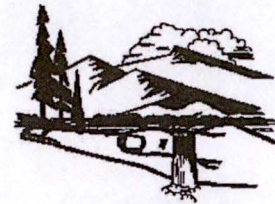




Matthew H. Mead, Governor

## Department of Environmental Quality

*To protect, conserve and enhance the quality of Wyoming's  
environment for the benefit of current and future generations.*



Todd Parfitt, Director

Date: May 23, 2016

Dominick Orlando  
Senior Project Manager  
Materials Decommissioning Branch  
Division of Decommissioning, Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards  
Mail Stop T-8F5  
Washington D.C. 20555-0001

**RE:** Mine Permit 352 (forfeited) - ANC Reclamation Project, Task Order # 2 Report and Request for  
Confirmatory Order Revision

Dear Mr. Orlando:

Enclosed is the Task Order # 2 report titled, "Draft ANC Uranium Mill Tailings Site Report of  
Engineering Evaluation / Cost Analysis and Prioritization of Reclamation Activities" for your review.

Based on the findings and recommendations of this report, Wyoming Department of Environmental  
Quality/Land Quality Division (WDEQ/LQD) is requesting a revision to the existing Confirmatory Order  
issued by the U.S. Nuclear Regulatory Commission (NRC) for the reclamation of the ANC Gas Hills site.  
WDEQ/LQD suggests the below revision language for NRC consideration:

*"Using the funds remaining from the forfeited reclamation bond, WDEQ shall perform engineering and  
reclamation activities to temporarily stabilize the tailing ponds and provide surface water diversions.*

*WDEQ may sample existing wells and surface water stations with any remaining funds from the forfeited  
bond after the completion of engineering and reclamation activities as described above."*

Please feel free to contact me if you have any questions regarding the report or the suggested  
Confirmatory Order revision language.

Sincerely,

Muthu Kuchanur  
Geology Supervisor  
Land Quality Division

Enclosure: Draft ANC Uranium Mill Tailings Site Report of Engineering Evaluation / Cost Analysis and  
Prioritization of Reclamation Activities

cc: File (Permit 352, forfeited)



# ANC URANIUM MILL TAILINGS SITE REPORT OF ENGINEERING EVALUATION / COST ANALYSIS AND PRIORITIZATION OF RECLAMATION ACTIVITIES



## Prepared for:

Wyoming Department of Environmental Quality  
Land Quality Division  
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May 2016



Lidstone and Associates - A Wenck Company

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## **1.0 EXECUTIVE SUMMARY**

The American Nuclear Corporation (ANC) Tailings site is located within the western portion of the historic Gas Hills Uranium Mining District near Riverton, Wyoming. Mining in the West Gas Hills began in the 1950's and continued through the 1980's. Reclamation efforts completed by both mining companies and the State of Wyoming has included backfilling of groundwater-fed uranium mine pits, heap leaches, and regrading/revegetation of the final land surfaces. The Wyoming Department of Environmental Quality (WDEQ) Abandoned Mine Land Division (AML) began reclamation of abandoned mines in the area in 1989 and that work continues to date.

Lidstone & Associates, a Wenck Company (LA), under contract to the WDEQ/Land Quality Division (LQD) completed Task Order 001 in March of 2016. This contract had a primary objective of installing and sampling additional down gradient monitoring wells to assist in defining the local geology as well as delineating the existence and extent of groundwater impacts, groundwater movement, and any possible outside sources of influence on groundwater impacts.

In January 2015, the Nuclear Regulatory Commission (NRC) provided LQD with a cost estimate for completing all remaining reclamation tasks at the ANC site. NRC's estimate was approximately \$16,000,000, which is beyond the available forfeited bonds for reclaiming the site. NRC stated that the estimate was being provided for LQD's planning purposes. NRC subsequently proposed that LQD may want to pursue additional federal funds that would allow for complete reclamation of the site so that it could be transferred to the U.S. Department of Energy (DOE) for long term surveillance and maintenance. Task Order 002 was initiated with the primary objective of providing LQD an updated realistic funding level cost estimate for reclaiming the ANC site to NRC standards.

The LA project team on Task Order 002 included RESPEC Consulting (engineering support), AVI Engineering (surveying), Datamap Services (digital mapping) and RDE, Inc. (radiologic studies). This report provides the results of LA's engineering work and an updated cost estimate for completing all remaining reclamation tasks at the ANC site. The primary objective of the task is to provide a reasonable cost analysis of those reclamation activities that would allow for transfer of the site to DOE for long-term surveillance. The LA team generated updated 2-foot contour topographic map coverage of the lands within and near the ANC site that might be disturbed or require further surface reclamation. The mapping allowed LA to perform an engineering evaluation of the site and more accurately calculate earthwork volumes and costs that may be involved in any additional site reclamation.

LA conducted a reconnaissance surface soils gamma survey to confirm if the areas of potential windblown tailings concern in 1997 had been cleaned up as part of the TP-2 final decommissioning work. The survey confirmed that the 1997 areas of concern had not been cleaned up as planned.

LA performed a funding level engineering evaluation and cost analysis (EE/CA), which addressed remaining reclamation tasks remaining for the closure of Tailings Pond No. 1 (TP-1) and evaluated the need for additional repair work at Tailings Pond No. 2 (TP-2) as was suggested by the preceding NRC analysis. TP-1 evaluations included a design that meets the NRC reclamation criteria provided in 10 CFR 40 Appendix A. LA analyzed and compared the NRC reclamation assessment against actual costs and tasks that would be necessary to provide long-term stability and safety, analyzed and prioritized those tasks that could be performed with available remaining funds assuming that no additional funding would be forthcoming, and evaluated potential sources of additional funds that may be obtained for use in conjunction with the remaining LQD funds to complete the site reclamation to NRC standards.

LA estimates that to complete the reclamation of TP-1 to NRC standards, the total cost would range from approximately \$13.8 million (2016 costs) to \$17.7 million (2026 costs). This estimate addresses all NRC line items contained in their 2015 estimate. The LA cost estimate also includes construction/repair of four diversion channels not addressed by NRC in their 2015 estimate. Finally, it was determined during the analysis that additional work on TP-2, as suggested by NRC in their assessment, is not necessary, and should not be included in this reclamation cost estimate. This cost estimate assumes that no additional degradation or negative site condition changes will occur between 2016 and 2026 that would potentially escalate costs beyond the current estimate. However, it should be noted that the longer it takes to agree on a path forward for final reclamation, the more expensive it will be to complete.

## **2.0 PROJECT HISTORICAL SUMMARY**

The ANC Uranium Mill Tailings Site is located within the Gas Hills Uranium Mining District in eastern Fremont County, Wyoming. **Figure 1** shows the site location. The site is located approximately 45 miles east of Riverton and 70 miles west of Casper. The site occupies approximately 550 acres that were used for uranium mining and milling activities between 1959 and 1981. ANC suspended milling activities in 1981 due to poor uranium market conditions and began the decommissioning and reclamation process as required by their NRC license. In 1994, before decommissioning and reclamation was completed, ANC announced that they were going out of business. They subsequently relinquished the remaining surety funds to the State of Wyoming, and LQD accepted responsibility for the reclamation responsibilities remaining on ANC's NRC license under a Confirmatory Order signed in 1996. LQD commenced reclamation activities in 1996 but suspended construction activities in 2009 because of nearly total depletion of the reclamation surety funds. Between 1996 and 2009, LQD completed reclamation activities, including:

- 1) Reclamation of the Bullrush Heap Leach site and deposition of contaminated materials into TP-1;
- 2) Reclamation of TP-2; and,
- 3) Limited construction of Campsite Draw. Work was limited by the southwestern extent of the permit boundary.

Between 2009 and 2015, site activities have included:

- 1) Annual sampling of existing down gradient monitoring wells;
- 2) Operation of the TP-1 pump back system;
- 3) Monitoring of settlement monuments at TP-1; and,
- 4) Review and analysis of down gradient monitoring well data and surface water sources to determine the extent and amount of down gradient impacts on the alluvial aquifer.

In June of 2014, during a revision of the 1996 Confirmatory Order, LQD and NRC agreed that the above mentioned pump back system and monitoring of settlement monuments could be discontinued and that ground water issues should be addressed.

LQD contracted with LA on November 6, 2014 to assist with work associated with reclamation of the ANC site. Task Order No. 001 included professional services to include the installation of additional monitoring wells and the completion of a hydrogeologic investigation. The final report for this task order was provided to LQD on March 31, 2016.

On January 8, 2015, the NRC provided LQD a document titled "Summary of Remaining Work to be Completed to Allow Closure of the ANC Site and Reclamation Cost Estimate". This document provided NRC's summary of necessary construction work and associated cost estimates that might lead to site closure. Upon review of the NRC document, it was apparent that there was a need for additional reclamation planning, including a review of reclamation options and development of accurate funding level probable costs. Task Order 002 was approved by LQD on July 8, 2015. A copy of the signed contract and approved Task Order 002 are provided in **Appendix A**. The January 8, 2015 NRC document is provided in **Appendix B**.

The approved Task Order 002 consists of four tasks, including:

- 1) Aerial photography and topographic mapping;
- 2) Characterization and reconnaissance-level surveys of potential windblown tailings within the site;
- 3) Groundwater Impacts Update; and,
- 4) Engineering Evaluation and Cost Analysis.

This report summarizes the results of the four tasks and provides LQD and NRC with updated realistic conceptual, risk-based reclamation options and funding level costs for completing reclamation at the site. This information will allow the agencies to consider a path forward for site reclamation utilizing existing funds and explore potential federal funding options that may allow for additional reclamation work. This additional work may lead to site closure and transfer to the DOE.

### **3.0 TASK 1 - AERIAL PHOTOGRAPHY AND MAPPING**

Aerial photography was performed at the site by subcontractor DataMap during August 2015 after ground targets had been set and surveyed by subcontractor AVI. Topographic mapping at 2-foot contours was ordered only for the southern portion of the property area where reclamation work may be performed. However, ortho rectified photos were obtained for the entire area of interest in the event that topographic mapping of the northern portion of the area may be needed in the future. Additionally, LA has received from DataMap positive and negative images of the aerial flight and an electronic copy of the topographic base upon which the conceptual plans and costs presented in Task 4 were developed.

### **4.0 TASK 2 - WINDBLOWN TAILINGS/SOILS CHARACTERIZATION**

Criterion 6(6) of 10 CFR 40 Appendix A provides the reclamation design requirement for the cleanup of windblown tailings material. Averaged over land areas of 100 square meters (m), the concentration of radium-226 (Ra-226) in the soil must not exceed 5 picocuries per gram (pCi/g) above background averaged over the first 15 centimeters (cm) of soil depth and 15 pCi/g above background averaged over subsequent 15 cm soil depth layers.

