.00099	237	1110	2020	<0.1	<0.0003
		5/5/2010			130					<0.04	7.31					245	1010	2060		
		8/16/2010	<0.00095	<0.0002	148	<0.0006	1.3	<0.001	0.0015	<0.04	6.89	0.68	1.7	2.38	<0.00025	244	1100	2100	<0.2	<0.0003
		11/5/2010			132					<0.04	7.30					222	1090	2070		
mean/median			<0.00095	<0.0002	*137*	<0.0006	1.1	<0.00005	0.0008	*<0.04*	*7.29*	0.56	1.8	2.31	<0.00099	*238*	*1088*	*2045*	<0.2	<0.0003

Appendix E

Highland Uranium Project 2009-20019 Groundwater Quality Data (continued)

Well Number	Well Name	Sample Date	As (mg/l)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Gross Alpha (pCi/L)	Pb (mg/l)	Ni (mg/l)	NO2 +NO3 (mg/l)	pH-Field (s.u.)	Ra226 (pCi/L)	Ra228 (pCi/L)	Ra226 +228 (pCi/L)	Se (mg/l)	Na (mg/l)	SO4 (mg/l)	TDS (mg/l)	Th230 (pCi/L)	Unat (mg/l)
Groundwater Protection Standards:			**0.05**	**0.01**		**0.1**	**15**	**0.05**	**0.1**					**5**	**0.05**				**0.55**	**0.03**
Pit Lake																				
167	Surface	7/1/2009			37.2		3.1				8.20	2.2	<1	<3.2	0.0804	154	588	1020	<0.1	3.17
		8/17/2009			42		2.6				8.20	2.5	<1.4	<3.9	0.0744	134	577	1030	<0.2	3.23
		11/7/2009									8.25									
		6/7/2010			38.4		2.6				8.27	1.9	2.1	4	0.0718	127	575	1050	<0.2	3.22
		8/11/2010			38.1		2.6				8.20	2.3	<1.1	<3.4	0.0725	143	608	1050	<0.1	3.3
	mean/median				38.9		2.7				*8.20*	2.2	<1.4	<3.9	0.0748	140	587	1038	<0.2	3.23
168	1/3 Depth	7/1/2009			35.5		3.3				8.33	1.8	1.1	2.9	0.0759	148	579	1000	<0.2	3.18
		8/17/2009			38.2		3.3				8.31	2.6	1.9	4.5	0.0724	135	650	1000	<0.1	3.18
		11/7/2009									8.33									
		6/7/2010			38.5		3.0				8.27	1.2	2.1	3.3	0.0695	124	567	1040	<0.2	3.18
		8/11/2010			38.3		2.6				8.42	2.4	1.1	3.5	0.0717	140	590	1000	<0.1	3.19
	mean/median				37.6		3.1				*8.33*	2.0	1.6	3.6	0.0724	137	597	1010	<0.2	3.18
169	2/3 Depth	7/1/2009			36.3		3.2				8.20	2	1	3	0.0737	156	592	1010	<0.2	3.09
		8/17/2009			39.1		4.3				8.29	2.5	4.4	6.9	0.0712	135	578	988	<0.2	3.03
		11/7/2009									8.45									
		6/7/2010			38.7		2.6				8.29	2.3	1.5	3.8	0.071	123	555	1060	<0.2	3.24
		8/11/2010			40.0		2.7				8.31	2.4	1.1	3.5	0.072	136	596	1020	<0.2	3.31
	mean/median				38.5		3.2				8.31	2.3	2.0	4.3	0.0720	138	580	1020	<0.2	3.17

Notes:

Either the mean or the *median* was calculated on sample sets >2 based on the distribution of the historical data for that particular location/analyte

*Means were calculated from last available year's data : this was 1996 for well 177, and 2002 for wells 150 and 152.

The nondetect values are replaced by the detection limit

Bold = Result exceeds Groundwater Protection Standards

Note: Alternate Concentration Limits (ACL) apply to:

Well 125: Unat = 0.089 mg/l

Well 175: Ni = 1.8 mg/l; Ra226+228 = 25 pCi/L

Well 177: Unat = 0.11 mg/l

EXHIBIT 3
COST ESTIMATE FOR ACTIVE WATER TREATMENT
HIGHLAND PIT LAKE, HIGHLAND MINE AND MILL RECLAMATION PROJECT.

ADVANCED ENVIRONMENTAL SCIENCES, INC.
NOVEMBER 2010

DRAFT

Cost Estimate for Active Water Treatment, Highland Pit Lake, Highland Mine and Mill Reclamation Project

November 1, 2010

Prepared For:
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Table of Contents

List of Figures

List of Tables

List of Appendices

1.0 INTRODUCTION

The Highland pit lake water is relatively clean water, with only uranium and selenium concentrations above the United States Environmental Protection Agency primary drinking water standards. In 2009, uranium concentrations were measured at approximately 3 mg/L and selenium concentrations were measured at approximately 0.07 mg/L. The EPA primary drinking water standards are 0.03 mg/L for uranium and 0.05 mg/L for selenium. If the Highland pit lake were to require active treatment, the estimated stored volume requiring treatment is approximately 3.9 billion gallons. In addition to the stored volume, approximately 300 gpm (158 million gallons per year) of groundwater inflows to the pit, would require perpetual treatment.

In contrast to many mine sites, where acid rock drainage (ARD) is present, the Highland site is a carbonate system resulting in higher pH and lower dissolved analyte concentrations in the pit lake water. The pH of the pit lake water is approximately 8.3; at this pH and in the carbonate environment, the form of uranium is expected to be anionic and the species to be $UO_2(CO_3)_3^{4-}$. The form of selenium is expected to be anionic and species to be selenate (SeO_4^{2-}).

The following sections discuss potential treatment technologies, conceptual design, and conceptual costs. Every water differs in analytes present and analyte concentrations, and these differences can have significant implications to water treatment effectiveness, efficiencies, and related costs. As with any type of water treatment, the technology should be tested at the pilot-scale level prior to design and construction of a treatment plant.

2.0 TYPES OF TREATMENT TECHNOLOGIES

There are several types of water treatment technologies which have been determined by EPA as best available technologies (BAT) for selenium and uranium removal. For selenium, the BATs are activated alumina, coagulation/filtration, lime softening, and reverse osmosis. For uranium, the BATs are lime softening, ion-exchange, and reverse osmosis. EPA lists other non-BAT technologies for removal or uranium and selenium; however, these technologies are either cost prohibitive or have not been extensively tested at the full scale.

For the EPA BATs, activated alumina, lime softening, and reverse osmosis treatment technologies have been rejected as viable for the reasons discussed in the following paragraphs.

Reverse osmosis is an unlikely candidate for Highland pit lake treatment due to the high capital and operating costs. In addition, reverse osmosis produces a concentrated brine stream (i.e., reject) that would require secondary treatment and/or evaporation prior to disposal.

Activated Alumina (AA) is a treatment technology based on adsorption and consists of aluminum oxide that has been heated to a temperature of 300 to 700 ºC. Activated alumina adsorbs charged species and can be regenerated after the media has been loaded to its adsorption capacity. However, the regeneration process is typically performed through the use of acid which results in a breakdown and partial loss of media, and subsequent replacement, after each regeneration. If the activated alumina were to be regenerated onsite, a concentrated brine stream would be produced that would require secondary treatment and/or evaporation prior to disposal. Activated alumina is not expected to as efficient in uranium removal as other technologies.

Lime softening has been proven to be effective in removing varied species at various charge states. However, with the form of uranium ($UO_2[CO_3]_3^{4-}$) at the Highland pit lake, lime softening is not expected to be effective until the pH of the water is increased to above 11 standard units. Lime softening also produces large quantities of sludge that potential would be above the standard for non-radioactive disposal.

Based on the preceding discussions, ion exchange (IX) and coagulation/filtration are anticipated to be the most effective treatment options, from both cost and efficiency standpoints. Figure 1 provides a conceptual process flow diagram for treatment of the pit lake water and resultant reduction of selenium and uranium concentrations in the treatment effluent. As shown on Figure 1, the treatment system would consist of two interacting treatment technologies. The front end of the system would consist of filtration and ion exchange. The effluent from the IX would feed a chemical treatment process that consists of a metal salt addition, potential pH adjustment, coagulant addition, and filtration. The following sections discuss the various processes and assumptions for these processes.

2.1 Influent Filtration

It is anticipated that the feed water to the system will likely need to be prefiltered to remove suspended solids and prolong IX run durations. Ion-exchange resins can become ineffective if significant suspended solids become entrained within the resin beds. The entrainment of suspended solids can lead to excessive differential pressure across the bed and potential flow short circuiting of the bed. For these reasons a prefilter is necessary to reduce the risk of high concentrations of uranium in the IX effluent. A multi-media filter (i.e., prefilter) is a cost effective method of removing suspended solids. A multi-media filter typically consists of, from the top down: (1) anthracite layer, (2) sand layer, (3) fine garnet layer, (4) coarse garnet layer, and (5) gravel support layer. The internals of the media filter consist of designed distributers to promote even flow through the filter. A mixed-media filter is typically run in a top down flow mode, where water enters though the top of the filter, flows through the media and exits through the bottom of the filter. Particles are retained in the top portion of the filter and in many cases a coagulant is added to agglomerate the particles and improve particle retention. The hydraulic loading through a media filter is typically between 3 and 5 gallons per minute per square foot (gpm/ft^2).

After a predetermined time or pressure differential across the media filter bed, the filter requires a cleaning cycle. The backwash cycle is run to expand the prefiltration bed and flush particulate material from the bed. During the backwash cycle, the flow is reversed from the influent cycle and is forced up through the bed, at a typical flow rate of between 13 and 17 gpm/ft^2 for 10 to 20 minutes. The filter backwash water is collected in a tank and the solids removed through a clarification system. The prefilter backwashed solids may contain high concentrations of uranium if significant suspended solids concentrations are present in the influent water and these solids are high in uranium. However, because the water is coming from a lake, it is anticipated that suspended solids concentrations will be low. Therefore, because it is not anticipated that suspended solids concentrations will be high, the resultant solids will be mixed with the solids from the coagulation/filtration treatment for selenium, discussed below.

2.2 Ion Exchange

Ion exchange is a process in which ions are exchanged from a solid resin with ions in the water to be treated. The mechanism behind IX involves attractive forces. Anion exchange resin carries a net positive charge and is saturated with negatively charged chloride ions. As the water to be treated is passed through a fixed bed of anion exchange resin, chloride ions are displaced by negatively charged uranium species and other negatively charged ions. Uranium removal onto IX media is dependent on the form(s) of uranium present in the process water. The uranium must be present as a negatively charged species for effective removal onto an anion exchange resin. The form of uranium is pH dependent; theoretically, at lower pH (<6.0 s.u.), the predominant uranium species is predicted to be cationic and at higher pH, the predominant species is predicted to be anionic. However, experience with uranium removal from mine waters and data from resin manufacturers indicate that cationic exchange resins do not work as effectively as anionic resins. For anion resins, uranium removal is typically most successful in the range of 5.5 to 8.0 standard units.

While anion exchange resin has a higher affinity for uranium, there will be other ions removed from the feed water onto the media. The ions expected to have the most significant interference with uranium anion exchange resins are sulfate, vanadium, silica, and total organic carbon (TOC). Some ion-exchange interference is expected from the sulfate in the Highland pit lake water, which has shown sulfate concentration ranging between 500 and 600 mg/L. While vanadium has not been found in measurable concentrations at the site, it is an important analyte because it generally can have the greatest detrimental and irreversible effects at water concentrations greater than 1 gram per liter on the IX media. Silica concentrations greater than 30 mg/L for weak base resin and greater than 50 mg/L for strong base resin, and TOC concentrations greater than 20 mg/L for weak base resin and greater than then 3 mg/L for strong base resin may interfere with uranium removal. Silica concentrations in the pit lake water are generally low, less than 5 mg/L, and are not expected to interfere with ion-exchange efficiency. TOC concentration data for the Highland pit lake have not been measured.

Determining the resin capacity for uranium will provide an indication of the operational requirements for IX. The number of bed volumes of a target constituent that a particular resin can effectively remove before exhaustion must be quantified to determine if this technology is feasible for full-scale treatment. Resins that quickly exhaust after a limited number of treatment bed volumes will require more frequent regeneration or change-out, which can significantly increase costs. Strong-base Type I anion exchange resins have a high selectivity for uranium at low concentrations, above many other negatively charged ions resulting in minimized interference with uranium removal. As the concentration of uranium on the resin increases and the resin is exhausted, the exchange sites for Type I resins are regenerated with a concentrated (approximately 20 percent) sodium chloride (NaCl) solution.

Typical capacities for Type I strong base anion exchange resins are reported as up to 2 equivalents per liter of resin. One type of resin, the DOWEX 21K XLT Type I strong base, which has been tested at another mine site for uranium removal, has a published total capacity of 1.40 equivalents per liter of media or 2.1 equivalents per kilogram of media. At a pH of 8.3 and an average Highland water uranium concentration of 3 mg/L, the estimated uranium removal for this resin is approximately 890 grams uranium per kilogram of resin. This calculation almost certainly overestimates the uranium removal as it is known that concentrations of sulfate greater than 250 mg/l, and other analytes, interfere with uranium removal on strong base anion exchange resins. At another uranium mine site this calculation overestimated the actual uranium loading by nearly 20 times, although the sulfate concentration at that site was four times greater than at the Highland site. In order to be conservative in terms of loading, it will be assumed that the resin will be loaded at 50,000 mg/kg of uranium and will require regeneration.

The design for the IX system is based on an assumed hydraulic loading rate of 8 gpm/ft^2. The type 1 resins have been shown to be relatively insensitive to the contact time necessary for exchange of uranium and chloride ions, in the 6 to 10 gpm/ft^2 range. For the conceptual cost estimate it is also assumed that the regeneration of the ion-exchange resin will be performed offsite, due to the complexity and cost for performing this operation onsite.

2.3 Coagulation and Filtration

As discussed above, one of the EPA BATs is coagulation and filtration. Coagulation and filtration consists of the addition of metal salts (e.g., aluminum or ferric iron salts) that undergo hydrolysis and form a precipitate. Other compounds co-precipitate with the metal salt and form a floc. A polymer is then added which allows the floc to agglomerate and be separated from the water. Due to the relatively high pH of the pit lake water, the species of selenium in the pit lake is most likely selenate. While coagulation is more effective in removal of the selenite species, than in removal of the selenate species, the selenium concentration of 0.07 mg/L is close to the primary drinking water standard of 0.05 mg/L, and even an inefficient removal should lower the selenium concentration to below the drinking water standard. This inefficient removal may require higher dosing of the metal salt than under ideal conditions, which leads to increased chemical costs. Depending on the metal salt used, a pH adjustment maybe necessary to improve the effectiveness of the metal salt coprecipitation. For example, ferric iron salts are typically more effective at coprecipitation at pHs less than 7.0 standard units.

After coagulation, the floc is separated from the water. The floc separation can be accomplished in a similar manner to the influent suspend solids removal; that is, through the use of a multi-media filter. As discussed above, a multi-media filter typically consists of an anthracite layer, sand layer, fine garnet layer, coarse garnet layer, and gravel support layer. The internals of the media filter consist of designed distributers to promote even flow through the filter. A mixed-media filter is typically run in a top down flow mode, where water enters through the top of the filter, flows through the media and exits through the bottom of the filter. Floc is retained in the top portion of the filter and in many cases a coagulant is added to agglomerate the particles and improve floc retention. The hydraulic loading through a media filter is typically between 3 and 5 gallons per minute per square foot (gpm/ft^2).

After a predetermined time or pressure differential across the media filter bed, the filter will require a cleaning cycle. The backwash cycle is run to expand the prefiltration bed and flush retained particulate material from the bed. During the backwash cycle, the flow is reversed from the influent cycle and is forced up through the bed, typically at a flow rate of between 13 and 17 gpm/ft^2 for 10 to 20 minutes, though the time duration is specific to the loading and retained floc characteristics. The filter backwash water is collected in a tank and then pumped through a separation system consisting of a clarifier, sludge thickener tank, and finally to a filter press. The filter press is used to "press" most of the water out of the sludge, resulting in a sludge than can range from 20 to 45% solids. As shown on Figure

1, the overflow from the sludge thickener and waste water from the filter press would be returned to the front of the plant for retreatment.

