

2014 SURETY REBASELINING REPORT SWEETWATER URANIUM FACILITY

Prepared for:

**Sweetwater Uranium Facility
SUA-1350
Sweetwater County, Wyoming**

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July 2014

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SOLUTIONS • INCORPORATED

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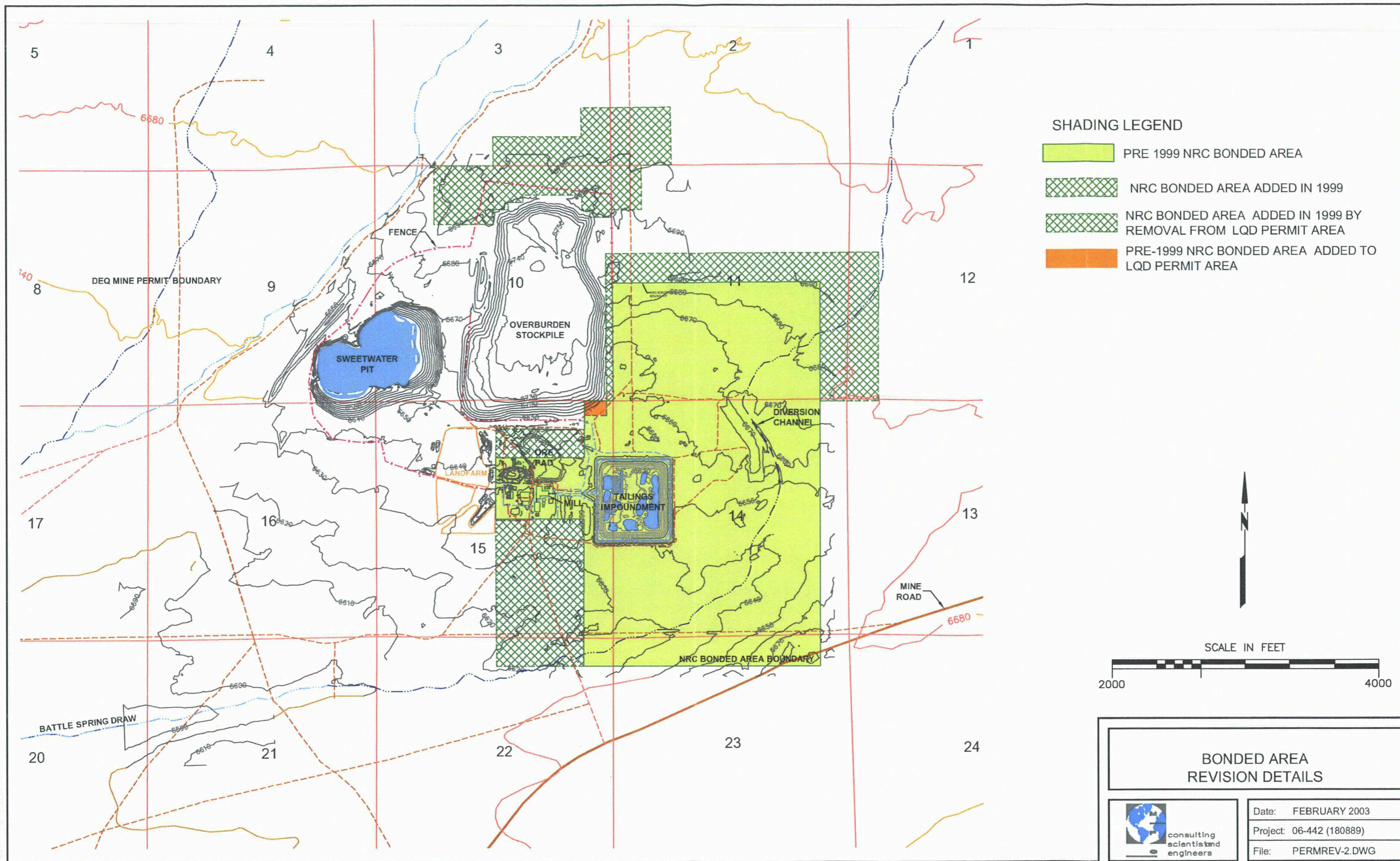
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1.0 INTRODUCTION

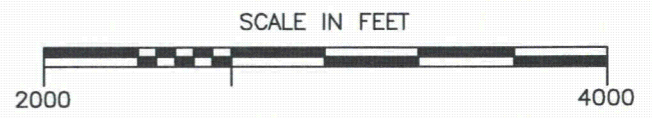
Telesto Solutions Inc. (Telesto) has prepared the following update to the surety baseline cost estimate for the Sweetwater Uranium Facility in Sweetwater County, Wyoming. The Nuclear Regulatory Commission (NRC) requires that sureties be rebaselined to current costs every 5 years. This 2014 surety cost estimate is a rebaselining of the 2009 estimate prepared by KBC Engineers, “*Surety Rebaselining Report, Sweetwater Uranium Facility,*” July 2009.