#### **4.1 Historical ANC Cleanup Efforts**

Amendment 14 to SUA-667, dated April 10, 1983 required ANC to perform a gamma survey in areas to be disturbed during construction of the Willow Springs Draw and Campsite Draw diversion channels. Survey results and a plan for cleaning up any contaminated areas were to be submitted to NRC for review and approval.



ANC documents dated May 23, July 13, and August 22, 1983 responded to NRC's requirement to provide a plan for survey and cleanup of any contaminated surficial soils that may be disturbed during construction of Willow Springs Draw and Campsite Draw diversion channels (approved December 28, 1983 as Amendment 15 to SUA-667, License Condition 40h). The amendment approval letter acknowledged acceptance of ANC's calculated Ra-226 cleanup concentration of 8.7 pCi/g correlated to a gamma survey level of 50 micro roentgen per hour ( $\mu\text{R/hr}$ ). The NRC noted that since the gamma survey identified additional areas of contaminated soils outside the proposed construction area, a program of additional soils cleanup and interim stabilization would be necessary. This and a final gamma survey of the cleaned up areas was required by the amendment.

ANC document dated February 24, 1984 provided documentation of TP-2 interim stabilization efforts, including the construction of the Willow Springs Draw diversion channel and TP-2 dike; NRC approved these construction items in Amendment 16 to SUA-667, dated May 17, 1984. In the amendment letter, NRC noted that the required Probable Maximum



Flood (PMF) protection on the Campsite Draw diversion and road remained to be constructed. NRC also noted that the post-construction gamma survey around TP-2 was not provided, but agreed to postpone the survey until final reclamation of TP-2.

Amendment 32 to SUA-667, dated June 9, 1988, required ANC (License Condition 15. B.) to provide NRC by July 15, 1988 a detailed methodology for soil sample collection and radiological analysis for a post decommissioning verification survey and program for determining background Ra-226 in soil.

ANC document dated July 14, 1988 provides a proposed radiological survey and soil sampling program and a methodology to be used to determine background Ra-226 in soils. The proposal included 1983 soils data showing that the average background Ra-226 concentration in surrounding area surface soils was 4.27 pCi/g. Based on the 1983 background soils sampling data, ANC proposed Ra-226 cleanup values of 9.27 pCi/g in the first 15 cm thickness of soil and 19.07 pCi/g over 15 cm subsequent soil thicknesses.

Amendment 34 to SUA-667, dated October 31, 1988 (License Condition 15.B.) approved ANC's July 14, 1988 proposal for post decommissioning surveys, soil samples and determination of background and cleanup concentrations of Ra-226 in soils.

The approved soil radium cleanup criteria of 9.27 pCi/g remained in the license until Amendment No. 52, issued by NRC on January 22, 1998. With the issuance of this amendment, License Condition 15.B. was deleted from the license as were all conditions related to site reclamation. Surface reclamation responsibilities, including the soil radium cleanup criteria, had been transferred to the LQD as Section IV of NRC's Confirmatory Order dated October 8, 1996. Specifically, Section IV, Item 4 of the Order required LQD to use the July 1988 ANC soil radium cleanup criteria.

## **4.2 1996 - 1997 Cleanup Plan**

During 1996 and 1997, LQD's contract engineer, AVI, developed a windblown tailings delineation and cleanup plan, a final draft of which was provided to LQD in August 1997 and subsequently submitted to NRC as part of LQD's revised Reclamation Plan.

The plan followed the methodology referenced in Section IV, Item 4 of the Confirmatory Order and focused on seven potentially contaminated areas (Area 1 through 7) surrounding TP-1 and TP-2. These areas are identified on **Figure 2**. Using a linear regression analysis, it was determined that the 9.27 pCi/g radium cleanup concentration is approximately equal to 50  $\mu$ R/hr at one meter above the surface. The pre-cleanup gamma survey was performed during July 1997. Representative soil samples were collected and analyzed in a laboratory for Ra-226 to confirm the radiometric survey information. AVI constructed a map showing several areas that exceeded 45  $\mu$ R/hr measured at one meter above the surface. These areas are shown on **Figure 3**. The major areas of exceedance were in Areas 1, 5, 6 and 7. Area 9 had only one node reading that exceeded 45  $\mu$ R/hr, located near the eastern edge of TP-2. Areas 8 and 10 were not sampled.

The cleanup plan, which included soils removal within portions of Areas 1, 5, 6 and 7, was made a part of the 1996 reclamation plan that was submitted to NRC for review and approval.

Upon review of the submittal, NRC requested that the soil radium background concentration and subsequent cleanup criteria be reevaluated to a more conservative figure. Because the background and cleanup criteria question could not be resolved before TP-2 reclamation commenced, the planned soils cleanup work was not performed (M. Moxley, personal communication, 2016).

## **4.3 2015 Reconnaissance Survey Findings**

At the time Task Order 002 was approved, it was uncertain whether the 1997 proposed windblown cleanup program had been performed. Therefore task 2 of Task Order 002 was developed to provide confirmation that the cleanup had or had not been completed, and whether other areas around the ANC site downwind of TP-1 and TP-2 had become impacted during the past 20 years since the last survey had been performed.

A reconnaissance radiological survey and limited soil sampling program within and near the areas identified in the 1997 survey (**Figure 3**) was performed in two separate phases between August 15 and September 20, 2015 utilizing a handheld GPS unit and calibrated micro R meters (Sodium Iodide-based gamma scintillation rate meter). A total of 203 gamma survey measurements were made representing 9 of the 11 areas identified by AVI in their publication, "ANC Tailings Delineation and Cleanup, AVI, July 11, 1997". Eleven near surface and one at depth profile (0-15 cm, 15-30 cm, and at 68 cm) soil samples were collected as part of the survey. However, due to budget constraints, only the at depth location profile was selected for chemical analysis. The remainder of the soil samples has been placed into storage for future analysis, as appropriate.

AVI generated, as part of the 1997 publication, a 50 m transect gamma survey result map (**Figure 3**). In addition to surveying general areas identified in the task 2 Scope, specific locations identified in the 1997 survey were located on the ground and resurveyed during the field reconnaissance. Specific locations were in areas 1, 2, 5, 6, 7, and 9. Survey investigations in Area 6 led to the discovery of a small localized "hot spot" in Area 11, north of TP-1 and the former Western Nuclear Ore Haul Road (now a Fremont County road).

Phase I of the survey was performed on August 18, 2015 and followed the intent of task 2, investigating both upwind and downwind locations relative to TP-1 and TP-2. The maximum reading obtained was 60  $\mu$ R/hr at the top of TP-1 bench area (**Figure 4**). Other than a 50  $\mu$ R/hr

reading obtained north of TP-1 at the Ore Haul Road (suspected to be “spilled ore”), no readings exceeded 45  $\mu\text{R/hr}$ . Areas north of the Ore Haul Road were not surveyed in 1997 nor in this survey. It was agreed between ANC and NRC in the 1980s that cleanup north of the road would not be required because of the difficulty in determining contamination caused by ore hauling (NORM) and windblown tailings.

Phase II of the investigation was based on confirmation of “hot spots” identified in the 1997 AVI survey. A two day survey targeting these areas was performed on September 19-20, 2015. Following is a discussion of findings based on the apparent order of importance regarding “offsite” radiological anomalies identified in the 1997 survey. **Table 4.1** provides the gamma survey data and location information. The 1997 areas of concern are shown on **Figure 3** and are shown with the 2015 survey results on **Figure 4**.

**Area 5: Man Camp Site Area** – Upwind from TP-1 and near the Johnny Potatoes Well, several apparently undisturbed areas demonstrated elevated gamma readings. A maximum reading of 100  $\mu\text{R/hr}$  was noted adjacent to a roadway leading to two small, lined reservoirs used in the past to hold dust suppression water pumped from the Johnny Potatoes well. An unexplained off-permit anomalous reading of 70  $\mu\text{R/hr}$ , located upwind from the Man Camp and identified in the 1997 survey, was also confirmed in this survey. Based on the 1997 survey results, radium concentrations in the soil averaged 10.5 pCi/g and only three survey nodes exhibited gamma measurements greater than 50  $\mu\text{R/hr}$ . The area exhibiting anomalous gamma in the 2015 survey remains small and isolated and presents little impact to the environment or public health and safety.

**Area 2: Willow Springs Draw and East of Electrical Substation** – Limited elevated gamma measurements were noted within Willow Springs Draw resembling measurements observed in 1997 (34-55  $\mu\text{R/hr}$ ). The area to the east of the substation also demonstrated minor gamma elevations ranging from 36 to 60  $\mu\text{R/hr}$ , mostly in a secondary drainage. Based on the 1997 survey results, radium concentrations in the soil averaged 6.45 pCi/g and none of the survey measurements exceeded 50  $\mu\text{R/hr}$ . Based on the data collected to date, the average radium concentration in soils within Area 2 is less than the cleanup limit of 9.27 pCi/g. Therefore, this area is considered “clean”.

**Area 9: East-Northeast of TP-2** – Two points located at the northeast corner of TP-2 exhibited gamma values of 65 and 90  $\mu\text{R/hr}$ , respectively and corresponded with the 62  $\mu\text{R/hr}$  reading obtained in 1997 in the same area. The balance of the entire area north-northeast of TP-2 was at or below 45  $\mu\text{R/hr}$ . Based on the 1997 survey results, radium concentrations in the soil averaged 15.66 pCi/g and only one of the survey readings exceeded 50  $\mu\text{R/hr}$ . The area of elevated radium levels is very small and isolated and presents little impact to the environment or public health and safety.

**Area 1: North of TP-2 near the Ore Haul Road** – A low lying drainage area which appears to experience spring flooding exhibited gamma measurements of 44 to 160  $\mu\text{R/hr}$ , verifying readings observed in 1997. During the mill operation, this area contained several ponds that were used as settling ponds for water treated for radium removal. It is also possible that this area received drainage from TP-2 prior to its being covered and reclaimed. Based on the 1997 survey results, radium concentrations in the soil averaged 23.20 pCi/g and only two of the survey readings exceeded 50  $\mu\text{R/hr}$ . The area of radium elevation is small and isolated and presents little impact to the environment or public health and safety.

**Area 7: Northwest of TP-1 and northeast of the AML reclaimed Bullrush Mine area** – Other than a gamma reading of 95  $\mu\text{R/hr}$  located in the borrow ditch to the south of the Ore Haul Road



(suspected to be from historical ore spillage) the highest gamma measurement observed in the designated area was 50  $\mu\text{R/hr}$ . Based on the 1997 survey results, radium concentrations in the soil averaged 23.2 pCi/g and only two of the survey readings exceeded 50  $\mu\text{R/hr}$ . The area of gamma elevation is small and isolated near the Ore Haul Road and presents little impact to the environment or public health and safety.