3.0 CONCEPTUAL COST ESTIMATE

The conceptual cost estimate is based on a treatment system as described above and presented in Figure 1. The system consists of prefiltration, ion exchange, coagulant addition and filtration, and sludge dewatering. Without pilot-scale testing, geotechnical evaluations, siting studies, and other required information, conceptual costs should be considered +100% and -25% and only take into account major pieces of equipment. Costs for the equipment are based on recent or historic vendor quotes, percentages of overall work, and estimates.

The following presents the assumptions used:

1. Currently 3.9 billion gallons of water requires treatment.
2. The ground water inflow rate to the pit is 300 gpm
3. Bench and pilot-scale tests, treatment plant design, permitting, and construction will take 3 years.
4. At the inflow rate of 300 gpm and 3 years before treatment can begin, an additional 500 million gallons will accumulate in the pit lake, for a total of 4.4 billion gallons.
5. The treatment rate will be 1,000 gpm.
6. Ongoing treatment of 300 gpm after initial treatment.
7. Influent mixed-media filter hydraulic loading rate of 4 gpm/ft^2 and a backwash rate of 15 gpm/ft^2 for 15 minutes. Backwashes will occur once per 24 hour period.
8. Ion exchange hydraulic loading rate of approximately 8 gpm/ft^2.
9. Ion exchange resin will be loaded at 50,000 mg/kg of uranium, requiring regeneration.
10. Coagulant, acid, and polymer dosing are unknown and this cost is based on preliminary modeling and estimates.
11. A base addition, if needed to raise the pH for discharge, has not been included in the cost estimate.
12. Coagulation mixed-media filter hydraulic loading rate of 4 gpm/ft^2 and a backwash rate of 15 gpm/ft^2 for 15 minutes. Backwashes will occur once per 24 hour period.
13. Backwashes of the influent and coagulation filters can be staggered and allow for a storage tank sized for holding two backwashes.
14. Incline plate clarifiers.
15. Plate and frame filter press, sized for 1 cubic yard per day of sludge production.
16. Construction costs do not include cut/fill costs including excavation, blasting, compaction, importation, or disposal of fill.
17. Seismic/environmental (i.e., snow, wind, etc.) considerations may change costs.
18. Erected steel building with insulation, no fire suppression.
19. One and one-half foot thick concrete-reinforced mat foundation for the main part of the plant. Final cost will be dependent on geotechnical/seismic analysis.

20. Three foot thick concrete, reinforced foundation under equipment. Final cost will be dependent on geotechnical/seismic analysis.
21. Freight/tax assumed to be 12% of the equipment cost.
22. Costs for regulatory meetings, and predesign meetings are not included.
23. Phone and 480V, 3 phase power available within 100 feet of the plant location.
24. Smith Ranch-Highland can accept and regenerate the IX resin at $45 per cubic foot.
25. Electric cost is estimated at $0.11 per kilowatt hour.

As detailed on Table 1, the conceptual capital costs are estimated to be $7,600,000. As presented on Table 2, the conceptual operation and maintenance cost for treating 4.4 billion gallons is estimated to be $1,270,000 per year and at a treatment rate of 1,000 gpm, will take 12 years to treat the pit lake. The total conceptual cost to treat the stored water in the pit lake is $15,250,000. As shown on Table 3, the conceptual cost for treating 300 gpm in perpetuity is $680,000 per year.

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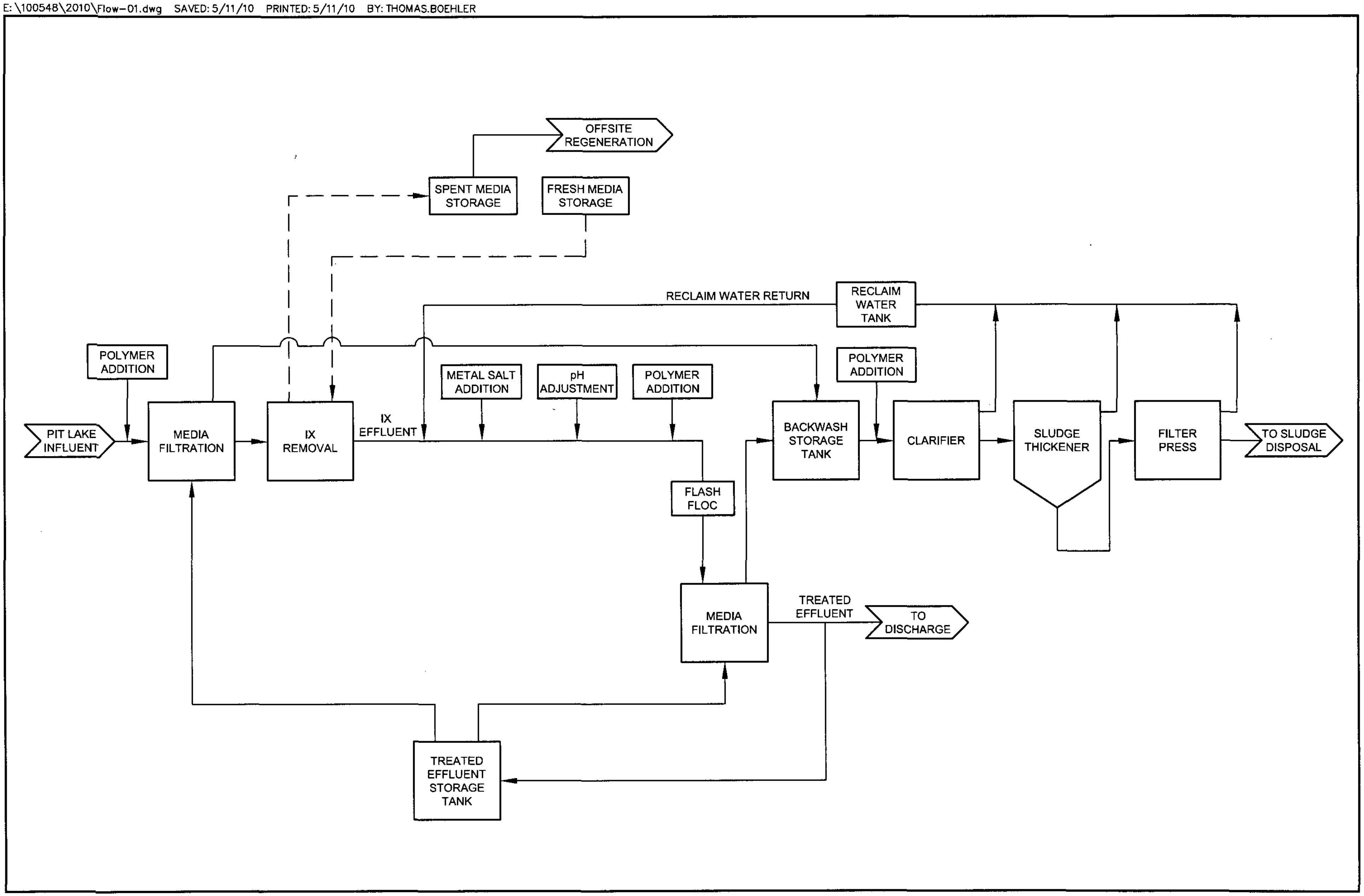

Project No. 181549

May 2010

Figure 1
Conceptual Process Flow Diagram

TABLE 1 - CONCEPTUAL HIGHLAND CAPITAL COST ESTIMATE (+100%, -25%)

ITEM	QUANTITY	UNIT	UNIT COST	UNIT TOTAL[11] (inc freight/tax)	SUBTOTAL	TOTAL
Building[1,2]	9,000	sf	$24.00	$241,920		
Cut/Fill[3,9,10]	0	cy	$0.00	$0		
Building foundation[2,4,10]	500	cy	$300.00	$168,000	$409,920	
Pit Lake						
Installation of 2, 12-inch water lines[3,7,8,10]	1,000	foot	$32.00	$35,840		
Pit Lake Pumps (1000 gpm)[3]	2	ea	$20,000.00	$44,800		
Variable Frequency Drives (1000 gpm)[3]	2	ea	$18,000.00	$40,320	$120,960	
Influent						
Flow Meter	1	ea	$4,500.00	$5,040	$5,040	
Ion Exchange Process						
Influent filtration						
Influent Media Filters (4 gpm/ft2)(96" dia.)(steel)	5	ea	$57,600.00	$322,560		
Filter Media (anthracite, fine garnet, sand, coarse garnet, gravel)	5	ea	$5,000.00	$28,000		
Media Filter Foundations[2,5]	28	cy	$450.00	$14,000		
Turbidimeter	1	ea	$2,600.00	$2,912	$367,472	
Ion Exchange Vessels and Media						
IX Vessels (7.7 gpm/ft2)(63" dia.)(FRP)(6 trains-3 vessels/train)[2]	6	ea	$99,500.00	$668,640		
Initial IX Media (DOW 21K XLT)(127 cu yds/vessel)(18 vessels)	2286	cf	$167.00	$427,573		
Fresh IX Media, Stored (DOW 21K XLT)	1143	cf	$167.00	$213,787		
IX Vessel Foundations[2,5]	43	cy	$450.00	$21,620	$1,331,620	
Ion Exchange Storage						
IX Spent/Fresh Media Storage Tanks[2]	2400	cf	$10.00	$26,880		
IX Storage Foundations[2,5]	11	cy	$450.00	$5,600	$32,480	
Coagulation/Filtration						
Reagents and Metering						
Acid Skid/Tank (6500 gal)(FRP)[2]	1	ea	$22,000.00	$24,640		
Secondary Containment	9	cy	$450.00	$4,480		
Metal Salt Tank/Skid (6500 gal)(FRP)[2]	1	ea	$22,000.00	$24,640		
Secondary Containment	9	cy	$450.00	$4,480		
Polyelectrolyte Tank/Skid (55 gal)	1	ea	$2,300.00	$2,576		
Metering Pumps	6	ea	$3,500.00	$23,520		
Tank Level Switches (high/low)	6	ea	$250.00	$1,680		
Inline pH Meter	2	ea	$2,400.00	$5,376		
Flash-floc Tank Assembly (8,000 gal)[2]	1	ea	$25,000.00	$28,000	$119,392	
Media Filters						
Influent Media Filters (4 gpm/ft2)(96" dia.)(steel)[2]	5	ea	$57,600.00	$322,560		
Filter Media (anthracite, fine garnet, sand, coarse garnet, gravel)	5	ea	$5,000.00	$28,000		
Media Filter Foundations[2,5]	28	cy	$450.00	$14,000		
Turbidimeter	1	ea	$2,000.00	$2,240	$366,800	
Backwash Collection						
BW Flow Meter	1	ea	$4,500.00	$5,040	$5,040	
Backwash Tank						
Backwash Collection Tank (30,000 gal)[2]	1	ea	$45,000.00	$50,400		
Tank Foundation[2,5]	10	cy	$450.00	$4,946		
Transfer Pump/skid	1	ea	$3,500.00	$3,920		
Backwash Collection Tank Level Sensor	1	ea	$2,000.00	$2,240		
Backwash Tank Level switch (shutoff)	1	ea	$250.00	$280	$61,786	
Clarifier						
Incline Plate Clarifier[2]	2	ea	$65,000.00	$145,600		
Clarifier Foundation[2,5]	34	cy	$450.00	$17,232		
Clarifier Sludge Pump-AOD-(100 gpm)	2	ea	$2,800.00	$6,272	$169,104	
Solids Storage Tank / Thickener						
Thickener Tank/Stand Assembly (3000 gal)[2]	2	ea	$40,000.00	$89,600		
Solids Pump-AOD-(25 gpm)	1	ea	$1,500.00	$1,680		
Solids Storage Level Switches (high/low)	2	ea	$250.00	$560	$91,840	
Filter Press						
Filter Press (1 Cu yd)	1	ea	$170,000.00	$190,400		
Control	1	ea	$1,500.00	$1,680		
Sludge Cart	1	ea	$3,700.00	$4,144	$196,224	
Recycle						
Recycle Tank (10,000 gal)[2]	1	ea	$15,000.00	$16,800		
Tank Foundation[2,5]	13	cy	$450.00	$6,330		
Recycle Water Pump/Skid	1	ea	$3,500.00	$3,920		
Recycle Tank Level Sensor	1	ea	$2,000.00	$2,240		
Recycle Tank Level switch (shutoff)	1	ea	$250.00	$280	$29,570	
Effluent						
Treated Effluent Storage Tank (25,000 gallon)[2,6]	1	ea	$37,500.00	$42,000		
Tank Foundation[2,5]	20	cy	$450.00	$9,891		
Effluent Tank Pump/Skid	1	ea	$3,500.00	$3,920		
Inline pH Meter	1	ea	$2,400.00	$2,688		
Flow Meter	1	ea	$3,500.00	$3,920		
Turbidimeter	1	ea	$2,000.00	$2,240	$64,659	
Utility						
Air Compressor & Dryer	1	ea	$22,000.00	$24,640		
Air Tank/Regulators/piping	1	ea	$4,500.00	$5,040		
Safety Shower/Eyewash/flow switch	4	ea	$1,000.00	$4,480		
Sump Pumps (Chemical Room)	2	ea	$1,500.00	$3,360		
Sump Level Switches	3	ea	$250.00	$840	$38,360	
Electrical/Control/HVAC						
Motor Control Center[2]	1	LS	$200,000.00	$224,000		
PLC (includes programming)	1	LS	$75,000.00	$84,000		
Computer/HMI (includes programming)	1	LS	$50,000.00	$56,000		
Building Lighting & Electrical	1	LS	$200,000.00	$224,000		
Power/phone 100 ft[3] (Incl transformers)	1	LS	$100,000.00	$112,000		
HVAC/Plumbing/Air Lines[4]	1	LS	$100,000.00	$112,000	$812,000	
IDENTIFIED EQUIPMENT SUBTOTAL	70%				$4,222,267	
Misc Process Piping/Valves[2,7]	10%		$6,031,809.60	$603,181		
Equipment Installation[2]	10%		$6,031,809.60	$603,181		
Unidentified Equipment[2]	10%		$6,031,809.60	$603,181		
UNIDENTIFIED EQUIPMENT/INSTALLATION SUBTOTAL	100%				$1,809,543	
Design	12%		$6,031,809.60	$723,817		
Construction Admin/Site Inspections	10%		$6,031,809.60	$603,181		
PLANT DESIGN, ADMINISTRATION SUBTOTAL					$1,326,998	
Geotechnical Studies	1	LS	$65,000.00	$65,000.00		
Bench- and Pilot-Scale Testing	1	LS	$200,000.00	$200,000.00		
OTHER COSTS SUBTOTAL					$265,000.00	
TOTAL CONCEPTUAL PLANT CONSTRUCTION, DESIGN, AND ADMINISTRATION COSTS						$7,623,808

1=Erected steel building with insulation, no fire supression.
2=Seismic/environmental (i.e., snow, wind, etc.) considerations may change costs.
3=Dependent on plant location, actual cost unknown.
4=One and one-half foot thick concrete, reinforced mat foundation. Final cost will be dependent on geotechnical/seismic analysis.
5=Three foot thick concrete, reinforced foundation. Final cost will be dependent on geotechnical/seismic analysis.
6=Tank capacity for designed two backwash volumes.
7=Assumes PVC pipe.
8=Includes installation of one air/vac vault, two 500-foot lines in the same trench.
9=Does not include compaction/importation/disposal.
10=Dewatering (if needed) and associated costs not included.
11=Freight/tax assumed to be 12% of the equipment cost.

Exclusions:
Permitting
Predesign/preconstruction meetings and site visits

Assumptions:
Nominal plant design of 1.44 mgd.
Phone and 480V, 3 phase power available within 100 feet of the plant location.
Not all equipment/labor needs to be bid (i.e., full specifications do not need to be prepared).
Blasting will not be necessary for installation of the pipeline or foundations.