Elements of the reclamation are described and costs are provided for these elements. Costs are estimated based upon third party costs to reclaim, remediate, and decommission facilities and lands affected by past project operations. *NUREG-1620 – Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act*, was followed as guidance for costing. Sweetwater facilities in the NRC bonded area boundary are shown in the drawing *Bonded Area – Revision Details*. The tailings impoundment, based on a December 2008 survey of the regraded tailings surface, is shown in the drawing *Sweetwater Uranium Facility – Tailings Impoundment – December 2009*.

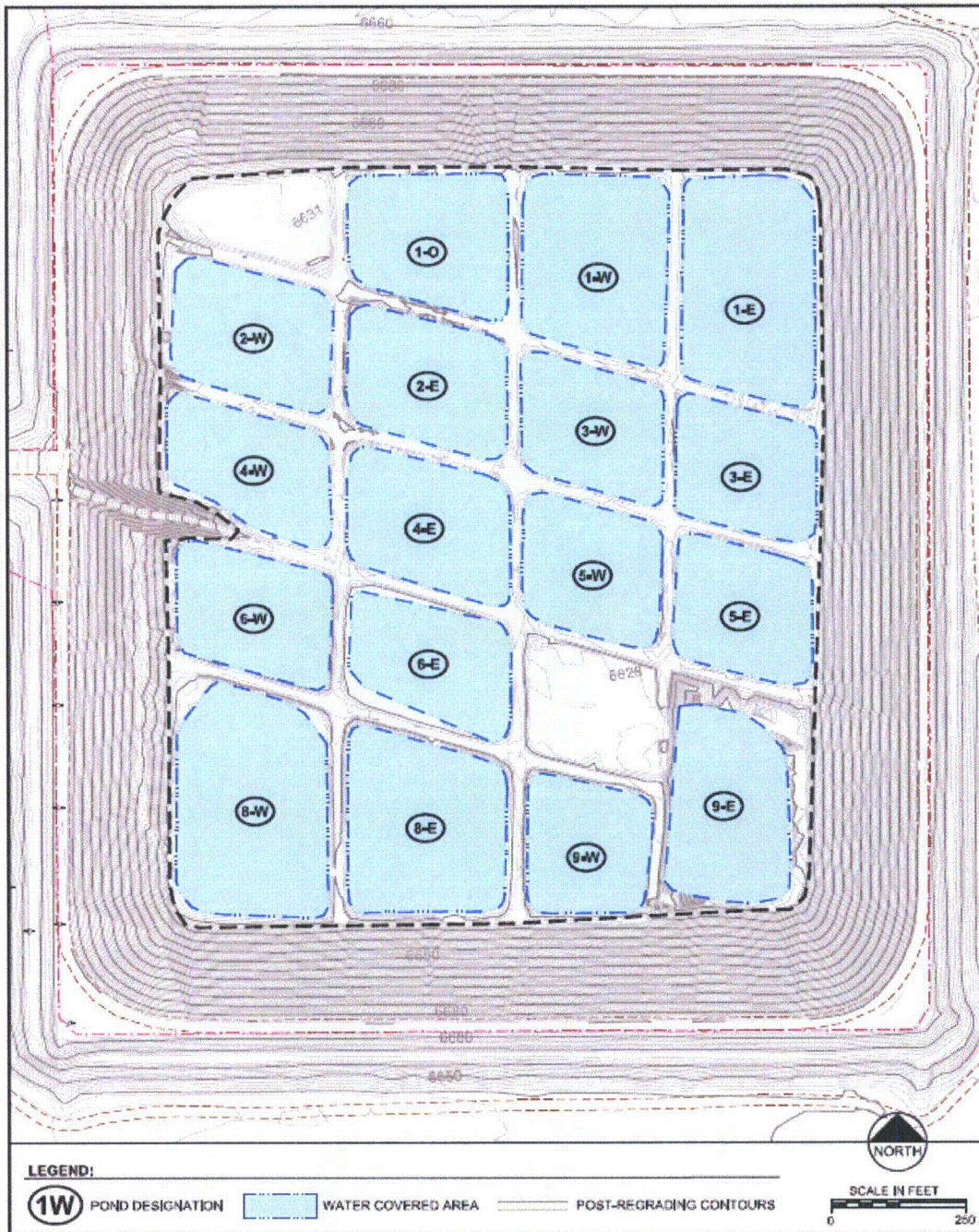


SHADING LEGEND

- PRE 1999 NRC BONDED AREA
- NRC BONDED AREA ADDED IN 1999
- NRC BONDED AREA ADDED IN 1999 BY REMOVAL FROM LQD PERMIT AREA
- PRE-1999 NRC BONDED AREA ADDED TO LQD PERMIT AREA