**Area 6: North of TP-1 bounded by the Ore Haul Road and the drainage leading from the base of TP-1 north across the Ore Haul Road** – The majority of the gamma measurements in the area directly north of TP-1 exceeded 45  $\mu\text{R/hr}$ , ranging from 38 to 175  $\mu\text{R/hr}$  confirming the results of the 1997 survey. A playa located to the northwest of TP-1 near the Ore Haul Road, physically defined by a sediment/clay soil and stunted vegetation, exhibited gamma measurements ranging from 49 to 95  $\mu\text{R/hr}$ . This area and an area effectively bordering the TP-1 north-northeast restricted area boundary (exhibiting gamma values as high as 175  $\mu\text{R/hr}$ ) collectively drain to a culvert crossing under the Ore Haul Road to the north towards Area 11. Based on the 1997 survey results, radium concentrations in the soil averaged 13.55 pCi/g with numerous survey readings exceeding 50  $\mu\text{R/hr}$ .

**Area 11: TP-1 Drainage north of Haul Road** – The area north of the current Ore Haul Road location in the TP-1 drainage area, discussed above for Area 6, was extensively surveyed and demonstrated gamma measurements ranging from 42 to 150  $\mu\text{R/hr}$ . Approximately 50 m north of the Ore Haul Road, directly in the drainage channel, an area was located that demonstrated gamma readings of 235  $\mu\text{R/hr}$  at one meter above the surface and 620  $\mu\text{R/hr}$  at ground surface. Upon removing approximately 2.5 feet of soil from the location, a reading of 1,100  $\mu\text{R/hr}$  was observed. This area was selected for sampling (along with 11 others). Samples were collected at 0 to 15 cm, 15 to 30 cm and at 68 cm. The three profile samples were submitted for chemical and radiological analysis. The analytical results are provided as **Appendix C** and confirm that the material is tailings solids, rather than windblown or ore material. Subsequent to LA's receipt of these data, an additional field reconnaissance survey was completed. The original location of Area 11 was confirmed with the LA Ludlum Micro-R meter and a downstream longitudinal profile (800 m) was extended until the drainage crossed Highway 136. The survey included surface readings every 15 m and a surface and subsurface reading every 30 m. No significant elevated readings were identified during this survey downstream of the original site. Prior to this survey, LA hypothesized that tailings had been released from TP-1 at some time during operations. Following this follow up investigation, it appears that the area extends approximately 100 feet downstream from where the samples were collected and may reflect a localized spill as opposed to prolonged release of tailings. The 1997 survey did not extend north of the Ore Haul Road, and no historical data are available.

**Areas 3 and 4:** Based on the 1997 survey data, these two areas exhibited no survey readings greater than 43  $\mu\text{R/hr}$  and average radium concentration in the soils was 3.66 pCi/g, significantly less than the 9.27 pCi/g cleanup limit. The 2015 reconnaissance survey corroborated the 1997 findings. These areas should be considered "clean".

**Areas 8 and 10:** Area 8 is a mine spoils area upwind of TP-1. ANC characterized the radium in the pile and determined that the radium within the pile ranges from 3.0 to 49.2 pCi/g with a mean value of 10.9 pCi/g. The area was not included in the 1997 survey because it was determined that it would be nearly impossible to determine the existence of windblown tailings because of the ambient radium content within the pile. This area was not part of the 2015 reconnaissance survey. Should the spoils material be used as cover for TP-1, additional characterization will be performed prior to removal of the material and placement at TP-1.

Area 10 contained clean borrow material in 1997. Results of a 1995 drilling program showed that radium in the borrow material ranged from 1.3 to 2.5 pCi/g with a mean value of 1.9 pCi/g. The material was used as cover during the final reclamation of TP-2. This area was not part of the 2015 reconnaissance survey.

#### **4.4 Conclusions and Recommendations**

Based on the results of the 1997 survey and the 2015 reconnaissance survey, Areas 2, 3 and 4 should be considered "clean" as the majority of survey measurements were less than 50  $\mu\text{R/hr}$  (only one measurement exceeded 50  $\mu\text{R/hr}$  in 2015) and average radium soils concentrations were less than 4 pCi/g. Within Areas 1, 5, 7, and 9, the data indicate that areas with elevated soil radium concentrations are small and isolated and present little impact to the environment and public health and safety. Areas 6, 7 and possibly 11 may have larger areas of soils containing radium elevated above the 9.27 pCi/g cleanup limit. However, the 1997 survey results indicated that the average radium concentration in soils within Areas 6 and 7 are 13.55 and 10.6 pCi/g respectively, just barely above the cleanup limit. A preliminary estimate of all affected acreage, that, should it be decided to conduct soil cleanup, is approximately 130 acres. Assuming replacement soil is available on site, estimated costs for cleanup, including verification survey, laboratory and revegetation costs, would be approximately \$260,000 (2016 costs) or if delayed until 2026 and no changes in site conditions, the costs would be approximately \$330,000. With the limited funds available at this time, it is considered that the money would be more wisely spent on higher risk items, for example, placing additional cover on TP-1.

### **5.0 TASK 3 – GROUNDWATER IMPACTS UPDATE**

#### **5.1 Monitoring Well Sampling and Data Analysis**

The current 35 groundwater and surface water sampling locations will be sampled two additional times. Once the data has been received and analyzed the Task Order 001 analysis report will be updated and provided in a report to be delivered as part of Task Order 004. This additional sampling cost will be approximately \$90,000 (2016 costs) including analytical costs.

#### **5.2 Groundwater Alternate Concentration Limits for Point of Compliance and Point of Exposure**

Alternate concentration limits (ACL) cannot be determined at this time. Additional investigation and groundwater monitoring will be necessary in order to determine the Long Term Surveillance Boundary (LTSB) and associated Point of Compliance (POC) and Point of Exposure (POE) monitoring wells, and to define reasonable ACLs. These costs are not included within this EE/CA.

### **6.0 TASK 4 – RECLAMATION METHODOLOGIES ENGINEERING EVALUATION/COST ANALYSIS**

#### **6.1 Overview of NRC Reclamation Standards**

The NRC reclamation standards are governed by the technical criteria contained in their regulations at 10 CFR 40, Appendix A, particularly Criteria 1 and 4 through 6. The primary closure design standards in Appendix A are to provide control and containment of the tailings for at least 200 years and up to 1,000 years, and limit the release of radon to the atmosphere to 20 pCi/m<sup>2</sup>s averaged over the entire tailings impoundment area. The tailings pond protection and closure criteria used to meet the standards include: 1) sideslopes no steeper than 5h:1v with 10h:1v preferred; 2) nearly flat surface on the top of the impoundment; 3) a minimum of 1 foot thickness of radon barrier material (clay); 4) a minimum of 3 feet of clean material covering the radon barrier;

and, 5) a minimum of 6 inches of small (4 inch average size) cobble riprap on the top and side slopes that meets the NRC durability standards in the regulations. The large volume requirements for clay cover, clean material and NRC suitable riprap rock are significant cost considerations in an NRC closure. Since the early 1990's both Pathfinder Mines Corporation (PMC) and Umetco Minerals (Umetco) have closed tailings facilities in the Gas Hills. In each case these companies opened rock quarries to meet their rock volumetric and quality requirements. The LQD used screened large rock from existing conglomeratic waste dumps to address closure requirements for TP-2. The following section (6.2) addresses currently (as of 2016) available rock and clay sources for TP-1. Although drilling for suitable overburden has not taken place, the LA project team believes that an adequate volume of suitable overburden can be identified on site. The proposed borrow areas include unreclaimed overburden waste dumps in the Bullrush area and perhaps sand material from the Willow Springs Draw diversion.

Although the NRC criteria are quite prescriptive and are the preferred reclamation design option of the NRC Staff, the regulation does allow for alternative reclamation plan proposals from licensees. These alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. Upon review, the NRC may allow a proposed alternative design, if it can be shown that the alternative design will, to the extent practicable, achieve a level of stability and containment of the site as well as a level of protection for public health, safety and the environment from radiological and non-radiological hazards equivalent to or better than the levels achieved by the requirements in Appendix A and the U. S. Environmental Protection Agency (EPA) standards in 40 CFR 192 Subparts D and E (i.e., groundwater quality standards). The rule also states that the NRC review of any reclamation design proposal shall take into account the state of the technology and economics of the reclamation effort in relation to public health and safety risks and other societal and socioeconomic considerations. This is an important consideration given the remaining ANC Bond Forfeiture reclamation funds (approximately \$635,000). One should consider economics and balance the need for protection of public health, safety and the environment while prioritizing the use of these remaining funds.

## **6.2 Rock and Clay Sources within Proximity of the ANC Site**

NUREG-1623 presents design criteria for Erosion Protection for Long Term Stabilization of tailings covers. Appendix D of NUREG-1623 addresses not only design procedures but also rock durability scoring and testing. Specifically, the NRC has developed a rock scoring analysis that addresses rock durability, which is summarized in Table D-1 of NUREG 1623. Rock durability testing typically includes specific gravity, Abrasion (Los Angeles Rattler Test), Absorption, Sodium Sulfate Soundness and surface hardness and penetration resistance (Schmidt Hammer test). This section describes the available cover and rock (riprap) sources within a reasonable distance of the ANC tailings project area and will provide this firm's professional opinion on rock quality, cost of development and available volume of resource. LA has not completed a true due diligence and has not completed any drilling or testing of potential reserves. LA's evaluation of permissibility is based on our experience in the area. **Figure 5** shows the location of each source.

### **6.2.1 Active Quarries**

There are two active rock quarries within a 100 mile radius of the ANC site. The Atlantic City site has provided high quality riprap rock for a large number of AML projects in the Gas Hills. The site is approximately 53 air miles from the ANC site and consists of Pre Cambrian taconite and iron ore in stockpile. The rock in this quarry is high quality and would meet NRC standards as a rock cover material. The operator has set up a "grizzly" and screens graded riprap from a stockpile. The historical development of the site includes the US Steel Iron Ore Mine that closed in the late 1970's. The mine site has been reclaimed, and AML has completed reclamation on eligible portions of the



site. Since the 1970's, this quarry has changed ownership several times and is currently operated by High Country Construction under LQD Permit #WYR320067. Riprap costs for AML projects have ranged from \$50 to \$75 per cubic yard delivered to the Gas Hills.

The second quarry is located approximately 2 miles north of Rawlins in Section 14, T21N, R88W. The site is identified as the Wyute Quarry and is operated by the McMurray Brothers Construction Company under LQD Permit # WYR320424. The quarry consists of Paleozoic Age limestone and should meet NRC standards as suitable tailings erosion protection cover. The quarry is 72 air miles from the Gas Hills, and trucking charges would likely add \$20 to \$30 per cubic yard to the rock price. Based on professional experience in the area, Wyute Quarry rock price would be approximately \$75 per cubic yard.