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Table 2 - Conceptual Estimated Operating and Maintenance Costs (+100%, -25%)
1000 gpm

Item	Basis	Method	Cost/Unit		Quantity	Unit	Annual Cost
Chemicals	Modeling, estimate	Fixed Rate/Gal	0.24	$/Kgal	525,600	KGal/Yr	$ 126,796
IX Regen Costs	Quotes/Estimates	Fixed Rate	290,192	$/Yr	1	Yr	$ 290,192
IX Replacement	Quotes/Estimate	Fixed Rate/Cu Ft	167	$/Cu Ft	1,564	Cu Ft	$ 261,236
Maintenance	Plant Cost Construction Estimate	Fixed Rate	3.00	%	6,000,000	$	$ 180,000
Operating Labor	Dept Labor/Advertisments	$/per hour + benefits	29.50	$/Man-Hr	8,320	Man-Hr/Yr	$ 245,419
Sampling	Estimate	Fixed Rate	25,000	$/Yr	1	Yr	$ 25,000
Sludge	Estimate Hazardous	Fixed Rate	7,626	$trip	4	Trips/Yr	$ 30,506
Energy	Plant Load	Fixed Rate	0.11	$/KW-Hr	111	KW	$ 107,201
				TOTAL			$ 1,266,349

Table 3 - Conceptual Estimated Operating and Maintenance Costs (+100%, -25%)
300 gpm

Item	Basis	Method	Cost/Unit		Quantity	Unit	Annual Cost
Chemicals	Modeling, estimate	Fixed Rate/Gal	0.1	$/Kgal	157,680	KGal/Yr	$ 11,412
IX Regen Costs	Quotes/Estimates	Fixed Rate	87,058	$/Yr	1	Yr	$ 87,058
IX Replacement	Quotes/Estimate	Fixed Rate/Cu Ft	167	$/Cu Ft	469	Cu Ft	$ 78,371
Maintenance	Plant Cost Construction Estimate	Fixed Rate	3.00	%	6,000,000	$	$ 180,000
Operating Labor	Dept Labor/Advertisments	$/per hour + benefits	29.50	$/Man-Hr	8,320	Man-Hr/Yr	$ 245,419
Sampling	Estimate	Fixed Rate	25,000	$/Yr	1	Yr	$ 25,000
Sludge	Estimate Hazardous	Fixed Rate	7,626	$trip	2	Trips/Yr	$ 15,253
Energy	Plant Load	Fixed Rate	0.11	$/KW-Hr	37	KW	$ 35,734
				TOTAL			$ 678,245

Appendix A
Cost Backup Information

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Conceptual Chemical Cost Estimate for Plant Operation - User entered Parameters and volume calcs

Design/Perm/Const(DPC)	3	Yrs
Inflow Rate	300	gal/min
IX Vessels in each Train	3	#
IX Media Replacement	4	Regenerations
Estimated Capital Cost	6,000,000	Dollars

Dewatering Treatment Rate	1000	gpm

Media Filters	1	#
Media Vessel Diam	8	ft
Backwash Frequency	1	per day
Backwash Rate	15	gpm/ft^2
Backwash Duration	10	min
Volume	7536	gal/day
IX Vessel Diameter	5.15	gpm/ft^2
IX Media Height	6.1	min
Volume	127	Cu Ft

Ongoing Treatment Rate	300	gpm

Media Filters	1	#
Media Vessel Diam	8	ft
Backwash Frequency	1	per day
Backwash Rate	15	gpm/ft^2
Backwash Duration	10	min
Volume	7536	gal/day
Backwash Rate	5.15	gpm/ft^2
Backwash Duration	6.1	min
Volume	127	Cu Ft

Calculations

Currently Pit Vol (Gal)	Time for Design/Permitting/Const. (Yrs)	Inflow During DPC (gpm)	Total Inflow during DPC (Gal)
3,900,000,000	3	300	473,040,000

Pit Vol After DPC	Dewatering/Treatment Rate (gpm)	Inflow During Dewatering (gpm)	Effective dewatering rate (gpm)	Time to Dewater (Yrs)
4,373,040,000	1,000	300	700	12

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Highland IX Assumptions and Conceptual O&M Costs

Operational Data	**Intial Pit Lake Dewatering**	**Ongoing Pit Lake Dewatering**
Treatment duration per year (days)	365	365
Work week (days)	7	7
Number of IX trains	6	6
Uranium in feed (mg/L)	3	3
Treatment Rate (gpm)	1000	300
Utilization of IX trains (6 trains, 3 vessels per train)(percent)	98%	29%
Influent treated per day (gallons)	1,440,000	432,000
Influent treated per month (gallons)	43,776,000	13,132,800
Influent treated per year (gallons)	525,600,000	157,680,000
Uranium removed per day (mg)	16,329,600	4,898,880
Uranium removed per year (pounds)	13,140	3,942
IX Vessel Design and Loading		
Media height in vessel (feet)	6.1	6.1
Vessel Diameter (feet)	5.15	5.15
Square feet of media per vessel	20.8	20.8
Cubic feet of media per vessel	127	127
Kilograms of media per vessel	2420	2420
Regeneration		
Est. resin capacity at exhaustion (mg/kg)	50,000	50,000
Uranium loaded per vessel at exhaustion (grams)	120,978	120,978
Uranium loaded per vessel at exhaustion (pounds)	267	267
Days running before exhaustion per vessel	7.4	24.7
Vessel exchanges per year	49	15
IX Train exchanges per year (3 vessels)	16.42	4.93
Offsite Shipment Calculations		
Cubic feet of loaded resin per year for regeneration	6,257	1,877
Pounds loaded resin per cubic foot	44.0	44.0
Number of pounds of loaded resin per year	275,314.3	82,594.3
Truck capacity (pounds)	48,000	48,000
Truck capacity (pounds)	1,091	1,091
Trucks per season	5.7	1.7

Regeneration cost	**Intial Pit Lake Dewatering**	**Ongoing Pit Lake Dewatering**
Distance to Stripper	1	1
Cost per mile	$3.00	$3.00
Cost of shipping per truck	$3.00	$3.00
Regeneration cost per cubic foot	$45.00	$45.00
Cubic feet per truck	1,091	1,091
Regeneration cost	$49,091	$49,091
Lease and decontamination per truck	$1,500	$1,500
Total cost per truck	$50,594	$50,594
Trucks per season	6	2
Total cost per year	**$290,192**	**$87,058**

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Conceptual Chemical Cost Estimate for Plant Operation - Lower Chemical Costs May be Obtainable with Long-Term Contracts. Chemical feed rates are conceptual estimates.

Influent Basis	1000	gpm
	1,440,000	gpd
	5,450,400	lpd

Function	Basis			Chemical	Form	Concentration	Consumption		Price (lb)	Cost ¢/Kgal
pH Adjust	Dosage	93	ppm	Sulfuric Acid	Liquid bulk	93%	1118	Lb/Day	$ 0.25	19.4
Metal Salt	Dosage	4	ppm	Ferric Sulfate	Liquid Bulk	60%	48.1	Lb/Day	$ 0.10	0.3
Polyelectrolyte	Dosage	2	ppm	Polymer	Liquid in Drum	100%	24.0	Lb/Day	$ 2.63	4.4

24.1 Cost in cents per 1000 gallons

Influent Basis	300	gpm
	432,000	gpd
	1,635,120	lpd

Function	Basis			Chemical	Form	Concentration	Consumption		Price (lb)	Cost ¢/Kgal
pH Adjust	Dosage	93	ppm	Sulfuric Acid	Liquid bulk	93%	335	Lb/Day	$ 0.25	5.8
Metal Salt	Dosage	4	ppm	Ferric Sulfate	Liquid Bulk	60%	14.4	Lb/Day	$ 0.10	0.1
Polyelectrolyte	Dosage	2	ppm	Polymer	Liquid in Drum	100%	7.2	Lb/Day	$ 2.63	1.3

7.2 Cost in cents per 1000 gallons

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Electrical Requirements Backup

Equipment	Number of Pumps/VFDs	Motor (HP)	Flow (gpm)	VFD	KW	Usage (KW)	KW Usage rounded	Notes
Caustic Tank					10	5	5	
Wet Well Pumps	2	20	500	Yes	12	23.92	24	500 gpm/pump
IX pumps	2	10	500	Yes	6	12.42	13	300 gpm/pump
Reclaim Tank Pump	1	2	100	No	1	1.38	2	100 gpm
Treated Wtr Backwash Pump	1	20	750	No	12	11.96	12	750 gpm
Backwash Transfer Pump	1	2	100	No	1	1.00	1	100 gpm
Compressor	1	50		No	29	14	15	
Sludge Pump	2	0		Na	0	AOD	0	120 V Solenoid
Filter Press Pump	2	0		Na	0	AOD	0	120 V Solenoid
Ferric	1	1		No	1			
Acid	1	1		No	1			4-20 millamp
Polymer Pumps	2	0.1		No	1	2	3	4-20 millamp
Thickener Rake	1	3		No	2	2	3	on/off
Misc Process				No	1	1	1	2 pH, 2 Turb, 2 flow meters,
Lighting, MCC, Comp., etc.				Na		10	10	

Kilowatts	89
Kilowatts derated	111.25

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Conceptual Labor Costs						
Operator	**Hourly Rate**[1]	**Burden**[2]	**Hourly Burdened Rate**	**Full Time Equivelents**	**Total Hourly Burdened Rate**	**Total Yearly Cost (2080 Hrs)**
Chief Operator	$24.76	35%	$33.43	1	$33.43	$69,526.08
Backup Operator	$20.88	35%	$28.19	3	$84.56	$175,893.12
1 = US Department of Labor, Occupational Employment Statistics, Wy 2008, SOC code 518031			Avg Burdened Hourly Cost		$29.50	
2 = Burden Estimated						
Total Man Hours Per Year						
Number of People	**Hrs/person**	**Full Time Equiv**	**Total Hours**			
4	2080	4	8320			

Sludge Sampling and Disposal Backup

Aluminum

M_{XMine}	Mass of aluminum discharged	0.54	kg/day	
M_{prec}	Mass of Aluminum precipitate	1.57	kg/day	
	Molecular Wt Al	26.98	g	
	Precipitate formula	Al(OH)3		
	Molecular Wt Al(OH)3	77.98	g	
	Molar ratio Al(OH)3:Al	2.89	g precipitate/g Al	
C_X	Average effluent concentration of aluminum	0.1	mg/l	
	Conversion factor mg/l to kg/l	0.000001	mg/kg	
	Conversion factor liters to gal	3.78	l/gal	
	Conversion factor pounds per gallon	8.345	lbs/gal	
Q_{Mine}	Estimated average daily inflow rate	1440000	gallons/day	

Iron

M_{XMine}	Mass of iron discharged	21.77	kg/day	
M_{prec}	Mass of Fe precipitate	43.99	kg/day	
	Molecular Wt Fe	55.85	g	
	Precipitate formula	Fe2O3:0.5H2O		
	Molecular Wt Fe2O3:0.5H2O	112.85	g	
	Molar ratio Fe2O3:0.5H2O:Fe	2.02	g precipitate/g Fe	
C_X	Average effluent concentration of iron	4	mg/l	
	Conversion factor mg/l to kg/l	0.000001	mg/kg	
	Conversion factor gal to liters	3.78	l/gal	
	Conversion factor pounds per gallon	8.345	lbs/gal	
Q_{Mine}	Estimated average daily inflow rate	1440000	gallons/day	5443200

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Manganese

M_{XMine}	Mass of manganese discharged	0.1	kg/day		
M_{prec}	Mass of Mn precipitate	0.09	kg/day		
	Molecular Wt Mn	54.94	g		
	Precipitate formula	MnO2			
	Molecular Wt MnO2	86.94	g		
	Molar ratio MnO2:Mn	1.58	g precipitate/g Mn		
C_X	Average effluent concentration of manganese	0.01	mg/l		
	Conversion factor mg/l to kg/l	0.000001	mg/kg		
	Conversion factor gal to liters	3.78	l/gal		
	Conversion factor pounds per gallon	8.345	lbs/gal		
Q_{Mine}	Estimated average daily inflow rate	1440000	gallons/day		
	Estimated total mass from Al, Fe, Mn (metals)	22	kg/day		
	Estimated total mass from Al, Fe, Mn (metals)	49	lbs/day		
	Estimated total mass of Al, Fe, Mn oxyhydroxide precipitate	46	kg/day		
	Estimated total mass of Al, Fe, Mn oxyhydroxide precipitate	100	lbs/day		
	Percent solids estimated	25%			

Specific gravity Al(OH)3 precipitate	2.3			gm/cm3	http://webmineral.com/data/Gibbsite.shtml
Specific gravity Fe2O3:0.5H2O precipitate	3.3			gm/cm3	http://webmineral.com/data/Goethite.shtml; htt
Specific gravity MnO2 precipitate	3.0			gm/cm3	http://webmineral.com/data/Birnessite.shtml
Specific gravity of all solid precipitate	3.3	25%	0.82	gm/cm3	
Specific gravity water	1.0	75%	0.75	gm/cm3	
Specific gravity sludge			1.57	gm/cm3	
Weight cubic foot sludge			98	lbs/ft3	
Weight of solids in sludge			24.4	lbs/ft3	
Total cubic feet of sludge per day			4.11	ft3/day	
Total weight of sludge per day			402	lbs/day	
Total weight of sludge per year			146638	lbs/yr	
Total weight of sludge per year			73	tons/yr	
Cubic yards per year			56	yd3/yr	

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HAZARDOUS DISPOSAL, CLEAN HARBORS, COLORADO						Comments
TCLP Metals	5	Samples	$175	$875	Estimated	
TPH	1	Samples	$85	$85	Estimated	
VOCs	1	Samples	$175	$175	Estimated	
SVOCs	1	Samples	$250	$250	Estimated	
Pesticdes/PCBs	1	Samples	$150	$150	Estimated	
Metals	1	Samples	$150	$150	Estimated	
Cyanide	0	Samples	$100	$0	Estimated	
		Sampling Total		$1,685		
Bin rental + Liner			$5,725	per year	Quote	
Disposal cost per ton			$200	per ton	Quote	
Hauling/ton			$115	per ton	Quote	
Generator fees			$0	per year	NA	
Total estimated sludge disposal cost			$30,506	per year		

NON-HAZARDOUS DISPOSAL						Comments
TCLP Metals	5	Samples	$175	$875	Estimated	
TPH	0	Samples	$85	$0	Estimated	
VOCs	0	Samples	$175	$0	Estimated	
SVOCs	0	Samples	$250	$0	Estimated	
Pesticdes/PCBs	0	Samples	$150	$0	Estimated	
Metals	0	Samples	$150	$0	Estimated	
Cyanide	0	Samples	$100	$0	Estimated	
		Sampling Total		$875		
Bin rental + Liner			$5,725	per year	Quote	
Landfill			$28	per ton	Estimate	
Hauling/ton			$49	per ton	Estimate	
Generator fees			$0	per year		
Total estimated sludge disposal cost			$12,188	per year		

ESTIMATED NPDES COMPLIANCE MONITORING COSTS

Estimated Anaylitical Costs

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Comment
1.0	**Annual Laboratory Analytical**					
	TSS	12	Samples	$25	$300	Effluent
	Settleable solids	12	Samples	$15	$180	Effluent
	Nitrate/Nitrite	12	Samples	$50	$600	Effluent
	Hardness	12	Samples	$30	$360	Effluent
	Total Dissolved Solids	12	Samples	$25	$300	Effluent
	Color	12	Samples	$15	$180	Effluent
	Sulfate	12	Samples	$20	$240	Effluent
	Aluminum	12	Samples	$17	$204	Effluent
	Antimony	12	Samples	$20	$240	Effluent
	Arsenic	12	Samples	$20	$240	Effluent
	Barium	12	Samples	$20	$240	Effluent
	Beryllium	12	Samples	$20	$240	Effluent
	Cadmium	12	Samples	$20	$240	Effluent
	Chromium	12	Samples	$20	$240	Effluent
	Cobalt	12	Samples	$20	$240	Effluent
	Copper	12	Samples	$20	$240	Effluent
	Iron	12	Samples	$20	$240	Effluent
	Lead	12	Samples	$20	$240	Effluent
	Manganese	12	Samples	$20	$240	Effluent
	Mercury	12	Samples	$30	$360	Effluent
	Molybdenum	4	Samples	$20	$80	Effluent
	Nickle	12	Samples	$20	$240	Effluent
	Selenium	4	Samples	$20	$80	Effluent
	Thallium	12	Samples	$20	$240	Effluent
	Vandium	12	Samples	$20	$240	Effluent
	Zinc	12	Samples	$20	$240	Effluent
	Pimephales Promelas (acute)	2	Samples	$500	$1,000	Effluent
	Pimephales Promelas (Chronic)	2	Samples	$790	$1,580	Effluent
	Daphnia Dubia (Acute)	2	Samples	$300	$600	Effluent
	Daphnia Dubia (Chronic)	2	Samples	$395	$790	Effluent
	Dissolved Oxygen	12	Samples	$12	$144	Effluent
	pH	cont	Samples	$0	$0	Meter
	Temperature	12	Samples	$5	$60	Effluent
	Turbidity	cont	Samples	$0	$0	Effluent
	Electrical Conductivity	cont	Samples	$0	$0	Effluent, meter
	Radionuclides	12	Samples	$500	$6,000	Receiving water
	Subtotal Annual Laboratory Analytical Costs (rounded)				$16,700	
2.0	**Sampling**					
	Operator	68	Hours	$29	$2,006	5 Hr/Mo +2 Hr/Qtr.
	Sampling equipment	1	Lump Sum	$1,500	$1,500	Composite sampler, meters, etc.
	Consumables	27	Events	$20	$540	Gloves, containers, calibrant, etc.
	Subtotal Annual Sampling Costs (rounded)				$4,000	
3.0	**Reporting**					
	Operator	104	Hours	$29	$3,068	6 Hr/Mo + 3 Hr/Qtr +20 Hr Annual
	Operator	24	Hours	$29	$708	1 Hr/Mo +1 Hr/Qtr + 8 Hr Annual
	Copying and Mailing	12	Each	$50	$600	
	Subtotal Annual Reporting Costs (rounded)				$4,400	
	Total Estimated Annual NPDES Compliance Monitoring Costs (round(				**$25,000**	

EXHIBIT 4
COST ESTIMATE FOR PARTIAL BACKFILL OF HIGHLAND MINE PIT

MWH GLOBAL, FEBRUARY 2010

Exxon Mobil

HIGHLAND RECLAMATION PROJECT

Cost Estimate for Partial Backfill of Highland Mine Pit

February 2010

MWH

3665 JFK Parkway
Suite 206
Fort Collins, CO USA

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This report provides an estimate of earthmoving costs for partial backfill of the remaining open pits (Pits 3 and 4) at the Highland Uranium Project in Converse County Wyoming. This estimate has been prepared for ExxonMobil by MWH Americas, Inc., under the direction of Tetra Tech in Fort Collins, CO. The objective of this work is to provide an engineering estimate of costs to partially backfill Pits 3 and 4 of the Highland Uranium Mine, described in this report as the pit. The level of backfill was chosen to be above the anticipated long-term natural groundwater elevation.