BONDED AREA REVISION DETAILS	
consulting scientists and engineers	Date: FEBRUARY 2003 Project: 06-442 (180889) File: PERMREV-2.DWG



SWEETWATER URANIUM FACILITY
TAILINGS IMPOUNDMENT – DECEMBER 2009

Date:	FEBRUARY 2010
Project:	06-442\REP2010\
File:	Tailings 2009-Dec.dwg

2.0 COST ESTIMATE

Reclamation and decommissioning costs for the facility were estimated based on plans approved by the NRC and were prepared for the following items:

1. Mill Area Decommissioning
2. Ground Water Remediation
3. Cleanup of Contaminated Soils
4. Existing Impoundment Reclamation
5. Radiological Survey and Monitoring
6. Project Management & Mobilization/Demobilization
7. Long-Term Surveillance Fee
8. Contingency

Unless stated otherwise, approved reclamation and decommissioning plans were those prepared by Shepherd Miller, Inc., as part of the Final Design for the mill and tailings facilities, prepared from July 1, 1997 through March 1, 1999. All soils, equipment, concrete and structures removed during the process of decommissioning and reclamation of the site, as 11e.(2) material, will be placed in the tailings impoundment.

For all unit costs, labor and equipment overhead, as well as contractor profit, were included. Unit costs taken from external sources such as RS Means Cost Data included overhead and contractor profit. A line item (Item 6.0 above) for project management by a third party and for mobilization and demobilization was provided with the cost estimate. Project management was estimated at 3 percent of the subtotal of reclamation and decommissioning costs, and mobilization and demobilization was estimated at 3.5 percent of the subtotal of reclamation and decommissioning costs, as described in Section 2.6 below.

From the Wyoming Department of Environmental Quality Guideline No. 12, “*Standardized Reclamation Performance Bond Format and Cost Calculation Methods*” (LDQ Guideline No. 12), “CONTRACTOR PROFIT, OVERHEAD, MOBILIZATION AND DEMOBILIZATION COSTS: The Dataquest Cost Reference Guides used to construct the appendices [appendices to Guideline No. 12] do not include these costs. If an operator uses these appendices in bond calculations, there is still a need for this distinct line item cost in the bond. Assorted references place these items from 8 to 15 percent of the total bond cost. Presently LQD is using 10 percent.” Telesto added 10% to the specific line items where Guideline No. 12 was used as a cost reference. Note identifying where the 10% was added is included in individual cost estimate data sheets (Appendix A).

Detailed calculations of the estimated cost to reclaim and decommission the facility are presented in spreadsheet form in Appendix A.

2.1 Mill Area Decommissioning

Costs for decommissioning the mill area were estimated for each of the buildings located within the NRC restricted area boundary, including the mill, solvent extraction (S/X) building, main shop, tire and lube building, administration building, external tanks, and miscellaneous buildings. Dismantling costs for mill and S/X equipment were determined based on level-of-effort estimates for crews to dismantle and demolish the various pieces of equipment, using RS Means *Heavy Construction Cost Data* (2014) data for labor crews. Building demolition costs were also derived from RS Means, which are provided on a cubic foot basis for the total building volume. The per cubic foot cost applied to each structure was multiplied by a constant to account for the level of effort required to demolish internal walls within each building, and was adjusted using the Rawlins, Wyoming Location Factor. For example, the unit cost for demolishing the S/X building (\$0.31 per cubic foot for steel buildings), with very few internal walls, and after equipment is removed, was multiplied by 0.5 to account for the lack of walls and by the 0.826 Location Factor. Engineering drawings of the various buildings were examined for accurate volume estimates. All equipment, structures and concrete from the mill area decommissioning effort, as 11e.(2) material, will be placed within the tailings impoundment.

Unit costs for removal and disposal of concrete pads for each building were derived from the WDEQ Guideline No. 12 (October 2013). Unit costs provided in Guideline No. 12 do not include contractor profit and were therefore increased by 10 percent.

2.2 Ground Water Remediation

Approved ground water remediation at the site is through the project's Corrective Action Program, defined in its NRC license. Seven pumpback wells in the vicinity of the tailings impoundment (TMWs 7, 17, 18, 57, 58, 59, and 75) are used to pump ground water into evaporation lagoons within the tailings impoundment. There are two (2) pumpback wells (TMWs-96 and 97) in the vicinity of the excavated Catchment Basin that also pump into the tailings impoundment for a total of nine (9) wells pumping into the impoundment. Four wells are point of compliance wells (TMWs 15, 16, 17 and 18), and 35 other monitoring wells are also sampled. For purposes of this surety calculation, we assumed that the 7 pumpback wells would continue to operate, and would be sampled quarterly. Additionally, 14 monitoring wells in the vicinity of the catchment basin (two of which, TMWs 96 and 97, are pumpback wells related to the excavated catchment Basin that are assumed to continue to operate) would continue to be sampled quarterly for hydrocarbons and three metals, per License Condition 11.3.