The East Gas Hills Shale Quarry is located in Section 1, T33N, R90W. The Cody Shale is exposed along the north-northeast dip slope of the Dutton Anticline at this location near the Iron Springs Reservoir. The site is located approximately 4 miles from the ANC project area. Several thousand cubic yards (CY) of clay material were removed from this site in the past to provide radon barrier material for uranium tailings reclamation projects in the East Gas Hills area (Umetco). In 2011, this quarry was operated by Rock Springs Mineral Processing Inc. under LQD Permit #723. Since that date there has been a bankruptcy filing and the status of the permit and quarry is undetermined. There are additional outcrops of shale in the area that may also provide a good source for radon barrier material, but would have to be permitted.

### **6.2.2 Inactive Quarries**

In their 2014 reclamation cost estimate, the NRC references the Umetco Rattlesnake Quarry as a source of rock for the ANC TP-1 riprap and rock cover. This quarry is located in Natrona County in Section 6, T33N, R88W and Section 31, T34N, R88W. The U.S. Bureau of Land Management (BLM) issued a competitive mineral material sales contract to Umetco on March 6, 2000 for 500,000 bank cubic yards. A letter from the BLM to Umetco on March 31, 2009, granted a contract extension to January 14, 2015. This quarry consists of high quality silicified sandstone within the Pennsylvanian Age Tensleep Formation. It has previously been approved as a rock source by the NRC and has been used as rock cover at Umetco's East Gas Hills operation. The rock should score high as a durable rock source. Umetco has completed their work and a limited quantity is available onsite in stockpiles. This material and materials contract has been transferred to Wyoming AML and Natrona County Road Department for graveling the roads. BLM has stated that they will not expand the mineral material sales license, and the quarry reclamation responsibility has been transferred to AML. Essentially there is no reserve available for the ANC reclamation despite its proximity to the site. Any effort to reopen the materials permit will encounter land management agency and likely public opposition (verbal conversation with BLM Mills District). Assuming there is a willingness to pursue this option, the Rattlesnake Quarry provides the best opportunity to find mineable high quality riprap within close proximity to the ANC site. However, permitting costs may be extensive.

PMC developed a quarry within 2 miles of the ANC site and mined Triassic Age Alcova Limestone. The BLM Master Title Plat shows this site to be under a Free Use Permit (FUP) (WYW 13144), but by 2011, this site had been reclaimed. The limestone at this quarry site dips to the north-northeast off the Dutton Anticline. Approximately 6 to 8 feet of backfill covers the face of the limestone. PMC obtained a sales contract from the BLM in October 1997 for the limestone outcrop in Section 24, T33N, R90W. After removing overburden and mining down dip, a dozer was utilized to rip the limestone and push the rock toward the processing plant. The limestone appears platy (perhaps laminated) and can be mined without drilling and blasting. The processed aggregate has been used historically for erosion protection cover on uranium tailings sites in the Central and East Gas Hills. Based on LA experience, the limestone at this site did not represent the highest quality in

dimension or partings and would score medium to low in any riprap scoring. The site has been reclaimed and would require reopening and repermitting through the BLM.

Umetco developed the Black Rock Quarry as their initial source for rock to be used for uranium tailings reclamation. The quarry is approximately 14 miles south of the ANC site. The exposed rock is a granitic intrusion into an upper member of the Tertiary White River Formation. Locally, the gangue rock (White River) exhibits characteristics of contact metamorphism. The granitic outcrop was drilled, blasted and processed for riprap reserves. Some reject materials were later used by AML in the upgrade of the Jeffrey City to Gas Hills county road (aka. The WNI Ore Haul Road). The site is currently under a BLM FUP to Fremont County Road and Bridge. Based on our last site inspection, there are very few stockpiles of rock on site and very little high quality rock that can be removed from the existing quarry faces. The granitic outcrops should meet NRC durability scoring criteria, but the gangue rock would not. The cost of developing this quarry into a usable reserve could be considerable.

The Western Nuclear, Inc. (WNI) Split Rock Mill Quarry is located approximately 2 miles north of Jeffrey City and approximately 20 miles from the ANC site. The exposed rock is high quality granite and would meet the NRC scoring criteria. Rock from this quarry was used for final cover at the Split Rock Mill tailings site. The quarry has been completely reclaimed and would require reopening and repermitting through the BLM. Access consent would have to be obtained from WNI. This site, approximately 20 air miles from the ANC site, represents an excellent opportunity to provide quality rock for the ANC project.

A Wyoming Department of Transportation gravel quarry is located in Section 3, T29N, R92W near Jeffrey City and is approximately 22 miles from the ANC site on surface owned by Fremont County. The County possesses a FUP covering 10 acres for mining, extraction and stockpiling. This site is located on an upper terrace of the Sweetwater River and does not contain large rock. This quarry would not provide suitable sized rock for tailings reclamation purposes.

### **6.2.3 Green Fields**

"Green fields" are defined as previously undisturbed sites that would have to be permitted and developed as a rock quarry. One such site exists in the Gas Hills at a location approximately 7 air miles from the ANC site. The Mississippian Age Madison Formation limestone outcrops in the East Gas Hills as an allochthonous block of Paleozoic rock. This area is immediately south of the Federal American Partners' reclaimed Tee Pit and Umetco's A-8 and B2/B3 reclaimed pits. This area could provide suitable rock for an NRC rock cover but, similar to Umetco's efforts at the Rattlesnake Quarry, would require special use (BLM) and mine (LQD) permitting. Since the BLM has stated that they will not renew the Rattlesnake Quarry materials license, the development of a "green field" may be the only reasonable option should the purchase and delivery of riprap rock from a permitted source not be selected. Other compatible uses for this quarry may include a source rock for Gas Hills road maintenance by Natrona County, Fremont County and perhaps future in situ recovery mining operations.

## **6.3 Tailings Pond No. 1 and 2 Reclamation to Meet NRC Standards**

### **6.3.1 2014 NRC Reclamation Cost Estimate for Tailings Pond No. 1**

In January 2015, NRC provided LQD with a cost estimate for completing the reclamation and decommissioning of the entire ANC site in accordance with the criteria contained within 10 CFR 40 Appendix A, so that the site could be transferred to the DOE for long-term care and maintenance. Costs for the proposed reclamation activities were based on costs reported by other similar mine reclamation projects completed between 2000 and 2009 and were revised to 2014 dollars to reflect

inflationary changes. NRC's cost estimate for completing the reclamation, installing additional monitor wells, sampling and decommissioning of the ANC site totaled \$16,382,356, which would be equivalent to \$16,401,802, adjusted for a 2015 inflation rate of 0.1%. For reference purposes, the NRC document is included in **Appendix B** of this document. The following sections evaluate site reclamation and closure costs using a more accurate assessment of earthwork requirements and a more accurate assessment of unit costs. The assessment addresses costs to complete closure and final reclamation in accordance with NRC standards which, as stated, require the permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance (10 CFR 40, Appendix A Criterion 1 and 6). For practical purposes, the NRC addresses a criteria suggesting reasonable assurance that there will be no release of tailings for a 1,000 year period where practicable and in any case, for a minimum of 200 years. Typical design criteria for stream channels are the PMF and rock protection on the tailings cover.

### **6.3.2 2016 Design Level Costs Associated with NRC Standards for TP-1 Dam Repair, Radon Barrier and Final Cover**

RESPEC Consulting was subcontracted to assist LA with addressing earthwork requirements associated with the reclamation and closure of TP-1. This section provides reclamation quantities and costs that can be compared to the NRC information provided in January 2015 specifically:

- 1) Repair the dam on TP-1;
- 2) Construct a 1 foot thick clay radon barrier on TP-1;
- 3) Place 10 feet of suitable cover material on TP-1; and,
- 4) Place 8 inches of D<sub>50</sub> 4-inch durable rock over the final cover.

The reclamation design includes grading along the Bullrush spoil area to generate the required suitable cover material, which is defined as unclassified excavation with scintillometer readings averaging 45 µR/hour or less.

With a TP-1 approximate area of 30 acres, the clay material required to provide a 1 foot thick barrier will be approximately 50,000 CY. To ensure compliance with the clean fill requirements, approximately 675,000 CY of unclassified material would need to be placed between the radon barrier and the riprap rock surface cover (approximately 10 feet). The NRC had previously estimated (January 2015) 230,000 CY of "clean sand" for this (3-foot) frost protection layer. Because of the difficulties of obtaining clean sand, a 10 foot layer of overburden is the preferred reclamation. The existing tailings dam and final cover would be graded to an 8h:1v slope, and all other sideslopes would be graded to a 5h:1v finished grade. An 8-inch thick rock erosion protection cap would then be placed on top of the cover material. This rock cap would extend approximately 10 feet outside of the clay layer boundary and along the embankment slopes, totaling an area of approximately 45 acres, resulting in approximately 48,400 CY of required rock. The design also includes a proposed diversion channel (Northwest Diversion) to divert water away from TP-1. **Figures 6 and 7** present the tailings pond closure and diversions. **Table 6.1** summarizes the bid items, calculated quantities, unit rates and total costs, as well as a 15% contingency for the design. An estimated 10-year inflation cost was added to the total assuming an increase of 2.5% per year. The total estimated cost to complete the TP-1 reclamation would range from approximately \$6.7M (2016 costs) to \$8.6M (2026 costs).

### **6.3.3 Diversion Channel Construction**

Surface diversions are critical design elements to maintain compliance with 10 CFR 40, Appendix A Criterion 1, 4 and 6. Design considerations include no release of tailings over a 1,000 year period,



recognizing a minimum criterion of no release under the 200 year time frame. NRC guidance suggests reclamation design for the PMF.

The following surface water diversions will provide long-term surface water protection and erosional stability for the tailings pond closures at TP-1 and TP -2:

- 1) Willow Springs Draw Diversion along the east side of TP-2
- 2) Campsite Draw repairs
- 3) Northwest Diversion along the west side of TP-1
- 4) South Diversion along the south side of TP-1 and TP-2
- 5) Northeast Diversion along the northeast flank of TP-2

### **Site Hydrology – All Channels (Figure 6)**

Per NRC criteria, the analysis was based on the 1-hour, 1 square mile Probable Maximum Precipitation (PMP) storm event. The PMP, calculated to be 9.22 inches, is considered the most severe storm that could occur for a project with a design life of 1,000 years. Willow Springs Draw is the primary basin channel that drains north from the TP-2 area through culverts under the Ore Haul Road. It collects water from surrounding basins totaling approximately 3,520 acres or 5.5 square miles. The PMF, which is generated from the PMP for the Willow Springs Draw Basin is approximately 22,055 cubic feet per second (cfs).

For this same basin, the 100-year event of 3.3 inches results in a discharge of 3,115 cfs, approximately 700% less than the PMF. With the presence of offset levees (designed for the PMF stage height) and design considerations for strategically placed riprap grade controls within the Willow Springs Draw, the project team is confident that the diversion will meet the stated goal of “no release” of tailings during extreme storm events. The hydrologic data for Willow Springs Draw are presented in **Table 6.2**.