This estimate was based on 1) identifying reasonable alternatives for partial pit backfilling, 2) calculating volumes of cut and fill to achieve the two backfill alternatives, and 3) estimating earthmoving costs for the backfill work on a unit price basis, and 4) calculating total earthmoving costs using a reasonable equipment layout and earthmoving schedule. Earthwork quantities are estimated without any shrink/swelling factors for material excavated from the borrow areas, since the density of the placed material would be similar to the current density of material in the anticipated borrow areas.

MWH provided cost estimates for two alternatives identified for partial pit backfill. The first alternative entails the placement material into the pit to an elevation that provides a 0.25% slope downward from the northernmost point of the pit, across the surface of the pit, through an excavated channel to a tie-in to the Box Canyon drainage south of the pit. The channel was designed to have a 600-ft bottom width. This alternative was selected with the thought that providing a path for surface water to drain from the pit would be a better long-term solution for pit reclamation. The layout for this alternative is shown in Figure 1.

The second alternative consisted of backfilling the mine pit to an even elevation of 5100 ft, without providing a channel to drain surface water from the pit. The layout for this alternative is shown in Figure 4. The second alternative involves backfill to a lower elevation, with associated lower costs.

2.0 ALTERNATIVE 1

The Alternative 1 backfill design was divided into three cut and three corresponding fill areas to further breakdown the amount of fill required and help determine the limits of borrow areas to provide fill. The goal of the grading plan exercise was to determine the extent and slopes of the cuts needed to provide the required fill amounts for the backfill design. The individual cut and fill areas can be seen in Figure 2. Quantities for each backfilled section are provided in Table 2-1 below.

Table 2-1. Alternative 1 Backfill Quantities

Backfilled Area	Quantity of Backfill Required
Fill Area A	18,323,014 cy
Fill Area B	17,963,131 cy
Fill Area C	4,711,314 cy
TOTAL	**40,997,459 cy**

For this alternative, it was assumed that the material for Fill Area A would be obtained by regrading the pit slopes of Cut Area A back at a 4:1 (horizontal : vertical) slope, using a D9 dozer, then pushing the material cut into the pit. Because of the long push distances, the work would be done in two steps, with the first push length being approximately 600 ft and then the same material pushed down to the floor of the pit. The unit cost for moving this material will be doubled due to the double handling of the material. The remainder (and majority) of the fill required would be provided by borrowing stockpiled material from the northeast borrow (North Dump) using scrapers.

Fill Area B material would be obtained from the excavation of the proposed channel at the south end of the pit leading to the Box Canyon drainage, as well as slope regrade, again at a 4:1 slope and in two steps, requiring double handling. The channel excavation would be completed using scrapers, with the regrade completed using D9 dozers.

Finally, Fill Area C material would be obtained from the regrading the pit walls in Cut Area C to a 4:1 slope along the western edge of the section and 10:1 slope along the southern edge of the section. A cut-fill isopach for this alternative is given in Figure 3.

Using production rates from Caterpillar (2007), unit production rates and unit costs were determined. Assuming two eleven hour shifts each day, total production each day for the dozer push was approximately 24,651 cy, and an average rate of approximately 25,343 cy for scraper hauls, depending on hauling distances. Using these production rates, the approximate duration of the project is four years assuming:

1) All three sections are being worked on concurrently, and
2) Working is limited to 9 months per year due to frozen ground conditions during the winter months,

Project duration calculations are given in Appendix B and unit cost development is described in detail in Section 5.

3.0 ALTERNATIVE 2

As mentioned previously, the second alternative for the partial backfill is to fill to elevation 5100 ft, containing any surface water on the flat backfill surface within the pit. Fill Area D material will be obtained partially from a 4:1 dozer pushdown in Cut Area D, with the remainder borrowed from the North Dump adjacent to the pit (as was planned for Fill Area A in Alternative 1). The two remaining fill areas (Fill Areas E and F) will be completed with dozer pushdowns at a 4:1 slope in Cut Areas E and F. Due to the long distance of the pushdowns in Cut Areas E and F, the work is estimated to be completed in two steps, pushing down approximately 600 ft and then pushing the same material again to the bottom. As was the case with the long pushes in Alternative 1, the material haul cost will be doubled to account for this double movement of material. Approximate volumes of backfill material required for this alternative are given in Table 3-1.

Table 3-1. Alternative 2 Backfill Quantities

Backfill Area	Quantity of Backfill Required
Fill Area D	14,497,886 cy
Fill Area E	14,224,875 cy
Fill Area F	2,631,440 cy
TOTAL	**31,354,201 cy**

Again, using production rates from Caterpillar (2007), the daily production rates for the dozer pushdown and scraper borrow are 24,651 cy and 23,405 cy, respectively. As previously mentioned, it is assumed that two crews work eleven hour shifts each day, working on all three sections concurrently. Given the nine month work year, the approximate duration of the project for Alternative 2, including revegetation activities, as described in detail in Section 6.0, would be three years.

The calculations for project duration are included in Appendix B. An isopach, showing cut and fill contours for the regrading of this alternative is given in Figure 6.

4.0 MOBILIZATION/DEMOBILIZATION ESTIMATE

Due to the large amount of equipment needed for this operation, mobilization and demobilization of the equipment will contribute a significant cost to the project. For this estimate, we assumed that the equipment will be rented from an equipment dealer within a day's travel of the site, thus requiring cost for a day in transit each way. In addition, we assumed that one day will be needed to reassemble and prepare the equipment. Assuming a cost of $100/hr for a flat bed truck and driver to transport the equipment for operation, a work day of 10-hrs, the cost at $100/day*10 hours/day*3 days = $3,000 per round trip. We assumed that the equipment will be returned from the site and serviced once a year, thus we assumed four round trip mobilization/demobilizations over the life of the project per piece of equipment for Alternative 1 and three round trips for Alternative 2. Table 4-1 and 4-2 give anticipated mobilization/demobilization cost estimates for each regrading alternative.

Table 4-1. Equipment Mobilization/Demobilization Estimate, Alternative 1

	Mobilization / Demobilization			
Equipment	Unit Mob/Demob Cost	Equipment Quantity	# of Mob/Demob	Total Mob/Demob Cost
CAT 631 Scraper	$3000	10	4	$120,000
CAT D9 Dozer	$3000	30	4	$360,000
CAT D8 Dozer	$3000	2	4	$24,000
CAT 16G Grader	$3000	2	4	$24,000
Water Truck	$3000	3	4	$36,000
Service Truck	$3000	3	4	$36,000
TOTAL MOBILIZATION/DEMOBILIZATION ESTIMATE				**$600,000**

Table 4-2. Equipment Mobilization/Demobilization Estimate, Alternative 2

	Mobilization / Demobilization			
Equipment	Unit Mob/Demob Cost	Equipment Quantity	# of Mob/Demob	Total Mob/Demob Cost
CAT 631 Scraper	$3000	5	3	$45,000
CAT D9 Dozer	$3000	30	3	$270,000
CAT D8 Dozer	$3000	1	3	$9,000
CAT 16G Grader	$3000	1	3	$9,000
Water Truck	$3000	3	3	$27,000
Service Truck	$3000	3	3	$27,000
TOTAL MOBILIZATION/DEMOBILIZATION ESTIMATE				**$387,000**

5.0 UNIT COST DETERMINATION AND PRODUCTION COST ESTIMATE

The unit cost and production estimates for Alternative 1 and 2 are summarized in Tables 5-1 and 5-2, and are discussed below.

Assumptions
This estimate assumes that two crews would be each working an 11-hour shift each day, with the remaining two hours available for maintenance and refueling. In addition, work is assumed to be completed by an outside contractor, a per diem of $100 per person per day was used in the unit cost calculation.

Dozer Pushdown
The unit costs for the dozer pushdown were determined by taking the average pushdown distance for the dozer push, finding the appropriate production for that distance using Caterpillar (2007), taking into account variables such as operator efficiency, slope, and side by side dozing. These unit cost calculations and daily production rates can be found in Appendix A. As mentioned above, unit costs for all dozer work, with the exception of the dozer pushdown of material in Cut Area D to Fill Area D, were doubled due to the double handling of material being pushed down long slope.

Scraper Hauling
Scraper hauling unit costs were determined using the Caterpillar (2007), finding travel and cycle times for loaded and unloaded CAT 631 Scrapers, taking into account slopes and other variables as described in Caterpillar (2007). These cycle times were used to determine hourly productivity and eventually unit costs. Cost calculations and daily production rates for Alternative 2 can also be found in Appendix A.

Table 5-1. Alternative 1 Production Cost Estimate

Operation	Unit Cost ($/cy)	Quantity Req.	Section Subtotal
Cut Area A Dozer Push	$1.16 x 2 = $2.32	6,579,112 cy	$15,263,540
North Dump Scraper Haul	$1.52	11,743,902 cy	$17,850,731
Cut Area B Scraper Haul	$1.30	16,189,193 cy	$21,045,951
Cut Area B Dozer Push	$1.16 x 2 = $2.32	1,773,938 cy	$4,115,536
Cut Area C Dozer Push	$1.16 x 2 = $2.32	4,711,314 cy	$10,930,249
TOTAL ALTERNATIVE 1 COST ESTIMATE			**$69,206,007**

Table 5-2. Alternative 2 Production Cost Estimate

Operation	Unit Cost ($/cy)	Quantity Req.	Total Cost
Cut Area D Dozer Push	$1.16	2,753,984 cy	$3,194,621
North Dump Scraper Haul	$1.52	11,743,902 cy	$17,850,731
Cut Area E Dozer Push	$1.16 x 2 = $2.32	14,224,875 cy	$33,001,710
Cut Area F Dozer Push	$1.16 x 2 = $2.32	2,631,440 cy	$6,104,941
TOTAL ALTERNATIVE 2 COST ESTIMATE			**$60,152,003**

6.0 REVEGETATION ESTIMATE

In addition to the work associated with the partial backfill of the mine pit, work will be required to revegetate the disturbed areas. Revegetation would be completed once a year for the duration of the project. Each year, equipment would be mobilized to the site to perform revegetation activities on areas completed during the previous year. This mobilization cost has been included in the unit cost per acre estimate for revegetation.

Revegetation would include placing a one-foot thick layer of growth media over all disturbed areas, applying fertilizer, ripping and harrowing the soil, broadcast seeding, and mulching all disturbed areas. The seed mix will be comprised of specific grasses and plants native to the area and/or grasses proven in previous similar revegetation projects to grow as required by revegetation guidelines of Wyoming. Revegetation unit costs per acre calculations are included in Appendix C. Estimates of the revegetation costs for each alternative are provided in Tables 6-1 and 6-2.

Table 6-1. Alternative 1 Revegetation Cost Estimate

Revegetation Activity	Quantity	Unit Cost	Subtotal
1-ft Thick Growth Media Application[1]	984,367 cy	$1.52/cy	$1,496,238
Revegetation Cost	724 acres	$2009/acre	$1,454,516
		TOTAL	**$2,950,754**

Note: [1]Assumes using scraper at cost of $1.52/cy. Also assumes North Dump does not require growth media.

Table 6-2. Alternative 2 Revegetation Cost

Revegetation Activity	Quantity	Unit Cost	Subtotal
1-ft Thick Growth Media Application[1]	785,174 cy	$1.52/cy	$1,193,464
Revegetation Cost	487 acres	$2011/acre	$979,357
		TOTAL	**$2,172,821**

Note: [1]Assumes using scraper at cost of $1.52/cy.

7.0 TOTAL ESTIMATED PROJECT COST

The estimated project costs for each alternative are given below in Table 7-1. Included in the estimate is a contingency of 10% for unexpected costs due to weather delays and unforeseen changes in fuel prices or equipment availability.

Table 7-1. Total Project Cost Estimates for Alternatives 1 and 2

Alternative	Mob/Demob Cost ($)	Production Cost ($)	Revegetation Cost ($)	Contingency (10%)	Total Cost ($)
1	$600,000	$69,206,007	$2,950,754	$7,275,676	**$80,032,437**
2	$387,000	$60,152,003	$2,172,821	$6,271,182	**$68,983,006**

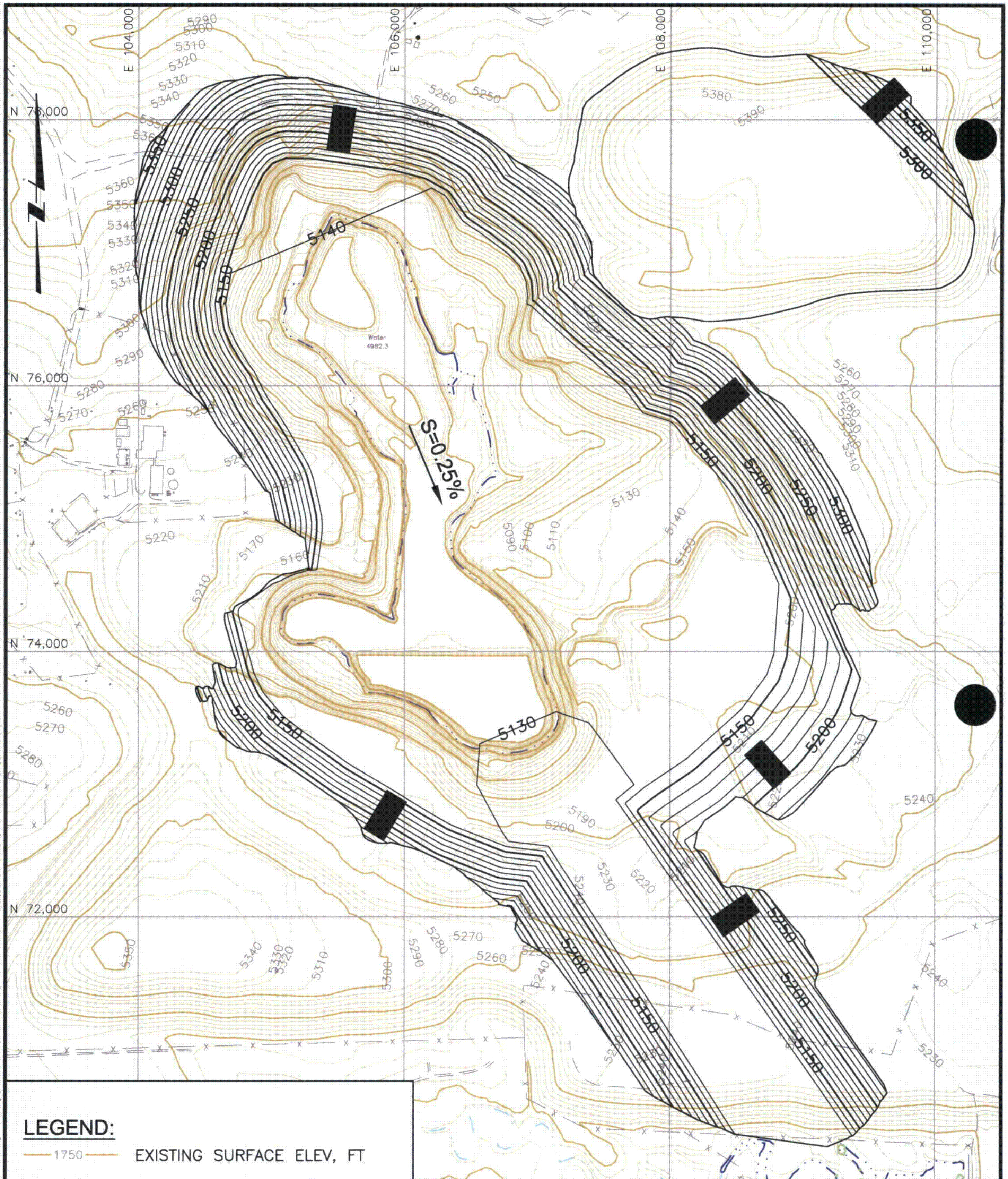
Costs associated with other necessary aspects of the partial pit backfill, that are not included in this estimate are listed below.