Telesto, in 2009, completed a study entitled "Ground Water Plume Interpretation," in which it concluded that the concentrations of several metals and radionuclides in monitoring wells were not decreasing. Telesto suggested that this may be due to a slow back-diffusion of chemical mass from near-stagnant zones within the aquifer into more permeable zones and/or to a slow continuing contribution of chemical mass from perched areas above the aquifer. Hence, Telesto concluded that the time the ground water pumping program will likely need to continue for longer than the 10 years assumed by

MFG in the 2004 rebaselining. Based on Telesto's conclusion, this cost estimate was prepared based on an assumed 20-year remediation program. The cost of the program was calculated to be the present value of an annuity in which the interest rate equals a conservative investment rate minus inflation, which was assumed to be 3.0 percent. It was assumed that pumps and wells will be maintained annually and that pumps will be replaced periodically.

2.3 Cleanup of Contaminated Soils

The cost for cleanup of contaminated soils was estimated for anticipated contamination in the vicinity of the mill as well as for wind-blown tailings. The site operated during the early 1980s with mill and S/X process fluids pumped to a catchment basin that was constructed per design with concrete side slopes and an unlined bottom. Seepage from the catchment basin containing hydrocarbons and radionuclides contaminated the unsaturated soils, perched on clay layers, and contaminated the upper 50 feet of the Battle Spring Aquifer in the vicinity of the catchment basin. Remediation of this area was undertaken from 2005 to 2007. The Catchment Basin Excavation Completion Report was submitted to the NRC on May 6, 2008. Comments were received dated November 19, 2008 and a response to those comments, including RESRAD modeling results, was submitted on January 27, 2009. Radiological verification sampling indicated that the catchment basin contamination has been cleaned up, in the area that could be safely excavated without removal of, or damage to, the mill and S/X buildings. Additionally, the Completion Report and the Response to the Request for Additional Information were submitted to the NRC. Final approval of the remediation by NRC is pending. Therefore, for the purposes of establishing the surety amount for the facility, this contaminated soils cleanup effort is assumed to be completed, and unit costs for this cleanup are used to estimate future soil cleanup at the facility. The costs for the catchment basin excavation are itemized in the back-up calculations for the surety cost estimate for reference purposes.

Costs were estimated for cleanup of contaminated soils beneath the mill and S/X buildings originating from the catchment basin, which was evidenced by the seepage in the west wall of the catchment basin excavation. These costs were estimated based on the assumption that the depth of contamination would be the same as for the catchment basin excavation, averaging 40 feet. Furthermore, the lateral extent of the contamination west of the catchment basin excavation was assumed to be roughly the same as observed within the catchment basin excavation, and encompassing the mill and tank battery west of the catchment basin and southeast of the mill, a surface area of approximately 94,500 square feet. Movement of fluids containing hydrocarbons and radionuclides within the unsaturated soils below the catchment basin was assumed to be primarily downward, driven by gravity. Hence, the extent of westward contamination was estimated by assuming a symmetrical shape for the ultimate contamination zone, using the location of the catchment basin and the general shape of the catchment basin excavation pit as a guide.

The extent of windblown tailings around the existing tailings impoundment was estimated in the 1997 pre-scoping survey, in which a total of 88 acres were identified as potentially being contaminated (Shepherd Miller, Inc., Volume VI, Part 2, 1998). It was

assumed that 6" of soil would be removed over these 88 acres, and that 12" of topsoil would be placed.

2.4 Existing Impoundment Reclamation

Tailings within the existing impoundment were regraded during 2007 and 2008 in an effort to prepare the impoundment for future reclamation or reuse and to create a more level surface for construction of evaporation lagoons. No additional tailings regrading is expected to be required within the impoundment. It is anticipated that soil removed during windblown tailings and mill area soil cleanup will be placed in the impoundment. Reclamation of the existing impoundment will consist of completion of dewatering, covering the tailings surface with embankment soil to a level close to the natural pre-construction ground surface, placing topsoil, revegetating, and monitoring for radon emanation and settlement.

2.5 Radiological Survey and Monitoring

The costs for soil analysis for radionuclide concentrations were estimated based on published cost data for a local laboratory (Energy Labs, 2014). The methods used to clean up windblown tailings and to perform radiological verification were taken from Shepherd Miller's "Final Design – Volume VI, Part 2 – Mill Decommissioning Addendum to the Existing Impoundment Reclamation Plans." It was assumed that 240 acres would be tested during a scoping survey for soil contamination, 16 of which would be located in the mill vicinity; that 160 acres would be identified as primary or secondary areas as defined by Shepherd Miller; that 88 acres would be identified as primary area; and that 90% of the primary area would be defined as "P1", as defined by Shepherd Miller, and that 10% of the primary area would be defined as "P2." In 2004, MFG, Inc. estimated verification costs with GPS technology at about \$1,000 per acre. This unit cost was assumed for this cost estimate to have increased at a rate equivalent to inflation.