**Table 6.2** presents the hydrologic analysis for the other three ANC diversions shown on **Figure 6**. The 1-hour PMF ranges from 831 cfs at the Northeast Diversion to 1,245 cfs at the South Diversion. Similar to Willow Springs Draw, the 100-year event is significantly less ranging from 170 cfs in the Northwest Diversion to 289 cfs at the South Diversion. The more frequently occurring events (2, 5, 10, 25 and 50-year) are important design events to maintain channel capacity and prevent excessive aggradation.

#### **6.3.4 Willow Springs Draw Repair (Figure 8, Figure 11)**

According to the NRC cost estimate, there are no reclamation plans for Willow Springs Draw and no additional work is required along Campsite Draw. Our 2015 field evaluation identified a 20-foot headcut where Willow Springs Draw crosses the Ore Haul Road near TP-2. Current grade of the ANC 1980's vintage PMF channel is held by one 48 inch culvert and the outfall is a highly eroded basin. It is considered that failure of the road is imminent and clearly does not meet the 200-year minimum criteria. Should a 20-foot headcut move upstream through the Willow Springs Draw Diversion, mass wasting could result in release of tailings from TP-2.

To address this state of incipient instability, LA is proposing to regrade the entire channel and add sinuosity to decrease the slope. This will require a new road crossing, complete with new culverts and riprap protection.

Channel capacity will pass the PMF, or 22,055 cfs. For sediment transport considerations, a low water channel will convey the 100-year event and will include sufficient freeboard to convey the PMF and thereby prevent the release of tailings. A smaller pilot channel will convey the 10-year event (753 cfs) and maintain sediment transport throughout the length of the channel.



Given the channel geometry and slope requirements, the main Willow Springs Draw channel will exhibit high and erodible velocities (over 9 ft/s). To offset this velocity increase, grade control structures will be installed every 1,000 feet along Willow Springs Draw as shown in **Figure 8**. These structures, consisting of graded riprap rock ( $D_{50} = 12$  inches) will prevent significant downcutting over the 1,000 year period.

The Willow Springs Draw Diversion will outlet to its natural channel through two 6-foot by 5-foot concrete box culverts below the Ore Haul Road. These culverts will be 80 feet in length and have a slope of 1%. On a combined flow basis, these culverts will pass 890 cfs. The overlying road will be redesigned to allow for a 12h:1v dip crossing (**Figure 11**). The remaining flow (PMF) will go over the top of the culverts as weir flow (aka, Texas Crossing). To protect the crossing from erosion, the material on the backside of the road (downstream) will be sloped at 5h:1v down toward the channel and covered with 12-inch riprap rock.

**Table 6.3** summarizes the bid items, calculated quantities, unit rates and total costs, as well as a 15% contingency. An estimated 10-year inflation cost was added to the total assuming an increase of 2.5% per year. The total estimated cost to complete the Willow Springs Draw Diversion will range from approximately \$890,000 (2016 costs) to \$1.1M (2026 costs). The excess cut from this diversion could be suitable for use as a sand cover for the TP-1 reclamation.

### 6.3.5 Campsite Draw Repair

The Campsite Draw Diversion is the largest drainage that flows into Willow Springs Draw. It was constructed in 1996 to divert discharge around the southern end of TP-2 and ensure no release of tailings. According to the NRC cost estimates, there is no need for additional work along Campsite Draw. Our 2015 field evaluation identified an unprotected portion of channel bank and a failing section of riprap rock along the southwest property corner of the TP-2 license area. Currently, there is approximately 1,100 linear feet of local granitic conglomerate placed at a thickness of 12 inches in Campsite Draw. The first 475 feet (upstream) of the bank protection (**Figures 6 and 9**) is unprotected and requires upgrading and replacement. Rock of a higher quality should be imported rather than gathered on site.

Using the existing cross section of the channel and local hydraulics, a  $D_{50}=7.0$  inches was determined to be stable. In summary, approximately 475 linear feet of 8-inch riprap rock would be installed. This results in a volume of approximately 750 CY. This rock should be imported from an acceptable rock quarry in order to meet NRC specifications for specific gravity, hardness, and abrasion.

**Table 6.4** summarizes the bid items, calculated quantities, unit rates and total costs, as well as a 15% contingency. An estimated 10-year inflation cost was added to the total assuming an increase



of 2.5% per year. The total estimated cost to complete the Campsite Draw repairs will range from approximately \$152,000 (2016 costs) to \$195,000 (2026 costs).

### **6.3.6 Remaining Diversions: Northwest, South and Northeast Channels**

As part of TP-1 closure, three additional diversion channels will be required: a Northwest Diversion, a South Diversion, and a Northeast Diversion. The Northwest and South Diversions combine to divert the PMP event around the closed tailings facility. The Northeast Diversion has been designed to stabilize a gully on the northwest side of TP-2.

The Northwest Diversion (**Figure 7, Figure 11**) will be approximately 5,200 feet in length and flows into a culvert to the west of the Willow Springs Draw culverts at a slope of approximately 2.7%. The channel has been designed to convey not only the PMF (NRC standard design) but also pass lesser flow events in an erosionally stable fashion (5.6 fps). To meet NRC standards, the benches in the overflow channel have been widened to provide a minimum of 1.6 feet of freeboard to contain the PMF event. The Northwest Diversion consists of approximately 210,000 CY of unclassified excavation and includes five riprap grade controls. The total estimated cost (**Table 6.5**) to complete the Northwest Diversion will range from approximately \$755,000 (2016 costs) to \$966,400 (2026 costs).

The South Diversion (**Figure 9, Figure 11**) diverts the upper basin flow from the TP-1 area and delivers the PMP to Campsite Draw and ultimately to Willow Springs Draw. The diversion includes approximately 150,000 CY of excavation for the channel cut and the construction of a diversion berm, which ties into TP-2 on its eastern limb. The diversion of these flows will allow improved hydraulics in the lower reaches of the Northwest Diversion. The total estimated cost to complete the South Diversion (**Table 6.6**) will range from approximately \$554,000 (2016 costs) to \$709,500 (2026 costs).

Finally, the Northeast Diversion will stabilize an existing gully on the northwest side of TP-2. This diversion (**Figure 10, Figure 11**) would collect water that drains from a native ridge northwest of TP-2 and to the east of TP-1. The proposed diversion is approximately 1,900 feet in length and has a slope of approximately 3.8%. The diversion outlet would meet the Willow Springs Draw Diversion approximately 200 feet upstream of the Willow Springs Draw culverts. The diversion would include 22,500 CY of material excavation. The total estimated cost to complete the Northeast Diversion (**Table 6.7**) will range from approximately \$196,000 (2016 costs) to \$251,000 (2026 costs).

### **6.3.7 Assumptions, Limitations and Uncertainties**

When considering a conceptual design of this nature, there are certain assumptions and uncertainties which influence overall reclamation costs. The principal assumption is the availability of suitable materials. This clearly pertains to suitable cover material (averaging 45 uR/hr or less), and the availability of clay and rock meeting NRC standards. Reclamation bids are highly dependent on the unit costs provided by a contractor. Critical elements, which include unclassified excavation and riprap, are dependent on cut/fill balances and the proximity of the source material to its placement location. A 60-mile haul for riprap will greatly affect overall costs. The above projects are not individually balanced, which suggests that any borrow area would require reclamation. Detailed design and earthwork balance is integral to final reclamation and ultimately cost estimation.

### **6.3.8 2014 NRC Reclamation Cost Estimate for Tailings Pond No. 2 Repair**

In January 2015, NRC provided LQD with a cost estimate for completing final cover repair and meeting closure standards for TP-2. It is the NRC position that the current closure does not meet rock durability or placement standards and that the site has seen gully erosion requiring not only

repairs but replacement of the entire rock surface. In this same document, the NRC proposes a reclamation cost of \$2.5M based on riprap costs adjusted for inflation of \$26.60 per CY. The source for the NRC riprap is the Rattlesnake Quarry, which is no longer a viable source. Actual costs for riprap delivered to the Gas Hills are approximately \$60 to \$75 per CY.

Based on the LA project team 2015 site evaluation, the existing rock mulch cover is stable with minimal if any rill or gully erosion. Vegetation is becoming established on the cover. The results of the 1997 final TP-2 radon flux test, which were summarized by Oak Ridge Associated Universities in their 2014 pilot radon flux study report for TP-1 showed that the radon flux across TP-2 ranged from  $<0.5$  pCi/m<sup>2</sup> sec to a high of 1.8 pCi/m<sup>2</sup> sec with an average of 0.5 pCi/m<sup>2</sup> sec. The radon flux from TP-2 is well within the NRC standard of 20 pCi/m<sup>2</sup> sec. Field surveys found that minor gullies that were present in November 2014 were "healed" in July of 2015, reflecting a stable landform in a transitional phase. LA would recommend that given funding concerns, no additional money be spent on the cover and repairs to TP-2.

## **6.4 Long-Term Care Boundary**

### **6.4.1 BLM Land Transfer/Private Land Purchase**

The long-term care boundary encompasses the land surrounding the disposal site that will be transferred to DOE or the State and from which the public will be prevented from using the groundwater. Since the work conducted under Task Order 001 did not bound the areal limits of groundwater contamination, the long-term care boundary and associated POC and POE locations cannot be determined at this time. In the case of the former ANC site, any public lands that would be encompassed within a long-term care boundary would be directly transferred from BLM to the DOE or the State, should the State opt to become the long-term custodian of the site, after an evaluation of the land's mineral potential. There would be no purchase cost to the State for this transfer (personal communication with Lander BLM Field Office).

Philp Sheep Company owns 320 acres of land north of the ANC site, which includes water and riparian land and is a critical component to the Philp livestock operation. Approximately 240 acres of the parcel lie within or near Willow Springs Draw that has been shown to have been impacted by previous mining and/or milling activities. It is possible that at least the 240 acres mentioned above would need to be incorporated into the long-term care boundary.

A search of the [www.landwatch.com](http://www.landwatch.com) website showed a total of three properties for sale northwest of Riverton that are reasonably comparable to the Philp parcel. Property 1 is 30 acres located northwest of Riverton listed at \$30,000. Property 2 is 321 acres off Sand Draw Road near Riverton listed at \$329,000. Property 3 is a 935 acre hay and cattle operation near Riverton listed at \$1,250,000. These properties represent an average cost of \$1,121 per acre. Assuming this cost represents fair market value for the Philp parcel, the total cost for acquiring the 240 acres would be approximately \$270,000. This fair market value determination does not consider how this parcel of land fits into the Philp livestock operation nor does it include potential costs for easements and/or rights-of-way that may be within the lands of interest.

## **6.5 Transfer of License to DOE**

The process of transferring the license to DOE typically begins when the licensee has completed all surface reclamation and has a groundwater remedy in place or at least under regulatory review. The licensee notifies the NRC and/or DOE of their intent to transition the site to DOE care and maintenance. Once initiated, it typically requires approximately two years to complete the process, depending on specific site conditions.