1. Permitting and licensing associated with backfill planning.
2. Property leases or purchases, and access permissions.
3. Removal of water from the mine, along with treatment and discharge of this water.
4. Installation and operation of dewatering systems for the mine prior to and during backfill operations.
5. Permitting and licensing associated with water removal, treatment, and discharge listed above.
6. Obtaining contractor bids, evaluating bids, and contract negotiation for the work listed above.
7. Monitoring of backfill and revegetation performance, (vegetation success, erosion control, slope stability, settlement, groundwater levels and quality).

8.0 REFERENCES

Caterpillar, Inc., 2007. Caterpillar Performance Handbook, Caterpillar Inc., Peoria, Illinois,

FIGURES



LEGEND:

1750	EXISTING SURFACE ELEV, FT
5300	REGRADED SURFACE ELEV, FT
— — —	EXISTING ROAD

SCALE

1000 0 1000

DRAWING REFERENCE:
TOPOGRAPHY PROVIDED BY TETRATECH–NOV, 09

ExxonMobil

PROJECT
HIGHLAND RECLAMATION PROJECT

TITLE
ALTERNATIVE 1 REGRADING PLAN

MWH

DATE FEB 2010

FIGURE 1

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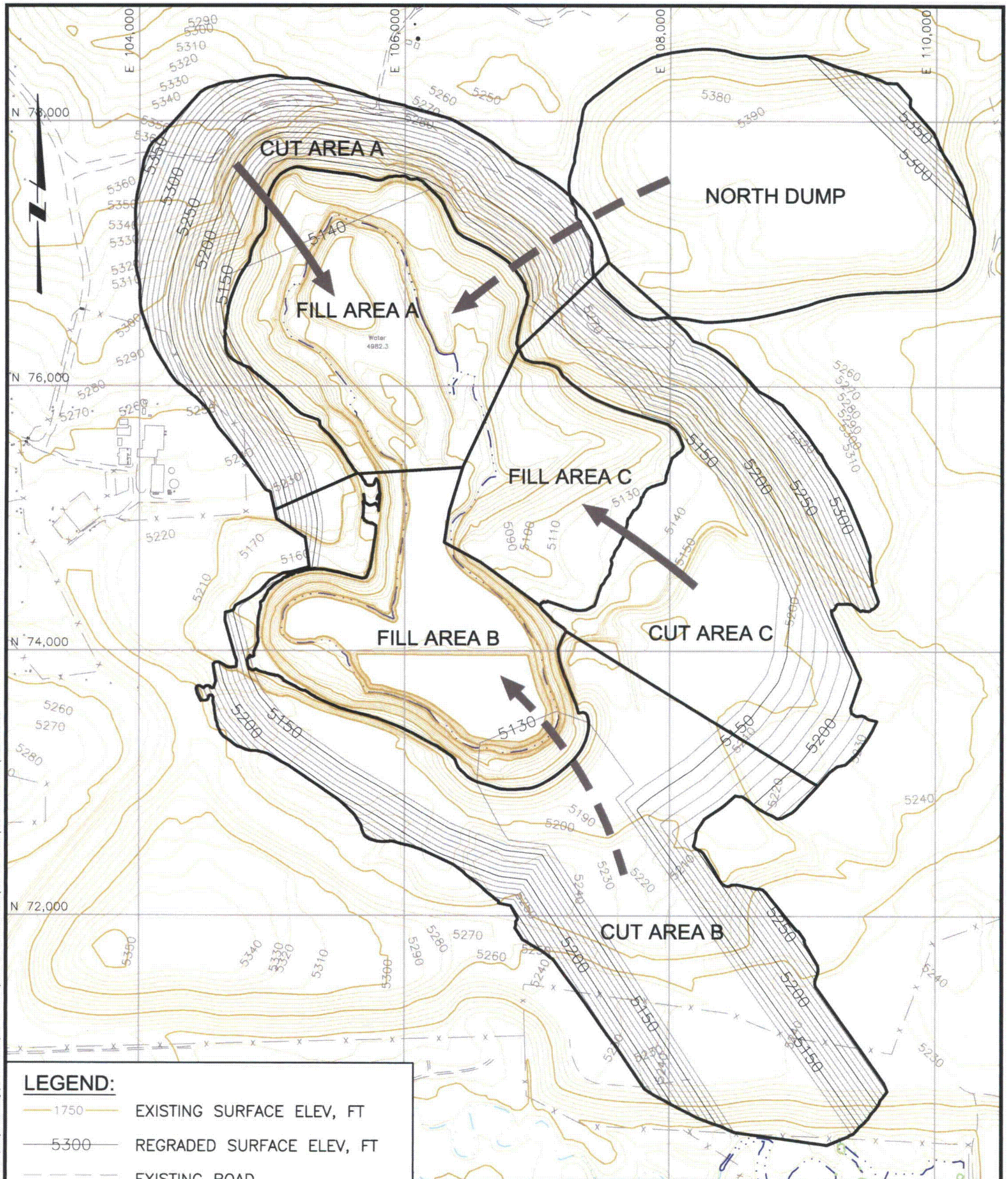

DRAWING REFERENCE:
TOPOGRAPHY PROVIDED BY TETRATECH-NOV, 09

ExxonMobil

PROJECT
HIGHLAND RECLAMATION PROJECT

TITLE
ALTERNATIVE 1 BORROW AND FILL AREAS

MWH

DATE FEB 2010

FIGURE 2

FILE NAME 1007455D006

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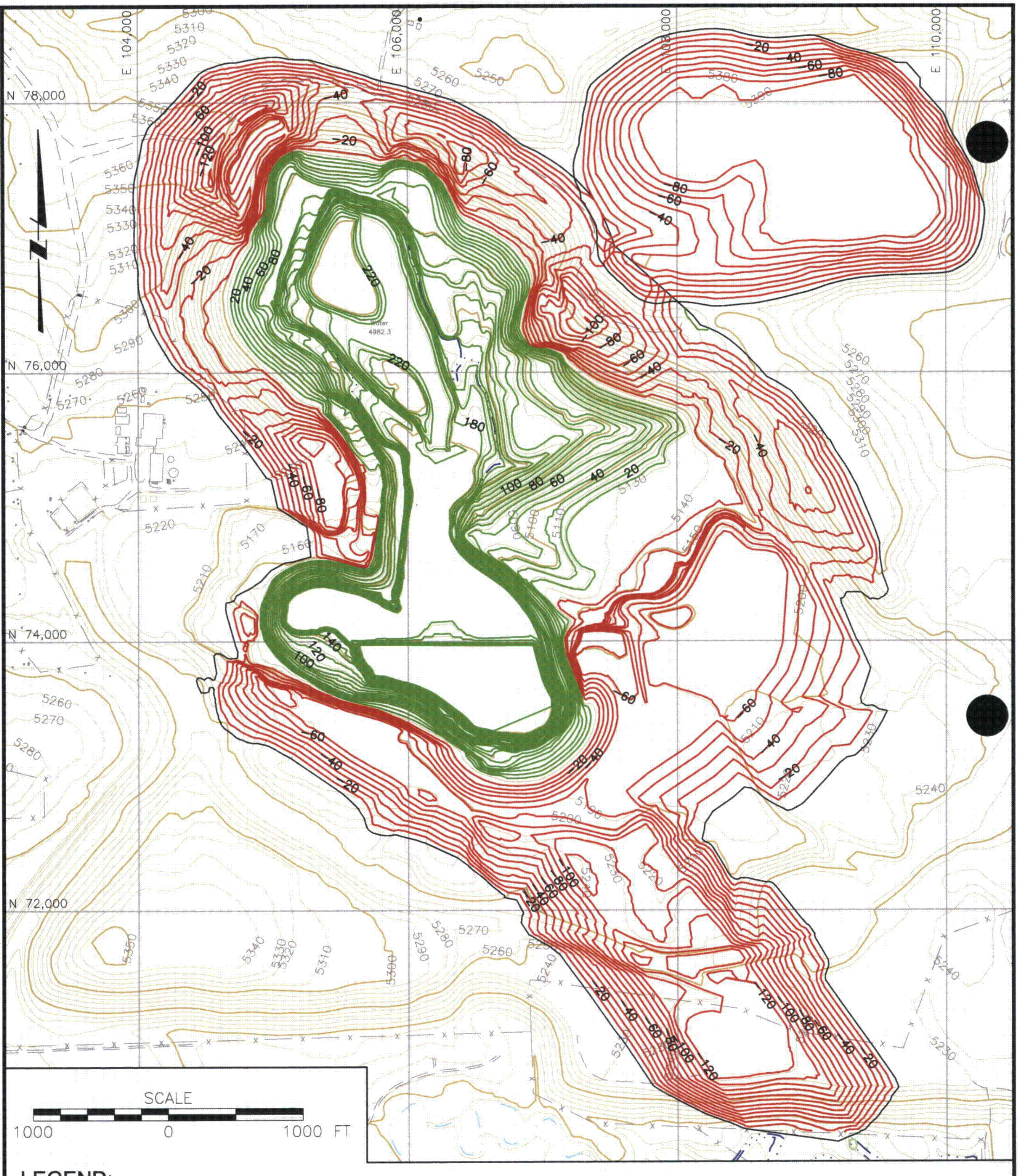

LEGEND:

1750	EXISTING SURFACE ELEV, FT
	EXISTING ROAD
100	ISOPACH FILL CONTOUR ELEV, FT
-100	ISOPACH CUT CONTOUR ELEV, FT

VOLUMES	
FILL REQUIRED (CY)	40,866,810
CUT SUPPLIED (CY)	43,164,287

VOLUME DIFFERENCE = 5.0%

DRAWING REFERENCE:
TOPOGRAPHY PROVIDED BY TETRATECH-NOV, 09

ExxonMobil

PROJECT: HIGHLAND RECLAMATION PROJECT

TITLE: ALTERNATIVE 1 ISOPACH CONTOURS

MWH

DATE: FEB 2010

FIGURE 3

FILE NAME: 1007455D003

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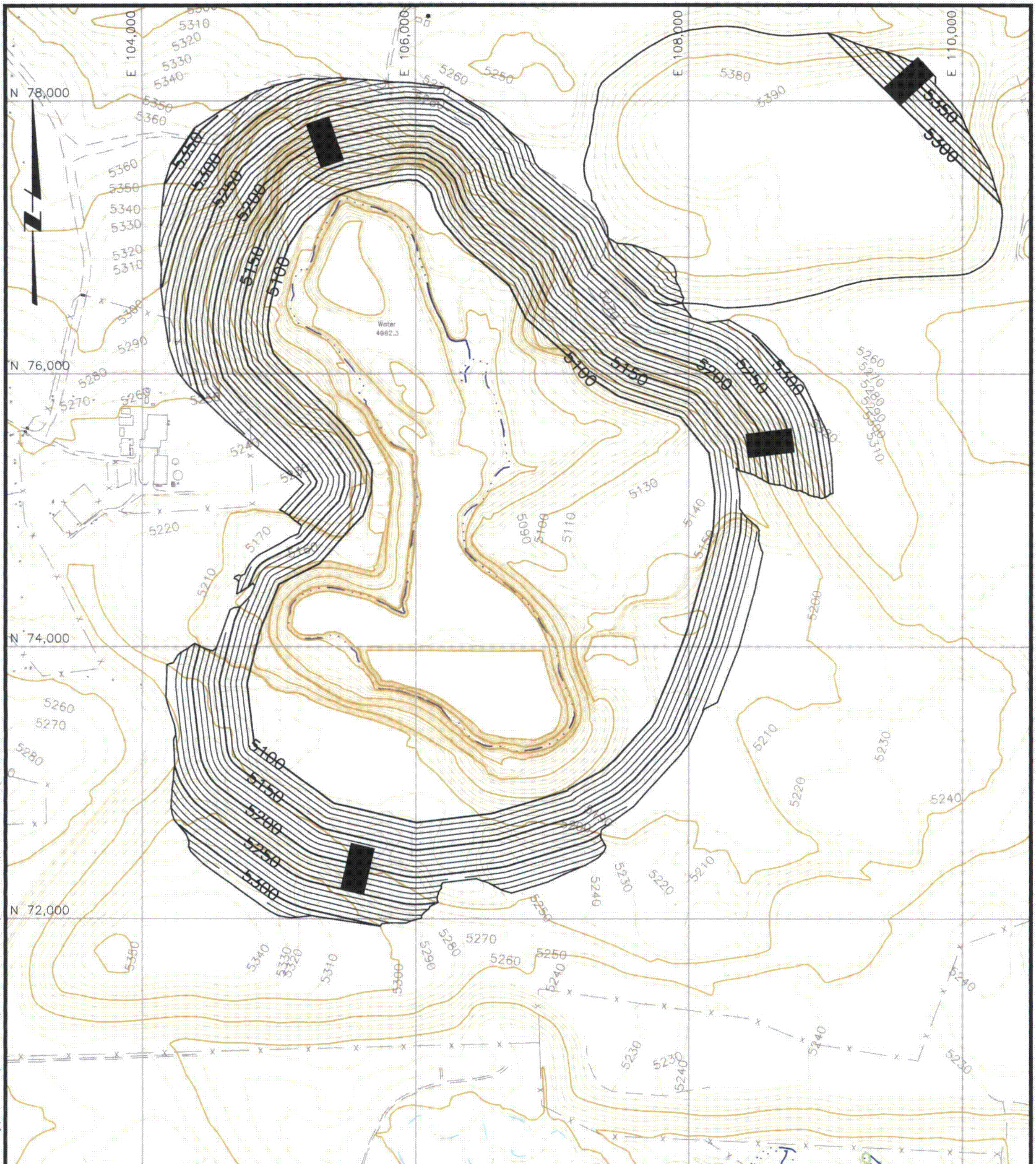

LEGEND:

1750 EXISTING SURFACE ELEV, FT

5300 REGRADED SURFACE ELEV, FT

EXISTING ROAD

SCALE

1000 0 1000 FT

DRAWING REFERENCE:
TOPOGRAPHY PROVIDED BY TETRATECH–NOV, 09

ExxonMobil

PROJECT
HIGHLAND RECLAMATION PROJECT

TITLE
ALTERNATIVE 2 REGRADING PLAN

MWH

DATE FEB 2010

FIGURE 4

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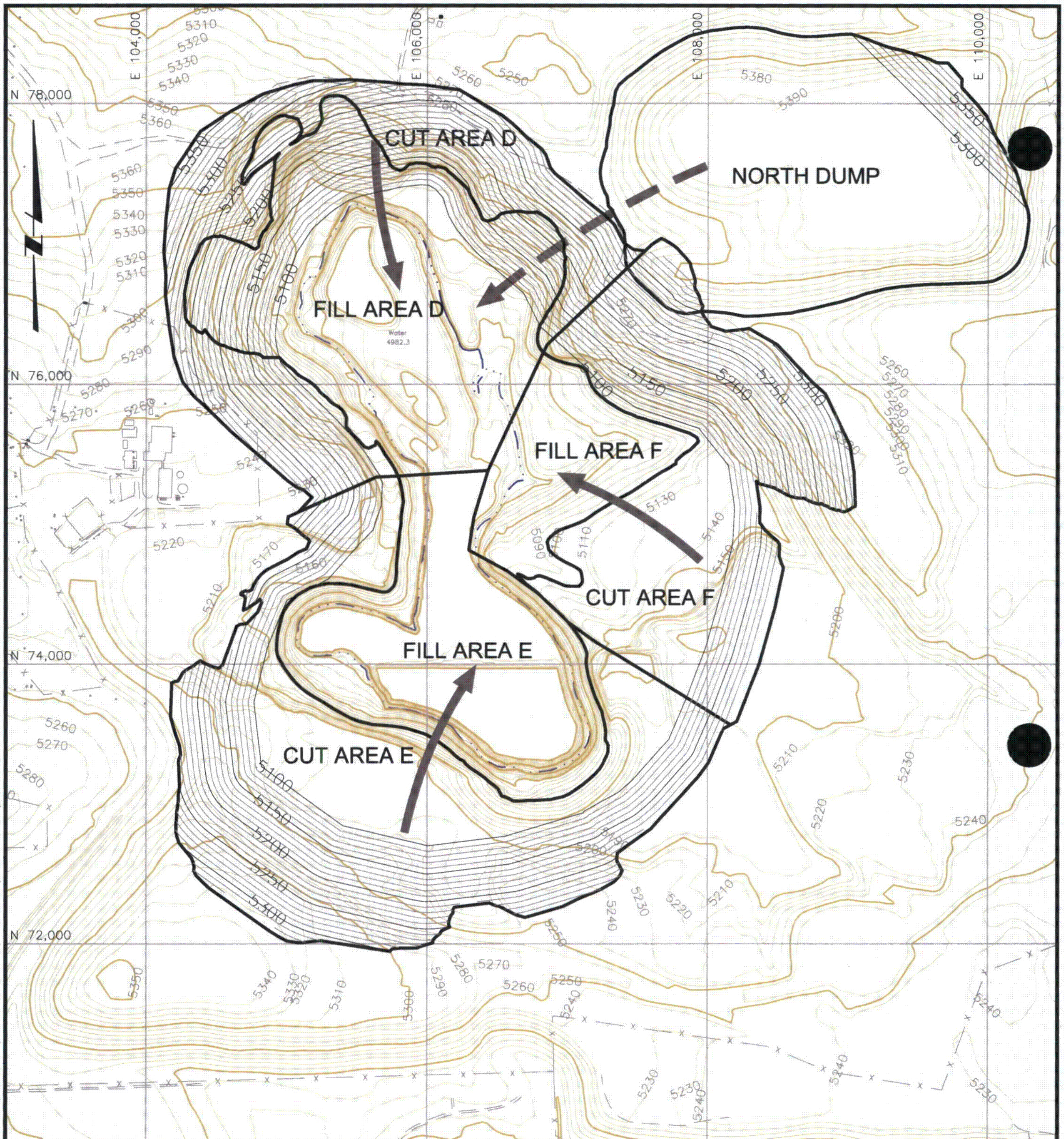

LEGEND:

—1750—	EXISTING SURFACE ELEV, FT
—5300—	REGRADED SURFACE ELEV, FT
— — — —	EXISTING ROAD
⟶	DOZER PUSHDOWN REGRADE
— — ⟶	SCRAPER BORROW TO FILL

SCALE

1000 0 1000

DRAWING REFERENCE:
TOPOGRAPHY PROVIDED BY TETRATECH–NOV, 09

ExxonMobil

PROJECT
HIGHLAND RECLAMATION PROJECT

TITLE
ALTERNATIVE 2 BORROW AND FILL AREAS

MWH

DATE FEB 2010

FIGURE 5

FILE NAME 1007455D007

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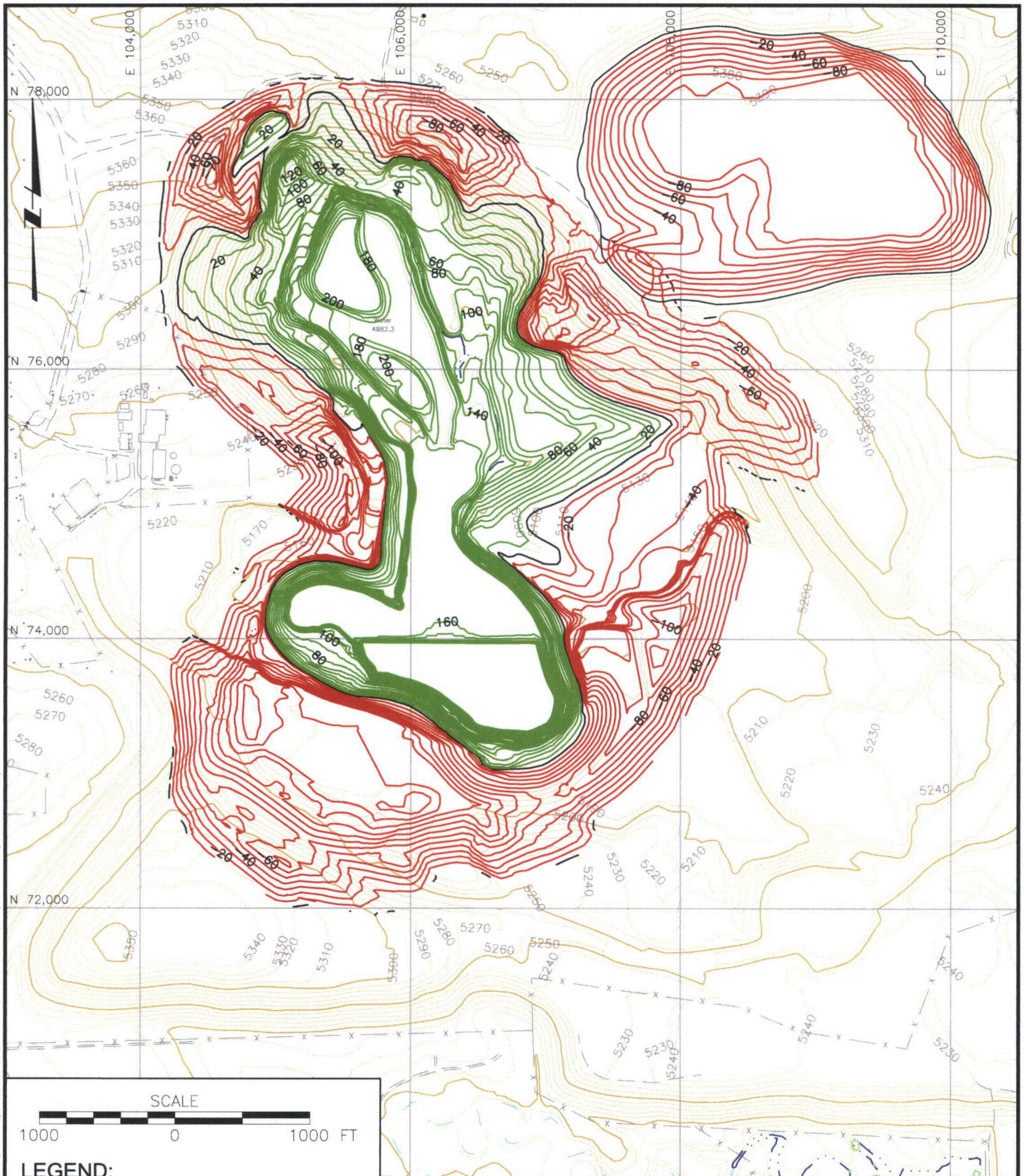

LEGEND:

1750	EXISTING SURFACE ELEV, FT
— — — —	EXISTING ROAD
100	ISOPACH FILL CONTOUR ELEV, FT
100	ISOPACH CUT CONTOUR ELEV, FT

VOLUMES	
FILL REQUIRED (CY)	30,124,149
CUT SUPPLIED (CY)	29,459,462

VOLUME DIFFERENCE = 2.3%

DRAWING REFERENCE:
TOPOGRAPHY PROVIDED BY TETRATECH-NOV, 09

ExxonMobil

PROJECT
HIGHLAND RECLAMATION PROJECT

TITLE
ALTERNATIVE 2 ISOPACH CONTOURS

MWH

DATE FEB 2010

FIGURE 6

FILE NAME 1007455D005

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APPENDIX A

COST ESTIMATE CALCULATIONS

ALTERNATIVE 1
BACKFILLING

CUT AREA A DOZER PUSHDOWN
CUTTING AND PUSH DOWN OF WALL MATERIAL INTO FILL AREA A AT 4H:1V
600 ft average dozing distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Dozer (Cat D9)	5	22	$185.00	$32.44	$217.44	$23,918.40
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	16					$1,600.00
					Overall Total =	*$28,554.18*

Daily Dozer Production

LCY/hr MAX	Operator Efficiency	material	Job Efficiency	Grade Factor	Side By Side Dozing	Corrected LCY/hr	LCY/day/unit
200	Average 0.75	Bank 1	50 min/hr 0.83	4H:1V downhill 1.5	Yes 1.2	224.1	4930.2
						LCY/hr/fleet	1120.5
						LCY/day/fleet	24651

Notes

Hourly production and load corrections from
2007 Caterpillar Performance Handbook

Average Dozing Distance (ft)	LCY/hr
100	1300
200	725
300	500
400	325
500	225
600	200

Daily Cost/Daily Production = $1.16 per cy

unit rate by item	cost/cy
Dozer (Cat D9)	$0.97
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.04
Crew Per Diem	$0.06

Load Corrections

Operator Efficiency		
Excellent	1	
Average	0.75	
Poor	0.6	
Load Conditions		
Bank	1	
Loose Stkple	1.2	
Rock	0.7	
Side By Side Dozing		1.2
Job Efficiency		
50 min/hr	0.83	
40 min/hr	0.67	

ALTERNATIVE 1
BACKFILLING

NORTH DUMP SCRAPER BORROW TO FILL AREA A
3300-ft average haul distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Scraper (Cat 631)	5	22	$163.00	$32.44	$195.44	$21,498.40
Dozer (Cat D8)	1	22	$147.00	$32.44	$179.44	$3,947.68
Grader (Cat 16G)	1	22	$108.00	$32.71	$140.71	$3,095.62
Water truck (2000 gal)	1	22	$45.00	$32.08	$77.08	$1,695.76
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	22					$2,200.00
					Overall Total =	*$35,473.24*

Daily Production

cycle time (min)	loads/hr	hr/day	efficiency	loads/day	rounded loads/day	cy/load	cy/day/unit
7	8.57	22	0.8	150.9	151	31	4681

cy/hr/unit	213
cy/hr	1064
cy/day	23405

Notes

Cycle time and hourly production from
1997 Caterpillar Performance Handbook

Production controlled by scraper travel times
Borrow from Northeast Stockpile

Daily Cost/Daily Production = $1.52 per cy

unit rate by item	cost/cy
Scraper (Cat 631)	$0.92
Dozer (Cat D8)	$0.17
Grader (Cat 16G)	$0.13
Water truck (2000 gal)	$0.07
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.05
Crew Per Diem	$0.09

ALTERNATIVE 1
BACKFILLING

FILL AREA B FROM CHANNEL SCRAPER BORROW
2500-ft average haul distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Scraper (Cat 631)	5	22	$163.00	$32.44	$195.44	$21,498.40
Dozer (Cat D8)	1	22	$147.00	$32.44	$179.44	$3,947.68
Grader (Cat 16G)	1	22	$108.00	$32.71	$140.71	$3,095.62
Water truck (2000 gal)	1	22	$45.00	$32.08	$77.08	$1,695.76
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	22					$2,200.00
					Overall Total =	*$35,473.24*

Daily Production

cycle time (min)	loads/hr	hr/day	efficiency	loads/day	rounded loads/day	cy/load	cy/day/unit
6	10.00	22	0.8	176.0	176	31	5456

cy/hr/unit	248
cy/hr	1240
cy/day	27280

Notes

Cycle time and hourly production from
1997 Caterpillar Performance Handbook

Production controlled by scraper travel times

Daily Cost/Daily Production = $1.30 per cy

unit rate by item	cost/cy
Scraper (Cat 631)	$0.79
Dozer (Cat D8)	$0.14
Grader (Cat 16G)	$0.11
Water truck (2000 gal)	$0.06
Foreman	$0.04
Grade checker	$0.03
Mechanic	$0.04
Crew Per Diem	$0.08

ALTERNATIVE 1
BACKFILLING

CUT AREA B DOZER PUSHDOWN TO FILL AREA B
CUTTING AND PUSH DOWN OF WALL MATERIAL INTO PIT AT 4H:1V
600 ft average dozing distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Dozer (Cat D9)	5	22	$185.00	$32.44	$217.44	$23,918.40
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	16					$1,600.00
					Overall Total =	*$28,554.18*

Daily Dozer Production

LCY/hr MAX	Operator Efficiency	material	Job Efficiency	Grade Factor	Side By Side Dozing	Corrected LCY/hr	LCY/day/unit
200	Average	Bank	50 min/hr	4H:1V downhill	Yes	224.1	4930.2
	0.75	1	0.83	1.5	1.2		
						LCY/hr/fleet	1120.5
						LCY/day/fleet	24651

Notes

Hourly production and load corrections from
2007 Caterpillar Performance Handbook

Average Dozing Distance (ft)	LCY/hr
100	1300
200	725
300	500
400	325
500	225
600	200

Daily Cost/Daily Production = $1.16 per cy

unit rate by item	cost/cy
Dozer (Cat D9)	$0.97
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.04
Crew Per Diem	$0.06

Load Corrections	
Operator Efficiency	
Excellent	1
Average	0.75
Poor	0.6
Load Conditions	
Bank	1
Loose Stkple	1.2
Rock	0.7
Side By Side Dozing	1.2
Job Efficiency	
50 min/hr	0.83
40 min/hr	0.67

ALTERNATIVE 1
BACKFILLING

CUT AREA C DOZER PUSHDOWN TO FILL AREA C
CUTTING AND PUSH DOWN OF WALL MATERIAL INTO PIT AT 4H:1V
600 ft average dozing distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Dozer (Cat D9)	5	22	$185.00	$32.44	$217.44	$23,918.40
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	16					$1,600.00
					Overall Total =	*$28,554.18*

Daily Dozer Production

LCY/hr MAX	Operator Efficiency	material	Job Efficiency	Grade Factor	Side By Side Dozing	Corrected LCY/hr	LCY/day/unit
200	Average 0.75	Bank 1	50 min/hr 0.83	4H:1V downhill 1.5	Yes 1.2	224.1	4930.2
						LCY/hr/fleet	1120.5
						LCY/day/fleet	24651

Notes

Hourly production and load corrections from
2007 Caterpillar Performance Handbook

Average Dozing Distance (ft)	LCY/hr
100	1300
200	725
300	500
400	325
500	225
600	200

Daily Cost/Daily Production = $1.16 per cy

unit rate by item	cost/cy
Dozer (Cat D9)	$0.97
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.04
Crew Per Diem	$0.06

Load Corrections	
Operator Efficiency	
Excellent	1
Average	0.75
Poor	0.6
Load Conditions	
Bank	1
Loose Stkple	1.2
Rock	0.7
Side By Side Dozing	1.2
Job Efficiency	
50 min/hr	0.83
40 min/hr	0.67

ALTERNATIVE 2
BACKFILLING

CUT AREA D DOZER PUSHDOWN TO FILL AREA D
CUTTING AND PUSH DOWN OF WALL MATERIAL INTO PIT AT 4H:1V
600 ft average dozing distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Dozer (Cat D9)	5	22	$185.00	$32.44	$217.44	$23,918.40
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	16					$1,600.00
					Overall Total =	*$28,554.18*