2.6 Project Management & Mobilization/Demobilization

Mobilization and demobilization of equipment was assumed to be 3.5 percent of the subtotal of reclamation costs for Items 1.0 through 5.0 listed above. This is based on the contracted terms of the 2006/2007 catchment basin soil cleanup effort at Sweetwater. Project management was assumed to be 3 percent of the subtotal of reclamation costs, based on direction within WDEQ Guideline No. 12.

2.7 Long-Term Surveillance Fee

The Long-Term Surveillance Fee was estimated, based on email correspondence dated July 16, 2009 with James Webb of the NRC, from the Bureau of Labor Statistic's inflation calculator to be \$900,233.90.

2.8 Contingency

The subtotal for reclamation costs for Items 1.0 through 5.0 was increased by a contingency factor of 15%.

3.0 SURETY SUMMARY, 2014

The cost estimate, totaled at \$11,614,151, detailed in Appendix A, and described above, is summarized in Table 3-1

Table 3-1 Cost Estimate Summary for 2014 Surety Rebaselining

Description	Sub-Item Cost	Total Item Cost
1.0 Mill Decommissioning		
Equipment Demo	\$336,561	
Structure Demo	957,576	
Concrete Disposal	1,035,597	
Revegetation	16,028	\$2,345,762
2.0 Cleanup of Contaminated Soils		
Mill Area	\$1,915,595	
Tailings Area	808,492	\$2,724,088
3.0 Ground Water Remediation		\$851,517
4.0 Existing Impoundment Reclamation		
Dewatering	\$78,232	
Earthwork	2,087,286	
Revegetation	71,523	
NESHAP Analysis	13,200	
Settlement Monitoring	29,700	\$2,279,940
5.0 Radiological Survey and Monitoring		
Soil Sampling	\$240,560	
Decommissioning Equipment	10,920	
Gamma Survey	383,550	
Environmental Monitoring	8,097	
Personnel Monitoring	4,324	\$647,452
Subtotal		\$8,848,758
6.0 Proj. Mgmt and Mob/Demob (6.5%)		\$575,169
7.0 Contingency (15%)		\$1,327,314
8.0 Long-Term Surveillance Fee		\$900,234
Total (rounded to nearest \$1000)		\$11,651,000

REFERENCES

- Energy Labs, 2014. www.energylab.com.
- KBC Engineers, "Surety Rebaselining Report, Sweetwater Uranium Facility," July 2009.
- Kennecott Uranium Company, License Number SUA-1350, "U.S. Nuclear Regulatory Commission Materials License, Amendment 26."
- Kennecott Uranium Company, May 6, 2008. "Sweetwater Uranium Project, Catchment Basin Excavation Completion Report, Volume I of II."
- MFG, Inc., 2004. "Sweetwater Uranium Project, 2004 Surety Update," July 2004, Revision 2.
- RS Means, 2009. "Heavy Construction Cost Data, 23rd Annual Edition." RS Means Company, Inc., Kingston, Massachusetts.
- Shepherd Miller, Inc., 1997. "Final Design Volume VI, Existing Impoundment Reclamation Plan," August 26, 1997.
- Shepherd Miller, Inc., 1998. "Final Design Volume VI, Part 2, Mill Decommissioning Amendment to the Existing Impoundment Reclamation Plan," June 9, 1998.
- Shepherd Miller, Inc., 1999. "Final Design Volume VIII, Response Report to the Request for Additional Information Dated December 3, 1998," February 3, 1999.
- Shepherd Miller, Inc., 1999. "Final Design Volume IX, Second Response Report," March 1, 1999.
- Telesto Solutions, Inc. 2009. "Final Ground Water Plume Interpretation, Sweetwater Uranium Facility," February 2009.
- U.S. Department of Labor, Bureau of Labor Statistics, 2009.
www.bls.gov/data/inflation_calculator.htm
- U.S. Nuclear Regulatory Commission, 1978. "NUREG-1620 – Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act."
- Wyoming Department of Environmental Quality, October, 2013. "Guideline No. 12a, Standardized Reclamation Performance Bond Format and Cost Calculation Methods."