License transfer activities cannot begin until the following criteria have been met by the licensee and concurrence has been obtained by the NRC or State regulator and reviewed and accepted by DOE:

- 1) Completion of surface reclamation of tailings and soils; any DOE concerns raised during review of the reclamation completion report and subsequent site visits should be taken under advisement by the licensee and resolved during the transition process period.
- 2) Achievement of groundwater compliance by attaining background or maximum contaminant level conditions or through approval of an ACL, which can take several years to resolve.
- 3) Finalization of the LTSB, which cannot take place until the predicted extent of groundwater impacts have been determined and accepted by the NRC or State regulator and concurred by DOE; considerations for establishing site boundaries may include, besides ownership, institutional controls, buffer areas for engineered structures, road rights-of-way, section lines, topography, and the likelihood of unauthorized access.
- 4) Development of a Long Term Surveillance Plan (LTSP) by DOE that is reviewed internally and by NRC and site licensee prior to implementation.
- 5) Payment of a long-term surveillance fee by the site licensee (per 10 CFR 40 Appendix A Criterion 10) equivalent to approximately \$908,500 in 2016 dollars.

Although actual costs for license transfer are unknown at this time, given the approximate two-year time frame, the resources required to develop the LTSP and the long-term surveillance fee, total costs for transferring the license could be as much as \$2,000,000 to \$4,000,000 (2016 costs).

## **7.0 PRIORITIZATION OF RECLAMATION ACTIVITIES**

Tables 7.1 and 7.2 present a prioritization of reclamation activities. Table 7.1 addresses reclamation actions that should take place and their order of priority. Without an infusion of additional funds, the amount and type of reclamation work that can be accomplished will be very limited. The Priority 1 item addresses the minimum work that should be accomplished to place additional cover on TP-1. The construction of a vegetated cover will reduce any meteoric water recharge to the tailings. If construction costs allow, the thickness of the cover can be increased (Priority Item 2) and with the increased thickness, there will be some savings in fertilization (and moisture barrier) requirements to ensure successful revegetation. The remaining priority items in Table 7.1 reflect actions that could take place in the order that would most benefit reclamation. All of these items consider funding priorities. The latter priority items suggest that there will be additional funding beyond the remaining ANC Bond Forfeiture dollars.

Table 7.2 considers the current budget constraint following the completion of Task Orders 001 and 002 and assumes no matching DOE funds. There is approximately \$635,000 remaining in the reclamation budget going forward. With this in mind, LA considers that at a minimum, the following tasks could be completed within the remaining budget:

- 1) A limited drilling and materials sampling and analysis program to identify suitable cover materials within spoil piles located within close proximity to TP-1.
- 2) In recognition of the permit boundary constraints towards final reclamation of the site, additional investigation and coordination with the land management agency (BLM) and Fremont County is required prior to completing the Willow Springs Draw repair.

- 3) TP-1 Final Cover Design (Plans and Specifications).
- 4) TP-1 geotechnical compaction testing during cover placement to ensure proper compaction density.
- 5) TP-1 cover placement construction management.
- 6) Competitively bid reclamation construction. In so doing and in recognition of the volatility of construction unit prices, LA would establish a Base Bid for temporary closure of TP-1. The proposed work activity under the Base Bid would include placement of a minimum of 2 feet of clean (low radioactive) spoils material and 1 foot of topsoil on TP-1 to prevent the potential for windblown impacts and to reduce the radon emanation from the pile to as near the NRC standard as possible. The Contractor would seed the placed cover to provide stability and reduce the potential for erosion.
- 6a) Within the framework of the competitive bid, LA would establish an Alternate Bid, which allows for a thicker (5 foot) cover. This thicker cover would include clean spoils material (3.5 feet), a 1 foot moisture barrier (sand) and 18 inches of topsoil. The volume of cover material and ultimately the cover thickness is dependent on the unit prices of earthwork. The Contractor would seed the placed cover to provide stability and reduce the potential for erosion. It is notable and for the purposes of this assumption, fertilizer is not proposed under this Alternate Bid.
- 7) Willow Springs Draw repair, which will require additional field investigation of possible rock sources for use as riprap.
- 8) Further groundwater investigations and sampling as the budget allows.

Cost details for the above activities are presented in **Table 7.2** and could be incorporated into Task Order 003. Each one of these tasks has merit for completion in terms of protection of public health and safety and the environment. The completion of work as described in **Table 7.2** recognizes budget constraints and allows for flexibility should additional funding become available over time.

## **8.0 ADDITIONAL FUNDING FOR COMPLETING RECLAMATION**

### **8.1 Comparison of Reclamation Cost Estimates**

**Table 8.1** presents a comparison of the January 2015 NRC Cost Estimate (**Appendix B**) with volumetrics and planning developed under the EE/CA section of Task Order 002. The work completed under this Task Order is a conceptual level design effort, which includes earthwork calculations, channel hydrology and hydraulics and cost estimations using locally developed costs and professional experience in the Gas Hills.

**Table 8.2** presents the major differences in the January 2015 NRC estimate and the more refined LA EE/CA. Specifically, the January 2015 NRC estimate included major work effort at TP-2, whereas the LA EE/CA assumes that no work at TP-2 will be required. Similarly, the NRC assumed no diversion work on Willow Springs and Campsite Draws, whereas the LA estimate sees these and the other diversions as critical elements in the long-term stability of both tailings ponds. Individual unit costs vary considerably between the NRC estimate and the LA EE/CA. The major cost differential includes the cost of riprap rock. The NRC assumed nearby quarries were still open and could produce rock for the job at approximately \$28 per CY (2015 costs). However, these local quarries are no longer available, which means that the required rock will have to be imported from 50+ miles away. This increased transportation distance will greatly impact the price of riprap rock, with unit prices ranging from \$60 to \$75 per CY (2016 costs). Under proposed Task Order 003, LA would investigate nearer sources to evaluate the feasibility of reopening some closed quarries.

## **8.2 Federal Funds**

The NRC has recommended that the State of Wyoming discuss with their U.S. congressional delegation the possibility of drafting a bill that would change the designation of the ANC site from Title II to Title I under UMTRCA, thereby transferring the remaining reclamation responsibilities and financial liability to the DOE who would prepare an Environmental Impact Statement and Reclamation Plan, and complete the site reclamation using federal funds, if appropriated by Congress under UMTRCA Title I. This approach would be similar to what the State of Utah accomplished in 2001 for the Moab Uranium Mill site.

A second possible scenario for funding would be similar to what NRC and DOE investigated in the early 2000 time period and would be analogous to other low level and mixed waste sites that had inadequate financial assurance or lack of funding. Available funding would originate from Congress and allow work on sites where reclamation completion and transfer to DOE is jeopardized. The source of these funds would be available under the Nuclear Waste Policy Act.

## **8.3 State Funds**

A third potential funding scenario could include additional funding by the Wyoming State Legislature. This scenario assumes that there would be NRC concurrence with the State's reclamation approach and that the Wyoming Legislature would provide project specific funding to the LQD for reclamation purposes. The source of funding could be the general fund or through the Wyoming Abandoned Mine Land Program. This scenario may not be a feasible option in the foreseeable future as the State of Wyoming is currently experiencing budget shortfalls due to the downturn in the minerals and oil and gas industries within the State. With a reduction in receipts from royalties and mineral excise taxes, all departmental budgets are being closely examined and cut as necessary. New projects likely will not be funded. Additionally, it is unknown at this time what ramifications might develop as a consequence of Wyoming becoming an NRC Agreement State, as the State would then technically be both regulator and licensee.

## **9.0 NO ACTION ALTERNATIVE**

The No Action Alternative means that no additional monies beyond what was committed in the NRC/LQD Confirmatory Order would be spent to further define groundwater impacts under and downgradient of the tailings piles, nor would any additional cleanup and disposal of byproduct material be accomplished. TP-1 would remain in its current state of reclamation with no additional cover or drainage diversion structures constructed. The site area would be fenced and posted to inhibit public access to the area. Because the site has not been decommissioned to EPA groundwater standards, the license likely could not be terminated nor the site deeded to the DOE for long-term surveillance and maintenance. LA does not believe that the No Action Alternative described above would be in the best interests of the State of Wyoming, the Federal Government or the general public. Given the remaining funds available, and assuming no additional funds will become available from State or federal funding avenues, the reclamation activities identified in Section 7 and summarized in Section 11 should be considered as the best possible alternative for protecting the environment, public health and safety and meeting the intent of the decommissioning/reclamation requirements.

## **10.0 WYOMING/NRC AGREEMENT STATE STATUS**

The State of Wyoming has commenced the regulatory process to become an NRC Agreement State for the purpose of having regulatory primacy over the operation and reclamation of uranium milling operations, including in situ recovery facilities. Enabling regulation has been passed

allowing LQD to move forward in seeking an agreement with the NRC. It is estimated that the program could be in place within the next five years.

Upon becoming an Agreement State, NRC will grant to Wyoming the regulatory authority to issue, oversee, and terminate source and byproduct materials licenses within its borders, including the ANC site. It is unknown at this time what the implications will be for Wyoming to be both regulator and licensee of the ANC site. This question will need to be addressed by LQD in concert with the NRC and DOE during the Agreement State process.

## **11.0 CONCLUSIONS AND RECOMMENDATIONS FOR EXPENDING REMAINING FUNDS**

Based upon the total funding remaining in the ANC forfeited bond, there will not be enough available money to perform all or even a significant number of the reclamation options evaluated during the course of Task Order 002. Should progressive funding become available, a sequence of reclamation actions is presented in **Table 7.1**. The most immediate reclamation need is to place a limited (3 foot) cover over TP-1. The least pressing priority is to replace or rebuild the rock cover over TP-2.

Following the completion of Task Orders 001 and 002, there will be approximately \$635,000 of ANC dedicated monies. Additional match monies may originate from DOE, but those monies are not considered in the analysis. **Table 7.2** presents LA's recommended best use of remaining funds, which include evaluation of suitable cover material and outside rock sources and placement of a 3-foot overburden and topsoil cover on TP-1. To the extent that funding will allow, LA would recommend placement of a thicker overburden cover, moisture barrier (sand layer) and topsoil over TP-1. In any case an effort to revegetate the final cover is recommended.

Finally, to ensure the most value for the project, it is recommended that LQD and NRC revise the Confirmatory Order in a manner that would allow LQD more flexibility to perform reclamation activities. DOE reimbursement to LQD under the Title X Program is an important component in any effort to achieve maximum reclamation and stability of the ANC site.