Load Corrections	
Operator Efficiency	
Excellent	1
Average	0.75
Poor	0.6
Load Conditions	
Bank	1
Loose Stkple	1.2
Rock	0.7
Side By Side Dozing	1.2
Job Efficiency	
50 min/hr	0.83
40 min/hr	0.67

Daily Dozer Production

LCY/hr MAX	Operator Efficiency	material	Job Efficiency	Grade Factor	Side By Side Dozing	Corrected LCY/hr	LCY/day/unit
200	Average	Bank	50 min/hr	4H:1V downhill	Yes	224.1	4930.2
	0.75	1	0.83	1.5	1.2		
						LCY/hr/fleet	1120.5
						LCY/day/fleet	24651

Notes

Hourly production and load corrections from
2007 Caterpillar Performance Handbook

Average Dozing Distance (ft)	LCY/hr
100	1300
200	725
300	500
400	325
500	225
600	200

Daily Cost/Daily Production = $1.16 per cy

unit rate by item	cost/cy
Dozer (Cat D9)	$0.97
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.04
Crew Per Diem	$0.06

ALTERNATIVE 2
BACKFILLING

NORTH DUMP SCRAPER BORROW TO FILL AREA D
3300-ft average haul distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Scraper (Cat 631)	5	22	$163.00	$32.44	$195.44	$21,498.40
Dozer (Cat D8)	1	22	$147.00	$32.44	$179.44	$3,947.68
Grader (Cat 16G)	1	22	$108.00	$32.71	$140.71	$3,095.62
Water truck (2000 gal)	1	22	$45.00	$32.08	$77.08	$1,695.76
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	22					$2,200.00
					Overall Total =	*$35,473.24*

Daily Production

cycle time (min)	loads/hr	hr/day	efficiency	loads/day	rounded loads/day	cy/load	cy/day/unit
7	8.57	22	0.8	150.9	151	31	4681

cy/hr/unit	213
cy/hr	1064
cy/day	23405

Notes

Cycle time and hourly production from
1997 Caterpillar Performance Handbook

Production controlled by scraper travel times
Borrow from Northeast Stockpile

Daily Cost/Daily Production = $1.52 per cy

unit rate by item	cost/cy
Scraper (Cat 631)	$0.92
Dozer (Cat D8)	$0.17
Grader (Cat 16G)	$0.13
Water truck (2000 gal)	$0.07
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.05
Crew Per Diem	$0.09

ALTERNATIVE 2
BACKFILLING

CUT AREA E DOZER PUSHDOWN TO FILL AREA E
CUTTING AND PUSH DOWN OF WALL MATERIAL INTO PIT AT 4H:1V
600 ft average dozing distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Dozer (Cat D9)	5	22	$185.00	$32.44	$217.44	$23,918.40
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	16					$1,600.00
					Overall Total =	*$28,554.18*

Daily Dozer Production

LCY/hr MAX	Operator Efficiency	material	Job Efficiency	Grade Factor	Side By Side Dozing	Corrected LCY/hr	LCY/day/unit
200	Average	Bank	50 min/hr	4H:1V downhill	Yes	224.1	4930.2
	0.75	1	0.83	1.5	1.2		
						LCY/hr/fleet	1120.5
						LCY/day/fleet	24651

Notes

Hourly production and load corrections from
2007 Caterpillar Performance Handbook

Average Dozing Distance (ft)	LCY/hr
100	1300
200	725
300	500
400	325
500	225
600	200

Daily Cost/Daily Production = $1.16 per cy

unit rate by item	cost/cy
Dozer (Cat D9)	$0.97
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.04
Crew Per Diem	$0.06

Load Corrections

Operator Efficiency	
Excellent	1
Average	0.75
Poor	0.6

Load Conditions	
Bank	1
Loose Stkple	1.2
Rock	0.7

Side By Side Dozing 1.2

Job Efficiency	
50 min/hr	0.83
40 min/hr	0.67

ALTERNATIVE 2
BACKFILLING

CUT AREA F DOZER PUSHDOWN TO FILL AREA F
CUTTING AND PUSH DOWN OF WALL MATERIAL INTO PIT AT 4H:1V
600 ft average dozing distance

Daily Cost

Item	Quantity	Hours Used/Day	Hourly Equipment Rate	Hourly Operator Rate	Total Hourly Rate	Total Daily Rate
Dozer (Cat D9)	5	22	$185.00	$32.44	$217.44	$23,918.40
Foreman	1	22	$14.00	$32.71	$46.71	$1,027.62
Grade checker	1	22	$14.00	$28.28	$42.28	$930.16
Mechanic	1	22	$17.00	$32.00	$49.00	$1,078.00
Crew Per Diem	16					$1,600.00
					Overall Total =	*$28,554.18*

Daily Dozer Production

LCY/hr MAX	Operator Efficiency	material	Job Efficiency	Grade Factor	Side By Side Dozing	Corrected LCY/hr	LCY/day/unit
200	Average 0.75	Bank 1	50 min/hr 0.83	4H:1V downhill 1.5	Yes 1.2	224.1	4930.2
						LCY/hr/fleet	1120.5
						LCY/day/fleet	24651

Notes

Hourly production and load corrections from
2007 Caterpillar Performance Handbook

Average Dozing Distance (ft)	LCY/hr
100	1300
200	725
300	500
400	325
500	225
600	200

Daily Cost/Daily Production = $1.16 per cy

unit rate by item	cost/cy
Dozer (Cat D9)	$0.97
Foreman	$0.04
Grade checker	$0.04
Mechanic	$0.04
Crew Per Diem	$0.06

Load Corrections	
Operator Efficiency	
Excellent	1
Average	0.75
Poor	0.6
Load Conditions	
Bank	1
Loose Stkple	1.2
Rock	0.7
Side By Side Dozing	1.2
Job Efficiency	
50 min/hr	0.83
40 min/hr	0.67

APPENDIX B

PROJECT DURATION CALCULATIONS

Highland Mine and Mill Site
Reclamation Project
Project Duration Calculations

Alternative 1:

Task ID	Backfill Quantity Required (cy)	Daily Production Rate (cy/day)	Duration of Task (days)	
Cut Area A Dozer Push	6,579,112	24651	267	
North Dump Scraper Haul	11,743,902	23405	502	
Cut Area B Scraper Haul	16,189,193	27280	593	
Cut Area B Dozer Push	1,773,938	24651	72	
Cut Area C Dozer Push	4,711,314	24651	191	
		TOTAL	**1625**	days
		Maximum Duration is Area A at	769	days

Task	Quantity Needing Revegetation (acres)	Daily Production Rate (acres/day)	Duration of Task (days)
Revegetation of Flat and 10H:1V Areas	389	5.5	71
Revegetation of 4H:1V Areas	221	2.5	88
		TOTAL DURATION	**159**

Assuming a 6-day work week and a 9 month work year, total working days per year = 234.75 days

Assuming all areas are worked concurrently, maximum duration of project = **4.0** years

Alternative 2:

Task ID	Backfill Quantity Required (cy)	Daily Production Rate (cy/day)	Duration of Task (days)	
Cut Area D Dozer Push	2,753,984	24651	112	
North Dump Scraper Haul	11,743,902	23405	502	
Cut Area E Dozer Push	14,224,875	24651	577	
Cut Area F Dozer Push	2,631,440	24651	107	
		TOTAL	**1297**	days
		Maximum Duration is Area A at	613	days

Task	Quantity Needing Revegetation (acres)	Daily Production Rate (acres/day)	Duration of Task (days)
Revegetation of Flat and 10H:1V Areas	246	5.5	45
Revegetation of 4H:1V Areas	241	2.5	96
		TOTAL DURATION	**141**

Assuming a 6-day work week and a 9 month work year, total working days per year = 234.75 days

Assuming all areas are worked concurrently, maximum duration of project = **3.2** years

we will assume 3.0 years

APPENDIX C

REVEGETATION COST PER ACRE CALCULATIONS

Highland Mine and Mill Site
Reclamation Project
Revegetation Cost per Acre Calculation

Alternative 1:

Item	Units	Unit Cost
Fertilizer and fertilizer application	per acre	$175
Ripping before seeding	per acre	$200
Harrowing after seeding	per acre	$120
Seed	per acre	$500
Broadcast seeding	per acre	$200
Mulch and mulching	per acre	$800

Mobilization/Demobilization = $2520 per round trip
Total Roundtrips = 4
Divide total mobilization/demobilization cost by total acreage (724 acres) = $14

TOTAL COST PER ACRE **$2,009**

Alternative 2:

Item	Units	Unit Cost
Fertilizer and fertilizer application	per acre	$175
Ripping before seeding	per acre	$200
Harrowing after seeding	per acre	$120
Seed	per acre	$500
Broadcast seeding	per acre	$200
Mulch and mulching	per acre	$800

Mobilization/Demobilization = $2520 per round trip
Total Roundtrips = 3
Divide total mobilization/demobilization cost by total acreage (487 acres) = $16

TOTAL COST PER ACRE **$2,011**

Appendix E

EXHIBIT 5
LISTING OF DOMESTIC WELLS FROM STATE DATABASE

Appendix E

Domestic Wells From State Database

Township	Tns Suffix	Range	Rng Suffix	Section	Qtrqtr	Applicant	Facility Name	Uses	Yld Act	Well Depth	Static Depth	Mwbz Top	Mwbz Bottom	Well Log	Chemical Analysis	County
37	N	73	W	10	NENW	ROY C. BAKER**FEROL BAKER	BAKER #1	DOM	6	300	20	Unknown	Unknown	Yes	No	Converse
36	N	71	W	31	SWSW	BONER BROTHERS PARTNERSHIP	BULL PASTURE	DOM	15	80	35	65	77	Yes	No	Converse
37	N	73	W	10	SENW	ROY C. & FEROL BAKER	BAKER 10 A	DOM	13	300	50	240	300	Yes	No	Converse
37	N	73	W	22	SENE	DUCK CREEK RANCHES INC.	REYNOLDS #22	DOM	3	375	-6	251	349	Yes	No	Converse
36	N	72	W	9	SESE	LEE FOWLER	FOWLER #1	DOM	8	212	182	Unknown	Unknown	No	No	Converse
37	N	73	W	22	SENE	DUCK CREEK RANCHES INC.	DUCK CREEK #2	DOM	1	400	0	310	340	Yes	No	Converse
36	N	73	W	27	NWNE	WILLIAM R. VOLLMAN	VOLLMAN #6	DOM	5	180	165	Unknown	Unknown	No	No	Converse
35	N	71	W	36	NESE	BONER BROTHERS PARTNERSHIP** STATE OF WY DEPT. OF PUBLIC LANDS	CLAUSEN STATE #1	DOM,STO	5	480	30	Unknown	Unknown	No	No	Converse
37	N	72	W	17	NESW	WARREN A. & JUDITH Y. MANNING	#3 G MANNING DOMESTIC WELL	DOM,STO	7	297	21	262	297	Yes	No	Converse
35	N	73	W	3	NESW	CARROLL JAY LISCO	LISCO #1	DOM,STO						No		Converse
36	N	72	W	30	NWNE	HUMBLE OIL & REFINING COMPANY	HIGHLAND #7	IND,DOM						No		Converse
36	N	72	W	19	SWSE	HUMBLE OIL & REFINING COMPANY	HIGHLAND #2	IND,DOM						No		Converse
36	N	72	W	29	NWSW	HUMBLE OIL & REFINING COMPANY	HIGHLAND #6	IND,DOM						No		Converse
36	N	73	W	21	SWSE	HUMBLE OIL & REFINING COMPANY	HIGHLAND #8	IND,DOM						No		Converse
36	N	73	W	29	NESW	HUMBLE OIL & REFINING COMPANY	HIGHLAND #9	IND,DOM						No		Converse
36	N	73	W	31	NWSE	HUMBLE OIL & REFINING COMPANY	HIGHLAND #10	IND,DOM						No		Converse
36	N	72	W	29	NENW	POWER RESOURCES INC.	HIGHLAND #6	RES,IND,DOM	100	400	50	250	355	Yes	Yes	Converse
36	N	72	W	20	NESE	POWER RESOURCES INC.	HIGHLAND #3	RES,IND,DOM	150	298	129	175	298	Yes	No	Converse
36	N	72	W	28	NWSW	EXXON CORPORATION	HIGHLAND #5	RES,IND,DOM	150	270	54	150	260	Yes	No	Converse
36	N	72	W	21	NENW	EXXON CORPORATION	HIGHLAND #4	RES,TEM,IND,DOM	52	600	-1	450	590	Yes	No	Converse

Appendix E

EXHIBIT 6
ASSESSMENT OF POTENTIAL HEALTH EFFECTS FROM EXPOSURE TO SELECTED CONTAMINANTS IN GROUNDWATER AND SURFACE WATER AT THE EXXONMOBIL HIGHLAND URANIUM PROJECT

ASSESSMENT OF POTENTIAL HEALTH EFFECTS FROM EXPOSURE TO SELECTED CONTAMINANTS IN GROUNDWATER AND SURFACE WATER AT THE EXXONMOBIL HIGHLAND URANIUM PROJECT

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February 4, 2011

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Environmental Services, Inc.

Table of Contents

Attachments

1 Introduction

This evaluation assesses potential adverse health effects resulting from exposure to both radiological and non-radiological constituents present in groundwater and surface water at the ExxonMobil Highland Uranium Project, near Douglas Wyoming if these water resources were used as a source of drinking water. The following describes estimates of potential adverse human health effects that might be avoided through successful implementation of corrective action at the Highland Site.

This area is remote from population centers and has very low population density (< 1 person/square mile) and use of the shallow groundwater and surface water for domestic drinking water is extremely unlikely. However, it has conservatively been assumed that the potentially exposed population is a residential family of four.

Background information on site conditions and relevant exposure scenarios is provided in the *Highland Uranium Mine and Millsite Request for Amendment to Radioactive Materials License SUA-1139, Application to Amend Existing Alternate Concentration Limits* (Exxon, 2011). This evaluation assumes that groundwater in the Southeast Drainage or Highland pit lake could be used as a drinking water source, which is highly unlikely for numerous reasons. Also, given the very low population density in this area, it is even less likely that persons would be exposed to surface water or groundwater as a drinking water source.

2 Evaluation of Potential Health Effects

2.1 Health Effects from Radiological Exposures

The avoided radiological dose from groundwater consumption can be estimated based on factors such as intake rates, groundwater concentrations, and exposure durations. The intake of radiological constituents from ingestion of groundwater that could be avoided by reducing groundwater concentrations to the MCL was calculated as follows:

Equation 1: Idw = (Cgw)((IW)(EF)(ED))

Where:

Idw= Lifetime intake from groundwater, µCi

Cgw = Groundwater concentration removed based on reduction to MCL, µCi/L

IW = Average daily water intake of 2 liters per day (EPA, 2010)

EF = Exposure frequency of 350 days/year (USEPA 1998)

ED = Exposure duration of 30 years.

The units of pCi were converted to µCi by multiplying by 1 x 10-6 (µCi/pCi). Intake from other food sources was not considered because the contribution from other food sources for these hazardous constituent is insignificant compared to the contribution from groundwater as a drinking water source. Additionally, potential dose from external exposure during showering or other dermal contact with water also was not included.

The lifetime averted dose if concentrations in drinking water were reduced to the MCL (averted dose (AD)) was calculated as follows:

Equation 2: LAD = (Idw)(CF)

Where:

LAD =	Lifetime averted dose in mrem
Idw =	Intake of a constituent by an individual in µCi (Idw, described above)
CF =	Intake to dose conversion factor in mrem/µCi CF for Unat = 268.9 mrem/µCi, (average for U-238 and U234) CF for Ra-226 = 1324.6, CF for Ra-228 = 1435.6 (higher CF value used)

The annual averted dose is calculated by dividing the lifetime averted dose by the number of years of exposure:

Equation 3: AAD = LAD/ED

Where:

AAD =	Annual averted dose in mrem/year
LAD =	Lifetime averted dose in mrem
ED =	Exposure duration (30 years)

Assuming a family of four would hypothetically be exposed to groundwater or surface water from the Southeast Drainage or Highland pit lake, the total annual averted dose would be four times higher.