Appendix A

Rebaselining Cost Detail

TABLE A-1. MILL AREA DECOMMISSIONING

Description	Quantity	Units	Unit Cost	Total Cost
A. Equipment Demolition^a				
1. Mill, Grinding	15	days	\$1,992	\$29,874
2. Mill, Boiler	5	days	1,992	9,958
3. Mill & S/X, Electrical	20	days	1,278	25,552
4. Mill, Leach	20	days	1,992	39,832
5. Mill, Thickening	25	days	1,992	49,790
6. Mill, Yellowcake	15	days	1,992	29,874
7. S/X, Settling	20	days	1,992	39,832
8. S/X, Storage Tanks	10	days	1,992	19,916
9. IX Resin & Tank	3	days	1,992	5,975
10. Health Physics	110	days	781	85,958
	Subtotal			\$336,561
B. Structure Demolition^b				
1. Mill Building	2,167,875	cu ft	\$0.208	\$450,918
2. S/X Building	528,000	cu ft	0.16	84,480
3. Clarifier (75' Diam)	88,360	cu ft	0.16	14,138
4. Clarifier Soln Tank (65' Diam)	33,180	cu ft	0.16	5,309
5. Raffinate Tank (50' Diam)	49,075	cu ft	0.16	7,852
6. Main Shop	902,000	cu ft	0.24	216,480
7. Admin Building	197,250	cu ft	0.32	63,120
8. Tire & Lube Building	270,000	cu ft	0.208	56,160
9. Misc Buildings	225,000	cu ft	0.24	54,000
10. Misc Tanks	32,000	cu ft	0.16	5,120
	Subtotal			\$957,576
C. Concrete Disposal^c				
1. Mill Building, concrete demo	48,175	sq ft	\$7.50	\$361,313
2. S/X Building, concrete demo	26,400	sq ft	7.50	198,000
3. Main Shop, concrete demo	22,550	sq ft	7.50	169,125
4. Admin Building, concrete demo	13,050	sq ft	7.50	97,875
5. Tire & Lube Building, concrete	9,000	sq ft	7.50	67,500
6. Misc Buildings, concrete demo	15,000	sq ft	7.50	112,500
7. Concrete Disposal On Site	3,550	cu yds	8.25	29,284
	Subtotal			\$1,035,597
D. Revegetation^d				
1. Ripping Compacted Surface	18.6	acres	\$76	\$1,413
2. Revegetation	18.6	acres	862	16,028
	Subtotal			\$16,028
	Total			\$2,345,762

Notes:

1) All structures within the NRC bonded area boundary are included in the decommissioning.

2) Unit costs derive from the following sources:

^aCrew 1 = RSMMeans Crew B-1B (w/o crane) = foreman, equip operator, 2 laborers (use Sweetwater crane) = \$1991.60/day

Crew 2 = 2 electricians @ \$79.85/hr each per 2014 RSMMeans Guide

Crew 3 = 1 HP tech + equipment, adjusted for CPI change between 2009 and 2014 = 8.529% increase to \$97.68/hour

^bRS Means Heavy Construction Cost Data, 2014; = \$0.39/cf x 0.826 = \$0.32/cf

- 50% reduction applied to RS Means unit cost for no internal walls
- adjust reduction for amount of internal walls

^cGuideline No. 12 (Oct 2013), Standard Reclamation Performance Bond Format and Cost Calculation Method - App K
Wyoming DEQ

Concrete Demo - RSMeans, 6" thick slab with wire mesh = \$7.50/sf, including overhead and profit

^dUnit costs from the 2006/2007 soil cleanup in the catchment basin area, adjusted to 2014 dollars.

TABLE A-2. CLEANUP OF CONTAMINATED SOILS

Description	Quantity	Units	Unit Cost	Total Cost
A. Mill Area^a				
1. Scoping Survey	4.94	ac	\$434	\$2,145
2. Soil Removal, Haul & Place	140,000	cu yds	9.18	1,285,417
3. Cleanup Verification Program	4.94	ac	2,713	13,403
4. Haul & Compact Backfill Soil	154,000	cu yds	3.84	591,657
5. Topsoil Placement	3,340	cu yds	3.44	11,491
6. Health Physics	1	lump sum	11,482	11,482
7. Revegetation	1.38	ac	862	1,189
8. Data Analysis & Report	300	hrs	115	34,512
Subtotal				<u>\$1,915,595</u>
B. Tailings Area^b				
1. Soil Removal	70,987	cu yds	\$3.44	\$244,221
2. Topsoil Placement	141,973	cu yds	3.44	488,440
3. Revegetation	88	ac	862	75,831
Subtotal				<u>\$808,492</u>
Total				\$2,724,088

Notes:

1) The Catchment Basin Area soils cleanup was completed in 2007. The unit costs for this remediation effort are provided for reference as recent, site-specific cost data, adjusted to 2014 dollars.