## Tables

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**Table 4.1 2015 Gamma Reconnaissance Survey Data**

Waypoint	Latitude	Longitude	Gamma_uR/hr	Comments
<b>AREA 1</b>				
182	42.80547	-107.6296	34	Drainage Going West
183	42.80497	-107.63029	30	Drainage by Topsoil Pile
184	42.80508	-107.63058	37	Dozer Diversion Disturbance
189	42.80346	-107.63047	42	Edge TP-2 Rock Armor North
190	42.80342	-107.62971	30	Edge TP-2 Rock Armor North
191	42.80324	-107.62874	42	Edge TP-2 Rock Armor NE
338	42.80666	-107.6295	70	Edge of Muck Pond
339	42.80664	-107.62971	140	
340	42.80663	-107.62989	160	
341	42.80662	-107.63013	80	
342	42.80658	-107.63037	140	
343	42.80635	-107.63036	80	
344	42.80629	-107.63019	130	145 @ Surface
345	42.8062	-107.63013	140	160 @ Surface
346	42.80619	-107.62981	60	
347	42.80631	-107.62969	110	135 @ Surface
<b>AREA 2</b>				
355	42.80569	-107.62491	40	
356	42.80543	-107.62492	60	Guy Wire of Substation
357	42.80516	-107.62501	44	
358	42.80516	-107.62507	50	
<b>AREA 3</b>				
195	42.8017	-107.62535	24	
196	42.79905	-107.62432	24	
197	42.79262	-107.62542	22	Road
<b>AREA 5</b>				
204	42.79598	-107.63837	37	Johnny Potato Well (16?)
205	42.79819	-107.63611	50	Road Intersection South of TP-1
206	42.79457	-107.63611	40	Townsite
292	42.79745	-107.63761	38	Johnny Potatoes Well Head
367	42.79808	-107.63613	70	North of Man Camp
368	42.79705	-107.63541	30	Man Camp Entrance
369	42.79725	-107.63608	28	
370	42.79647	-107.63618	48	Man Camp
371	42.79522	-107.63717	70	
372	42.79784	-107.63627	70	80 @ Surface; North of Man Camp
373	42.79762	-107.63661	65	North of Man Camp
374	42.79782	-107.63673	100	
<b>AREA 6</b>				
185	42.8047	-107.6307	28	Drainage
186	42.80442	-107.63094	34	North Topsoil Pile Cut
187	42.80405	-107.63106	40	Center Topsoil Pile Cut
188	42.80355	-107.63108	37	Edge TP-2 Rock Armor North
198	42.80866	-107.63732	36	
199	42.8086	-107.63742	40	MW-10
200	42.8075	-107.63905	38	Wood Well Cover
207	42.8067	-107.63129	36	Green Gate Old ANC Site Entrance
213	42.80859	-107.63737	45	MW2
214	42.80859	-107.63743	40	MW10
216	42.8088	-107.63721	50	
217	42.80889	-107.63715	80	Sample 1 @ 0-1 inch/Sample 2 @ 0-15 cm
218	42.80895	-107.63707	70	Road Edge
219	42.80899	-107.63705	50	Road Center

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**Table 4.1 2015 Gamma Reconnaissance Survey Data**

Waypoint	Latitude	Longitude	Gamma_uR/hr	Comments
220	42.80876	-107.63682	75	Culvert 1
221	42.8087	-107.63676	100	130 @ Surface Culvert 2
222	42.80846	-107.63648	60	
223	42.80829	-107.63622	50	
224	42.80809	-107.63593	45	
225	42.80793	-107.63566	80	Drainage
226	42.80774	-107.63544	70	Drainage
227	42.80753	-107.63519	75	
228	42.80734	-107.6349	65	
229	42.80722	-107.63464	55	Phone Pole
230	42.807	-107.63438	55	
231	42.80684	-107.63404	45	
232	42.80664	-107.63425	55	Fenceline
233	42.80682	-107.63456	75	
234	42.80698	-107.63493	80	
235	42.80715	-107.63534	80	Telephone Cable Marker
236	42.80735	-107.63561	80	
237	42.80752	-107.63592	80	
238	42.80774	-107.63626	60	
239	42.80789	-107.63651	75	Center TP1 Drainage/Sample 5 0-1 inch/sample 50-15cm
240	42.80808	-107.63681	50	
241	42.80826	-107.63711	50	
242	42.80781	-107.63789	50	42-50 Reading Adjusted to Record on Map by JHF
243	42.80822	-107.63739	50	
244	42.80795	-107.63701	52	
245	42.80772	-107.63679	50	
246	42.80758	-107.6366	65	
247	42.80727	-107.6364	70	
248	42.80708	-107.6362	70	
249	42.80685	-107.63602	130	
250	42.80667	-107.6359	175	
251	42.80675	-107.63617	110	
252	42.80698	-107.63641	70	
253	42.8072	-107.63667	52	
254	42.80736	-107.6369	50	
255	42.80766	-107.63721	46	
256	42.80728	-107.63703	70	
257	42.80706	-107.63679	60	
258	42.80683	-107.63657	75	
259	42.80698	-107.63689	75	
260	42.80708	-107.6371	70	
261	42.8073	-107.63733	50	
262	42.80756	-107.63907	40	
263	42.80865	-107.63782	38	
264	42.80865	-107.63818	43	
265	42.80873	-107.63857	45	
266	42.80881	-107.63898	42	
267	42.80886	-107.63939	40	2 inch Locked PVC Well
268	42.80914	-107.63954	44	
269	42.80939	-107.63963	40	Top of Knoll Road Cut ; South of Haul Road (Dry Creek Road)
270	42.80937	-107.63926	40	
271	42.80937	-107.63888	44	
272	42.8093	-107.6385	70	
273	42.80926	-107.6384	100	Playa North of TP1

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**Table 4.1 2015 Gamma Reconnaissance Survey Data**

Waypoint	Latitude	Longitude	Gamma_uR/hr	Comments
274	42.80917	-107.63847	49	Playa North of TP1
275	42.8093	-107.63853	70	Playa North of TP1
276	42.8094	-107.63846	70	Playa North of TP1
277	42.80935	-107.63834	100	Playa North of TP1; Sample 9 0-1 inch/Sample 10 0-15 cm
278	42.80923	-107.63809	80	
279	42.80918	-107.6379	70	
280	42.80913	-107.63766	85	
281	42.80908	-107.63748	95	
282	42.80902	-107.63727	90	
283	42.80878	-107.63746	45	
284	42.80891	-107.63734	90	
304	42.8093	-107.63705	60	Bell Cable Marker
326	42.8094	-107.64129	45	Reclamation Fence Northeast Corner
327	42.80908	-107.64131	50	
328	42.80874	-107.64137	44	
329	42.80841	-107.6414	50	
330	42.8079	-107.6415	50	Fence Bend South of Road
331	42.8079	-107.64103	50	
332	42.80819	-107.64097	44	
333	42.80852	-107.64093	46	Top of Knoll
334	42.80873	-107.64088	46	
335	42.80907	-107.64091	44	
336	42.80942	-107.64095	95	
<b>AREA 7</b>				
326	42.8094	-107.64129	45	Reclamation Fence Northeast Corner
327	42.80908	-107.64131	50	
328	42.80874	-107.64137	44	
329	42.80841	-107.6414	50	
330	42.8079	-107.6415	50	Fence Bend South of Road
331	42.8079	-107.64103	50	
332	42.80819	-107.64097	44	
333	42.80852	-107.64093	46	Top of Knoll
334	42.80873	-107.64088	46	
335	42.80907	-107.64091	44	
336	42.80942	-107.64095	95	
<b>AREA 8</b>				
202	42.8033	-107.6407	60	Top of TP-1 Bench
203	42.79908	-107.6396	45	South of TP-1 Bench
164	42.807	-107.6276	30	East Haul Road Edge
165	42.80702	-107.62762	30	MW-14A
166	42.80512	-107.62679	35	Northwest Corner Electric Sub-station
167	42.80464	-107.62649	30	Southwest Corner Electric Sub-station
168	42.80428	-107.62674	24	Willow Springs Drainage
169	42.80396	-107.62717	30	ANC Panel Point 216
171	42.80351	-107.62788	37	
172	42.80367	-107.62808	39	Buried Cable Marker
170	42.80342	-107.62742	29	Air Monitor Tower
171	42.80351	-107.62788	37	
173	42.80368	-107.62827	35	Road Along Fenceline
174	42.80388	-107.62835	36	Road Along Fenceline - TP2-2
175	42.80418	-107.62848	37	Road Along Fenceline
176	42.8045	-107.62863	33	Road Along Fenceline
177	42.80476	-107.62876	32	Road Along Fenceline
178	42.80506	-107.62891	32	Road Along Fenceline

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**Table 4.1 2015 Gamma Reconnaissance Survey Data**

Waypoint	Latitude	Longitude	Gamma_uR/hr	Comments
179	42.80537	-107.62903	31	Road Along Fenceline
180	42.80586	-107.6291	30	Road in Drainage
181	42.80572	-107.62926	32	Fenceline in Drainage
192	42.80312	-107.62801	29	Fenceline
193	42.80268	-107.62743	26	Fenceline Corner
194	42.8017	-107.62619	41	Air Monitor Tower (on side)
337	42.80666	-107.62944	44	Muck Pond at Fence
338	42.80666	-107.6295	70	Edge of Much Pond
348	42.80315	-107.62805	28	
349	42.80139	-107.62689	65	TP2 Hotspot
350	42.80127	-107.62685	90	105 @ Surface
352	42.80711	-107.62583	36	
352	42.80711	-107.62583	36	
353	42.80698	-107.62572	47	
353	42.80698	-107.62572	47	
354	42.8068	-107.6256	34	
354	42.8068	-107.6256	34	
362	42.80704	-107.62941	38	Haul Road @WSD
<b>AREA 11</b>				
285	42.80915	-107.6368	260	290 @ Surface
286	42.80931	-107.63682	105	
287	42.80925	-107.63667	180	235 @ Surface; Culvert Area
288	42.80917	-107.63673	420	620 @ Surface; 1100 in Hole; Sample 11 0-1 inch; Sample 12 0-15 cm; Sample 13 15-30 cm; Sample 14 @2'3", pH 2 s.u.; Drainage North of Road
289	42.80933	-107.63664	70	
290	42.80927	-107.63678	280	
293	42.80918	-107.63672	420	Gulch
294	42.80901	-107.63634	60	
295	42.80887	-107.63598	42	Road
296	42.8092	-107.63586	50	Road
297	42.80935	-107.63622	75	
298	42.80947	-107.63644	150	North Culvert Gulch
299	42.80968	-107.63685	60	
300	42.80982	-107.63716	60	
301	42.81	-107.63765	48	
302	42.80966	-107.63787	46	Dirt Mound West Road
303	42.80948	-107.63744	60	
304	42.8093	-107.63705	60	Bell Cable Marker
305	42.80918	-107.63689	150	West Edge Drainage
306	42.80904	-107.63683	100	Main Road Edge Culvert
307	42.80908	-107.63663	100	RT Buried Fiber Optic Cable
308	42.80949	-107.63587	50	Under Power Lines
309	42.80952	-107.63635	60	Under Power Lines, East Gulch
310	42.80964	-107.63629	120	Gulch
311	42.80969	-107.63615	100	Gulch
312	42.80981	-107.63612	70	Gulch
313	42.80996	-107.63619	50	Gulch
314	42.81025	-107.63628	50	Gulch
315	42.81026	-107.6362	44	Top of Gulch
316	42.81026	-107.63598	50	Road
317	42.8099	-107.63585	42	
318	42.81087	-107.63554	35	MW-7
319	42.81107	-107.63591	36	
320	42.81121	-107.63634	40	