2.1.1 Southeast Drainage

The maximum natural uranium (Unat) groundwater concentrations in the Southeast Drainage are observed in well MFG-1, all other Southeast Drainage wells exhibit uranium concentrations of approximately 0.07 mg/L or below. The average recent Unat concentration measurements from well MFG-1 is approximately 0.37 mg/L. If the groundwater could be remediated to the current MCL (0.03 mg/L), then the groundwater concentrations reduction would be 0.34 mg/L or 0.00023 µCi/L (assuming an activity concentration of 677 pCi/L for each mg/L of Unat). Similarly, Ra-226+228 are only observed in the Southeast Drainage above the MCL of 5 pCi/L in one well, BBL-3. The Ra-226+228 concentrations in all other Southeast Drainage wells are below the MCL value. The average recent Ra-226+228 concentration measurements from well BBL-3 is approximately 5.4 pCi/L, just 0.4 pCi/L above the MCL. If the groundwater could be remediated to the current MCL (5 pCi/L), then the maximum groundwater Ra-226+228 concentrations reduction by implementing a corrective action would be 0.4 pCi/L or 4.0×10^{-7} µCi/L.

Based on Equation 1, the avoided individual lifetime (30 years) intake of Unat from groundwater would be 4.83 µCi and 0.0084 µCi for Ra-226+228. Applying Equations 2 and 3, the annual averted dose equivalent for Unat would be 43.3 mrem/year and 0.40 mrem/year for Ra-226+228, for a total annual averted dose of 43.7 mrem/year. Assuming four people were exposed at these levels the total lifetime averted dose would be 5.25 person-rem.

This estimate represents a highly conservative assessment of averted dose for Unat and Ra-226+228 assuming the concentrations observed in worst wells of the Southeast Drainage. However, it should be noted that current Unat concentrations in all Southeast Drainage monitoring wells other than MFG-1 are less than or equal to 0.12 mg/L. Similarly, Ra-226+228 is below the MCL of 5 pCi/L in all wells other than BBL-3, including the proposed POC well MFG-1. Therefore, a more realistic annual averted dose could be calculated assuming a reduction Unat concentrations of 0.09 mg/L (0.12 mg/L minus the 0.03 mg/L MCL for Unat) and assuming no action was required for Ra-

226+228. In this case, the annual averted dose would be 11.5 mrem/year and the total lifetime avoided dose for four people would be 1.38 person-rem.

2.1.2 Pit Lake

The current pit lake water quality for Unat (3.15 mg/L) exceeds the MCL by approximately two orders of magnitude, all other known radiological parameters are below regulatory levels. Based on Equation 1, the avoided individual lifetime (30 years) intake of Unat from drinking the pit lake water would be 45.6 µCi. Applying Equations 2 and 3, the annual averted dose for Unat would be 409 mrem/year and the total lifetime avoided dose for four people would be 49.1 person-rem.

2.2 Non-Radiological Health Effects

Selenium is the only non-radiologcal hazardous constituent present in the limited groundwater system of the Southeast Drainage or in the Highland pit lake above the MCL. To evaluate potential non-cancer health effects for chemicals exceeding MCLs, the upper bound representative concentrations in the Southeast Drainage were compared to regional screening levels (RSLs) for tap water developed by EPA to evaluate potential exposure to these chemicals in a drinking water source (EPA, 2010b). The RSLs were developed to evaluate potential lifetime exposure to the chemical in the media of concern. EPA is working on developing toxicity criteria for Unat specifically, but that process has not been completed, and as such DWELs or RSLs have not been published for Unat. The RSL for selenium is 0.180 mg/L, which is also comparable to the Drinking Water Equivalent Level (DWEL) for selenium of 0.200 mg/L. Both the RSL and DWEL represent a lifetime exposure concentration protective of adverse, non-cancer health effects, which assume that all of the exposure to a contaminant is from drinking water.

2.2.1 Southeast Drainage

The fact that selenium occurs above the MCL in only one Southeast Drainage well (BBL-2) indicates that the elevated groundwater concentration of selenium is discrete and not wide spread, making the likelihood of a future exposure through groundwater use even lower than it is due to the remoteness of the site and limited extent of the groundwater system. The upper-bound concentration of selenium (0.0777 mg/L) is below the RSL and DWEL for selenium. As such, reduction of the selenium concentrations to the MCL may not result in a significant benefit to human health.

2.2.2 Pit Lake

The 2010 selenium levels in the Highland pit lake (0.071 mg/L) are well below the EPA RSL and DWEL for selenium of (0.18 and 0.2 mg/L, respectively). Adverse health effects would not be expected from even long-term chronic consumption of selenium at these concentrations. Therefore, there is no significant specific human benefit of avoiding adverse health effects by reducing the selenium concentration in the pit lake.

3 Conclusion

The potential radiological exposures avoided by reducing the Highland pit lake and\or the limited Southeast Drainage groundwater system concentrations to the MCLs are relatively low and are commensurate with typical annual doses for commercial airline flight crews (DOE, 2005). No specific adverse health effects can reliably be associated with these low exposures.

The likelihood of chronic exposures to the selenium in the Highland pit lake and the limited groundwater system of the Southeast Drainage is very low and the concentrations in these waters are a fraction of the EPA RSL and DWEL values, which EPA identifies as a lifetime exposure concentration protective of adverse, non-cancer health effects from the drinking water pathway. Therefore, there are no reasonably identifiable adverse health effects avoided from remediation of these waters.

4 References:

Exxon, 2011 Highland Uranium Mine And Millsite Request For Amendment To Radioactive Materials License Sua-1139; Application To Amend Existing Alternate Concentration Limits. March, 2011.

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ATTACHMENT 1

DOSE CALCULATIONS

Highland Southeast Drainage
Averted Dose Calculation
High Range

Idw = (Cgw)((IW)(EF)(ED))

where:

	Unat	Ra-226+228	Unat	
Idw= Intake from groundwater, uCi			0.340 mg/L	avg of last 4 values in MFG-1: 0.37 mg/L minus the MCL of 0.03 mg/L, assumes water returned to the MCL
Cgw = Groundwater concentration reduced by alternative corrective action, uCi/L	0.00023	0.00000040 uCi	230 pCi/L	@ 677 pCi/L = 1 mg/L
IW = Average daily water intake of 2 liters per day (U.S. EPA, 1989)	2	2 L/day	0.00023 uCi/L	convert pCi/L to uCi/l by multiplying annual intake by 1e-6 uCi/pCi
EF = Exposure frequency of 350 days/year (USEPA 1998)	350	350 days/yr		
ED = Exposure duration of 30 years.	30	30 yrs	**Ra-226+228**	
			0.40 pCi/L	avg of last 4 values in BBL-3: 5.4 pCi/L minus 5 pCi/L, assumes water returned to MCL
Therefore,			4.00E-07 uCi/L	convert pCi/L to uCi/l by multiplying annual intake by 1e-6 uCi/pCi
Idw =	4.83	0.0084 uCi		

AD = (I)(CF)(P)

Where:

AD = Averted effective dose equivalent in person-rem			
I = Intake of a constituent by an individual (uCi)	4.83	0.0084 uCi	
CF = Intake to dose conversion factor in mrem/uCi		1435.6 mrem/uCi	CF for Ra-226 = 1324.6, CF for Ra-228 = 1435.6, assume higher CF value
CF = Intake to dose conversion factor in mrem/uCi	268.9		CF for Uranium is average of CF for U238 (254.56) and U-234 (283.42)
P = Number of persons exposed or 4.	4	4 persons	

A hypothetical family of four was assumed for the unlikely scenario of consuming groundwater for domestic purposes at the potential POE.
Assumed food sources negligible compared to water intake

AD =	5.20	0.05 Avoided dose in person-rem over 30 years
AD/person	1.30	0.012
	43.3	**0.40 mrem/yr per person**
Total AD =	**5.25 Collective avoided dose in person-rem over 30 years from ground water intake**	
	1.31 **per person**	
	43.7 mrem/yr per person	

Highland Southeast Drainage
Averted Dose Calculation
Low Range

Idw = (Cgw)((IW)(EF)(ED))

where:

	Unat	Ra-226+228	Unat	
Idw= Intake from groundwater, uCi			0.090 mg/L	3/10-10/10 max in allwells other than MFG-1: 0.12 mg/L minus the MCL of 0.03 mg/L, assumes water returne
Cgw = Groundwater concentration reduced by alternative corrective action, uCi/L	0.00006	0.00000000 uCi	61 pCi/L	@ 677 pCi/L = 1 mg/L
IW = Average daily water intake of 2 liters per day (U.S. EPA, 1989)	2	2 L/day	0.00006 uCi/L	convert pCi/L to uCi/l by multiplying annual intake by 1e-6 uCi/pCi
EF = Exposure frequency of 350 days/year (USEPA 1998)	350	350 days/yr		
ED = Exposure duration of 30 years.	30	30 yrs	**Ra-226+228**	
			pCi/L	avg of last 6 values in BBL-3: 5.6 pCi/L minus 2.5 pCi/L, assumes water returned to 1/2 MCL
Therefore,			0.00E+00 uCi/L	convert pCi/L to uCi/l by multiplying annual intake by 1e-6 uCi/pCi
Idw =	1.28	0.000 uCi		

AD = (I)(CF)(P)

Where:

AD = Averted effective dose equivalent in person-rem.			
I = Intake of a constituent by an individual (uCi)	1.28	0.00 uCi	
CF = Intake to dose conversion factor in mrem/uCi		1435.6 mrem/uCi	CF for Ra-226 = 1324.6, CF for Ra-228 = 1435.6, assume higher CF value
CF = Intake to dose conversion factor in mrem/uCi	268.9		CF for Uranium is average of CF for U238 (254.56) and U-234 (283.42)
P = Number of persons exposed or 4.	4	4 persons	

A hypothetical family of four was assumed for the unlikely scenario of consuming groundwater for domestic purposes at the potential POE.
Assumed food sources negligible compared to water intake

AD =	1.38	0.00 Avoided dose in person-rem over 30 years
AD/person	0.34	0.000
	11.5	**mrem/yr per person**
Total AD =	**1.38 Collective avoided dose in person-rem over 30 years from ground water intake**	
	0.34 **per person**	
	11.5 mrem/yr per person	

Highland Pit Lake
Averted Dose Calculation

Idw = (Cgw)((IW)(EF)(ED))

where:

	Unat	**Ra-226+228**		**Unat**		
Idw= Intake from groundwater, uCi				3.21	mg/L	3.24 mg/L minus MCL of 0.03 mg/L, assumes water returned to the MCL
Cgw = Groundwater concentration reduced by alternative corrective action, uCi/L	0.00217	0.00000000	uCi	2173	pCi/L	@ 677 pCu/L = 1 mg/L
IW = Average daily water intake of 2 liters per day (U.S. EPA, 1989)	2	2	L/day	0.00217	uCi/L	convert pCi/L to uCi/l by multiplying annual intake by 1e-6 uCi/pCi
EF = Exposure frequency of 350 days/year (USEPA 1998)	350	350	days/yr			
ED = Exposure duration of 30 years.	30	30	yrs	**Ra-226+228**		
					pCi/L	Pit Ra-226+228 < MCL
Therefore,				0.00000000	uCi/L	convert pCi/L to uCi/l by multiplying annual intake by 1e-6 uCi/pCi
Idw =	45.6	0.0	uCi			

AD = (I)(CF)(P)

Where:

AD = Averted effective dose equivalent in person-rem				
I = Intake of a constituent by an individual (uCi)	45.6	0.00	uCi	
CF = Intake to dose conversion factor in mrem/uCi	268.9	1435.6	mrem/uCi	CF for Ra-226 = 1324.6, CF for Ra-228 = 1435.6, assume higher CF value
P = Number of persons exposed or 4.	4	4	persons	

A hypothetical family of four was assumed for the unlikely scenario of consuming groundwater for domestic purposes at the potential POE.

Assumed food sources negligible compared to water intake

AD =	49.1	0.000	Avoided dose in person-rem over 30 years
AD/person	12.3	0.000	

Total AD = 49.1 Collective avoided dose in person-rem over 30 years from ground water intake

409 mrem/yr per person

EXHIBIT 7
LAND APPRAISAL BY GARY T. CASPER
PETROLEUM LAND SERVICES, LLC. 2/6/10

Gary T. Casper
Petroleum Land Services, LLC
Office • 307-265-0638
Cell • 307-351-9066

Post Office Box 3697
Casper, Wyoming 82602
Fax • 307-472-3049

Saturday, February 6, 2010

Rebecca J. Bilodeau
Senior Environmental Scientist
Advanced Environmental Sciences, Inc.
118 East 29th Street, Suite C
Loveland, Colorado 80538

RE: Exxon Highland Mine Site
Current market prices and
2009 "sold" parcels
Converse County, Wyoming

Rebecca:

Enclosed please find some current advertisements for Converse County (and other counties) lands obtained from various realty web-sites and multi-list services showing the variety of acreages currently available for sale in central Wyoming. Since most of these lands are larger ranches or recreational or farming lands (some having improvements), most do not make for good comparisons for Highland area lands. Those parcels that are unimproved dry (non-irrigated) land of around 40 acres in size naturally are better comparisons.

I contacted local Douglas realtors Jim Willox (Comsee Horizon Realty) and H.R. Johnston (H.R. Johnston Realty) to inquire about what they thought current sales prices for 40 to 640 acre tracts of dry range land would run. Jim reported he thought they should bring about $1000 to $1500 per acre. He showed me two "rural residential" 40 acre tracts near Dull Center (about 12 miles from the Highland site) currently on the market for $25,500 and $71,000 respectively. The second tract has been on the market for 2 years. He also reported two other dry land tracts of 64 acres and 40 acres east of Douglas currently for sale for $3000/acre and $1775/acre, with the second tract on the market for over 700 days.

H.R. Johnson thought small tracts of 40 acres would bring $1500 to $1700, depending on size and location. Aspen Realty (of Douglas) reported that in 2009, they sold one 40 acre parcel near Dull Center for $25,500, while another tract of 40 acres sold in another part of the county for $65,000.

As reported in my 2008 findings, no lands within quite a few miles of the mine site are currently on the market, nor have been sold over the last two years. As reported before, those lands in the general vicinity the mine have been in ranching families for generations, and rarely come on the market.

The Converse County Assessor's Office again reported no sales of dry range land during 2009. However, their office received 2010 figures from the State of Wyoming Department of Revenue, indicating the average assessed production value of dry rangeland remains ranging from $90.00-$152.00-$193.00 per acre. These estimates represent the low, average and high amounts of income per acre ranchers are expected to derive from the dry range land they own.

Rebecca, I am also including a hard copy of my "Second Update to Memorandum of Title" e-mailed to you last week, together with copies of the probate files for Anne S. Boner proceedings obtained from the Circuit Court records for Converse County. Please let me know if you have any questions regarding the enclosed materials.

I happened to recall that I furnished MFG, Inc. with a complete abstract of title for the southeast quarter of Section 27 lands in October, 2003. Do you still have that in your possession and should it be updated? Or will you need another complete abstract for your continuing work?

I will forward my invoice for my current services in the near future, complete with a new W-9. Thanks for the continuing work.

Sincerely,

Gary T. Casper

Gary T. Casper, Manager
Petroleum Land Services, LLC

Appendix E

EXHIBIT 8
LETTER FROM JOHN LAWSON
US DEPARTMENT OF INTERIOR\BUREAU OF RECLAMATION
VALUATION OF WATER RESOURCES. 6/2/10

United States Department of the Interior

BUREAU OF RECLAMATION
Great Plains Region
Wyoming Area Office
P.O. Box 1630
Mills, Wyoming 82644-1630

IN REPLY REFER TO:

WY-4007
WTR-4.03

June 2, 2010

VIA ELECTRONIC MAIL ONLY

Mr. Toby Wright
Principal Engineer
Wright Environmental Services, LLC
3801 Automation Way, Suite 100
Fort Collins, CO 80525
(wrightenv@gmail.com)

Subject: Valuation of Ground Water

Dear Mr. Wright:

This is in response to your e-mail of April 21, 2010, regarding the value of ground water. The Bureau of Reclamation currently sells storage water from Glendo Reservoir on a temporary (one year or less) basis. Storage water for irrigation purposes is contracted only to supplement existing natural flow rights, and is valued at $5.00 per acre-foot (AF), with a minimum contract amount of 50 AF. Storage water for municipal and industrial purposes is contracted at a rate of $75.00 per AF with a minimum contract amount of 8 AF.

If you need any further information, please contact me at 307-261-5697.

Sincerely,

/s/
John H. Lawson
Area Manager

cc: WY-1000 (John H. Lawson)