Catchment Basin Area	Units	Unit Cost	Adj Unit Cost*
1. Scoping Survey	ac	\$400	\$400
2. Soil Removal, Haul & Place	cu yds	8.00	\$8.46
3. Highwall Liner Installation	sq ft	1.50	\$1.59
4. Cleanup Verification Program	ac	2,500	\$2,500
5. Haul & Compact Backfill Soil	cu yds	3.35	\$3.54
6. Topsoil Placement	cu yds	3.00	\$3.17
7. Seepage Collection	lump sum	25,000	\$26,450
8. Health Physics	lump sum	10,000	\$10,580
9. Revegetation	ac	750	\$794
10. Data Analysis & Report	hrs	100	\$106

*Unit Costs here are adjusted to 2009 dollars; in the estimate above, these costs are adjusted to 2014 dollars

2) Unit costs derive from the following sources:

^aUnit costs derived from the 2006/2007 soil cleanup in the catchment basin area, adjusted to 2014 dollars.

Verification costs include soil sampling and analysis costs. Scoping & verification survey costs from MFG.

^bSoils cleanup due to wind-blown tailings; depth = 6"; radiological survey costs totaled on separate worksheet.

TABLE A-3. GROUND WATER REMEDIATION & WELL DECOMMISSIONING

Description	Quantity	Units	Unit Cost	Total Cost
Annual Remediation Costs				
1. Pumping, electricity ^a	8,760	hrs	\$0.20	\$1,752
2. Inspection & Maintenance ^b	96	hrs	108	10,368
3. Ground Water Sampling ^b	64	hrs	108	6,912
4. Maintenance/Replacement Materials	1	lump sum	5,400	5,400
5. Ground Water Testing - Tailings Wells ^c	28	ea	450	12,611
6. Ground Water Testing - CB Wells ^d	56	ea	288	16,106
Subtotal				\$53,149
A. Total Remediation Costs^e				
1. Total Cost for # Years of Remediation	20	yrs	3.00%	\$790,720
Subtotal				\$790,720
B. Well Abandonment^f				
1. Plug Perched Wells	23	ea	\$352	\$8,096
2. Plug Ground Water Wells	66	ea	748	49,368
3. Plug Deep Wells	3	ea	1,111	3,333
Subtotal				\$60,797
Total				\$851,517

Notes:

1) Ground water to be pumped to evaporation cells within existing tailings impoundment.

2) Unit costs derive from the following sources:

^a50 gpm, 60% efficiency, 2.36 kW: \$0.0861 per kW-hr; national average for commercial electricity,

US Energy Information Administration, www.eia.gov

^bConsultant to spend one week per quarter performing repairs and replacements, and sampling.

Field engineer @\$100/hour, typical hourly rate for consultants in region, with travel costs embedded (costs adj per CPI)

^cEnergy Labs, Casper WY, published rates www.energylab.com; 7 pumpback wells quarterly (costs adjusted per CPI)

^dEnergy Labs, Casper WY, published rates www.energylab.com; 14 monitor wells quarterly (costs adj per CPI)

^ePresent value of an annuity, with interest rate the difference between investment rate and inflation

^fGuideline No. 12, Oct. 2013, Standard Reclamation Performance Bond Format and Cost Calculation Method

Wyoming DEQ: \$30 +\$4.00/LF + 10% profit (cost did not change between 2009 and 2014)

\$30 for top of well disposal, pump removal

TABLE A-4. EXISTING IMPOUNDMENT RECLAMATION

Description	Quantity	Units	Unit Cost	Total Cost
A. Dewatering				
1. Dewatering System Completion	1	lump sum	\$50,000	\$50,000
2. Pumping, Electricity ^a	8,760	hrs	0.20	1,752
3. Inspection & Maintenance ^b	160	hrs	108	17,280
4. Maintenance Materials	1	lump sum	5,000	5,000
5. Data Analysis & Report ^b	40	hrs	105	4,200
Subtotal				<u>\$78,232</u>
B. Earthwork				
1. Level Embankments ^c	1,150,100	cu yds	\$1.22	\$1,399,212
2. Place Topsoil ^d	200,000	cu yds	3.44	688,074
Subtotal				<u>\$2,087,286</u>
C. Revegetation				
1. Seed, Drill, and Apply Mulch ^d	83	ac	\$862	\$71,523
Subtotal				<u>\$71,523</u>
D. NESHAP Analysis/Method 115				
1. Cannister Setup/Retrieval ^b	40	hrs	\$108	\$4,320
2. Cannister Testing ^c	110	ea	60	6,600
3. Data Analysis & Report ^b	20	hrs	114	2,280
Subtotal				<u>\$13,200</u>
E. Settlement Monitoring				
1. Install Monuments ^f	45	ea	\$300	\$13,500
2. Quarterly Data Collection (3 yrs) ^b	12	ea	1,000	12,000
3. Data Analysis & Report ^b	40	hrs	105	4,200
Subtotal				<u>\$29,700</u>
Total				<u>\$2,279,940</u>

Notes:

1) Embankment soil volume = 1,361,000 cy (remaining volume above tailings to final grade) less soil placed in the tailings impoundment from soil cleanup (140,000 cy + 71,000 cy)

2) Unit costs derive from the following sources:

^a50 gpm, 60% efficiency, 2.36 kW: \$0.0965 per kW-hr; national average for commercial electricity, PacificCorp: Rocky Mountain Power, www.rockymountainpower.net

^bConsultant rates are typical for the region, increased by CPI (1.08529) from 2009.

Field engineer rate includes embedded travel costs.

Consultants rates for reporting include averaged staff engineer and project manager billing rates.

Daily survey rate for local surveyor is approx. \$1000.

^cGuideline No. 12, Standard Reclamation Performance Bond Format and Cost Calculation Method

Wyoming DEQ, 10/2013: 657G push-pull scraper fleet, level ground, 1000' one-way haul

= \$1.106/cy + 10% profit

^dUnit costs derived from the 2006/2007 soil cleanup in the catchment basin area, adjusted to 2014 dollars.

^eCannister testing cost based on invoice for 2009 Method 115 testing by Energy Labs for the facility.

^fSettlement monuments installed at one per acre; unit cost based on engineering estimate.

TABLE A-5. RADIOLOGICAL SURVEY AND MONITORING

Description	Quantity	Units	Unit Cost	Total Cost
A. Soil Sampling				
1. Digestion for Radiochemistry ^a	878	ea	\$25.00	\$21,950
2. Ra-226 Analysis ^a	440	ea	105.00	46,200
3. Ra-226, Th-230, U-nat Analysis ^a	438	ea	215.00	94,170
4. Sample Collection ^b	640	hrs	108	69,120
5. Data Analysis & Report ^b	80	hrs	114	9,120
Subtotal				\$240,560
B. Decommissioning Equipment				
1. Equipment Scan/End of Day ^b	40	hrs	\$108	\$4,320
2. Equipment Scan/Free Release ^b	40	hrs	108	4,320
3. Data Analysis & Report ^b	20	hrs	114	2,280
Subtotal				\$10,920
C. Gamma Survey - Verification				
1. Scoping Survey ^c	224	ac	\$434	\$97,242
2. Performance Evaluation Survey ^c	1	lump sum	49,055	49,055
3. Verification - Primary & Secondary ^c	144	ac	1,248	179,724
4. Verification - Tertiary Areas ^c	80	ac	434	34,729
5. Data Analysis & Report ^b	200	hrs	114	22,800
Subtotal				\$383,550
D. Environmental Monitoring				
1. Air Pump ^c	16	wks	\$152	\$2,431
2. Calibration Equipment ^c	16	wks	184	2,952
3. Air Monitoring Sampler ^c	16	wks	27	434
4. Data Analysis & Report ^b	20	hrs	114	2,280
Subtotal				\$8,097
E. Personnel Monitoring				
1. Bioassay Urinalysis ^a	40	ea	\$25	\$1,000
2. Personal Radiation Badge Testing ^a	20	ea	75	1,500
3. Data Analysis & Report ^b	16	hrs	114	1,824
Subtotal				\$4,324
Total				\$647,452

Notes:

1) Unit costs based on the following assumptions:

Primary & secondary areas total 144 acres; 88 acres primary & 56 acres secondary

- The 88 acres assumed to be split as 79 acres P1 & 9 acres P2 (10m x 10m grid)

- P1 areas: 10% soil samples for Ra-226; P2 areas: 100% soil samples for Ra-226, U-nat & Th-230

- Secondary areas, 5% of grids to be soil sampled for Ra-226 (10m x 10m grid)

Tertiary areas, 5% of grids to be soil sampled for Ra-226 (50m by 50m grid)

2) Unit costs derive from the following sources:

^aUnit costs for lab analysis taken from Energy Labs, Casper, WY web site: www.energylab.com.

^bConsultant rates are typical for the region. Field engineer rate includes embedded travel costs.

Consultants rates for reporting include averaged staff engineer and project manager billing rates.

^cBased on previous surety update by MFG (2004), adjusted to 2014 dollars

TABLE A-6. LONG-TERM SURVEILLANCE FEE

Maintenance Fee Calculation

Year	CPI, All Urban Consumers	Fee Amount
1978 Avg	65.2	\$250,000
February-14	234.781	\$900,233.90

Notes:

Long Term Surveillance Fee is equal to \$250,000 in 1978 dollars (1978 average), indexed to inflation, as determined from the Consumer Price Index (CPI), for all urban consumers, U.S. Bureau of Labor statistics (per 10 CFR 40. Appendix A, Criterion 10).

The figure calculated from the Department of Labor, Bureau of Labor Statistics online calculator from 1978 to 2014 is \$900,233.90, calculating from the average 1978 CPI to the most recent month for the given year for all goods and services consumed by urban households.

Online Calculator:

\$900,233.90

Use of the value above is based on email from James Webb of NRC dated July 16, 2009.