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**Table 4.1 2015 Gamma Reconnaissance Survey Data**

Waypoint	Latitude	Longitude	Gamma_uR/hr	Comments
321	42.81144	-107.6367	42	
322	42.81153	-107.63691	43	East Edge Drainage
323	42.81165	-107.63693	50	Bottom of Gulch
324	42.81172	-107.63716	40	West Edge Gulch
325	42.81172	-107.63699	50	60 @ Surface/Surface @ Bottom
359	42.80847	-107.62936	34	
360	42.80786	-107.62936	50	East WSD
361	42.80762	-107.62947	50	
362	42.80704	-107.62941	38	Haul Road @WSD
363	42.80731	-107.62952	50	WSD 1/2 Down
364	42.8075	-107.62958	34	WSD Bottom
365	42.80766	-107.6298	55	WSD West Branch
366	42.8074	-107.62994	55	



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**Table 6.1 TP-1 Reclamation Design Cost Estimate (Diversions not included)**

Item No.	Bid Item	Unit	Quantity	Unit Rate	Total
1	Mobilization	LS	1	700,000	\$700,000
2	Topsoil	CY	52,000	\$2.50	\$130,000
3	Unclassified Excavation	CY	675,000	\$2.00	\$1,350,000
4	Finish Grading	AC	105	\$365.00	\$40,000
5	Clay Radon Barrier	CY	50,000	\$10.00	\$500,000
6	Sediment and Erosion Control	LS	1	\$15,000	\$15,000
7	Rock Cap	CY	48,400	\$60.00	\$2,904,000
8	Agricultural Ripping and Disking	AC	105	\$400.00	\$42,000
9	Organic Material	AC	65	\$1000	\$65,000
10	Drill Seeding	AC	65	\$250.00	\$16,250
11	Fencing	LF	9,500	\$6.00	\$57,000
12	Force Account	LS	1	\$50,000	\$50,000
Subtotal					\$5,869,000
Contingency (15%)					\$880,000
Estimated Total					\$6,749,000
Current Year					2026
Inflation (2.5%/year)					\$1,890,000
<b>Final Estimated Total (includes inflation)</b>					<b>\$8,635,000</b>

**Table 6.2 Diversion Hydrology**

Event	Precipitation (inches)	Willow Springs Draw Flow (cfs)	Northeast Diversion	South Diversion	Northwest Diversion
Drainage Area (acres)		3656	132	198	136
PMP (1 hour)	9.22	22,055	831	1245	895
100-year, 24-hour	3.3	3115	197	289	170
50-year, 24-hour	2.6	18388	117	171	100
25-year, 24-hour	2.3	1338	86	126	73
10-year, 24-hour	1.9	753	49	72	41
2-year, 24-hour	1.1	44	2	3	2

**Table 6.3 Willow Springs Draw Diversion Repair Cost Estimate**

Item No.	Bid Item	Unit	Quantity	Unit Rate	Total
1	Mobilization	LS	1	\$70,000	\$70,000
2	Topsoil	CY	19,500	\$2.50	\$48,750
3	Unclassified Excavation	CY	160,000	\$2.00	\$320,000
4	Sediment and Erosion Control	LS	1	\$10,000	\$10,000
5	Agricultural Ripping and Disking	AC	25	\$400.00	\$10,000
6	Drill Seeding	AC	25	\$250.00	\$6,250
7	12-inch Riprap	CY	1,300	\$75.00	\$97,500
8	6 foot x 5 foot Concrete Box Culverts	LF	160	\$375.00	\$60,000
9	Willow Springs Grade Control	EA	5	\$20,000	\$100,000
10	Force Account	LS	1	\$50,000	\$50,000
Subtotal					\$772,500
Contingency (15%)					\$116,000
Estimated Total					\$890,000
Current Year					2026
Inflation (2.5%/year)					\$240,300
<b>Final Estimated Total (includes inflation)</b>					<b>\$1,130,000</b>

ANC URANIUM MILL TAILINGS SITE REPORT OF ENGINEERING EVALUATION / COST ANALYSIS AND  
PRIORITIZATION OF RECLAMATION ACTIVITIES

**Table 6.4 Campsite Draw Repair Cost Estimate**

Item No.	Bid Item	Unit	Quantity	Unit Rate	Total
1	Mobilization	LS	1	\$21,500	\$10,000
3	Unclassified Excavation	CY	5,000	\$2.00	\$10,000
4	Sediment and Erosion Control	LS	1	\$5,000	\$5,000
5	Riprap	CY	750	\$75.00	\$56,000
6	Drill Seeding	AC	2	\$250.00	\$500.00
7	Force Account	LS	1	\$50,000	\$50,000
Subtotal					\$132,000
Contingency (15%)					\$20,000
Estimated Total					\$152,000
Current Year					2026
Inflation (2.5%/year)					\$43,000
<b>Final Estimated Total (includes inflation)</b>					<b>\$195,000</b>

**Table 6.5 Northwest Diversion Cost Estimate**

Item No.	Bid Item	Unit	Quantity	Unit Rate	Total
1	Mobilization	LS	1	\$50,000	\$50,000
2	Topsoil	CY	8,000	\$2.50	\$20,000
3	Unclassified Excavation	CY	210,000	\$2.00	\$420,000
4	Sediment and Erosion Control	LS	1	\$10,000	\$10,000
5	Ripping and Disking*	AC	5	\$400.00	\$2,000
6	Drill Seeding*	AC	5	\$250.00	\$1,250
7	Riprap Structure (grade controls)	EA	5	\$20,000	\$100,000
8	Force Account	LS	1	\$50,000	\$50,000
Subtotal					\$655,000
Contingency (15%)					\$100,000
Estimated Total					\$755,000
Current Year					2026
Inflation (2.5%/year)					\$211,400
<b>Final Estimated Total (includes inflation)</b>					<b>\$966,400</b>

**Table 6.6 South Diversion and Berm Cost Estimate**

Item No.	Bid Item	Unit	Quantity	Unit Rate	Total
1	Mobilization	LS	1	\$44,000	\$44,000
2	Topsoil	CY	13,000	\$2.50	\$32,500
3	Unclassified Excavation	CY	150,000	\$2.00	\$300,000
4	Sediment and Erosion Control	LS	1	\$10,000	\$10,000
5	Riprap Structures	EA	2	\$20,000	\$40,000
6	Agricultural Ripping and Disking	AC	8	\$400.00	\$3,200
7	Drill Seeding	AC	8	\$250.00	\$2,000
8	Force Account	LS	1	\$50,000	\$50,000
Subtotal					\$482,000
Contingency (15%)					\$72,300
Estimated Total					\$554,000
Current Year					2026
Inflation (2.5%/year)					\$155,500
<b>Final Estimated Total (includes inflation)</b>					<b>\$709,500</b>

ANC URANIUM MILL TAILINGS SITE REPORT OF ENGINEERING EVALUATION / COST ANALYSIS AND  
PRIORITIZATION OF RECLAMATION ACTIVITIES

**Table 6.7 Northeast Diversion Cost Estimate**

Item No.	Bid Item	Unit	Quantity	Unit Rate	Total
1	Mobilization	LS	1	\$16,000	\$16,000
2	Topsoil	CY	2,500	\$2.50	\$6,250
3	Unclassified Excavation	CY	22,500	\$2.00	\$45,000
4	Sediment and Erosion Control	LS	1	\$10,000	\$10,000
5	Rock Structures	EA	2	\$20,000	\$40,000
5	Agricultural Ripping and Disking	AC	6	\$400.00	\$2,400
6	Drill Seeding	AC	6	\$250.00	\$1,500
7	Force Account	LS	1	\$50,000	\$50,000
Subtotal					\$171,000
Contingency (15%)					\$26,000
Estimated Total					\$196,000
Current Year					2026
Inflation (2.5%/year)					\$55,000
<b>Final Estimated Total (includes inflation)</b>					<b>\$251,000</b>

ANC URANIUM MILL TAILINGS SITE REPORT OF ENGINEERING EVALUATION / COST ANALYSIS AND  
PRIORITIZATION OF RECLAMATION ACTIVITIES

**Table 7.1 Reclamation Tasks in Order of Priority**

Priority 1	Place 3 feet of Fill on TP-1 and Seed (Base Case)
Priority 2	Place 5 feet of Fill on TP-1 and Seed (Alternate Bid)
Priority 3	Cut Northwest Diversion
Priority 4	Cut Northeast Diversion
Priority 5	Willow Springs Draw Repair
Priority 6	Cut South Diversion
Priority 7	Campsite Draw Repair
Priority 8	Complete 1 through 7
Priority 9	Complete NRC Reclamation (clay cap and total of 10 feet of cover)
Priority 10	Windblown Tailings Delineation and Cleanup
Priority 11	Rebuild Tailings Cover at TP-2

**Table 7.2 What Could be Accomplished with Remaining Funds (Approximately \$635,000)\***

1	Limited Cover Material Suitability Investigation and Reporting (\$45,000)
2	Address Permit Boundary Issue (BLM, Fremont County) (\$10,000)
3	Design (Plans and Specifications) TP-1 cover (\$60,000)
4	Geotechnical Investigations (Compaction Testing) (\$10,000)
5a	Construction Management (\$60,000)
5b	Surveying (\$10,000)
6	Placement of 3 feet (Base Option) of Cover on Top of TP-1 and Seed the Cover (\$427,350)
	<ul style="list-style-type: none"> <li>i. Mob/Demob \$30,000</li> <li>ii. 135,000 CY fill at \$2.30 per CY = \$310,500 (Base Case)</li> <li>iii. Drainage improvements (Force Account) \$30,000</li> <li>iv. Fertilization (27 acres) @ \$1,000 per acre \$27,000</li> <li>v. Seeding (27 acres) @ \$550 per acre \$14,850</li> <li>vi. Fencing at \$15,000</li> </ul>
6a	Placement of 5 feet (Alternate Bid) of Cover on Top of TP-1 and Seed the Cover (\$427,350)
	<ul style="list-style-type: none"> <li>i. Mob/Demob \$30,000</li> <li>ii. 225,000 CY fill at \$1.50 per CY = \$337,500 (Alternative Bid)</li> <li>iii. Drainage improvements (Force Account) \$30,000</li> <li>iv. Seeding (27 acres) @ \$550 per acre \$14,850</li> <li>v. Fencing at \$15,000</li> </ul>
7	Willow Springs Draw Repair (Available funds)
	<ul style="list-style-type: none"> <li>i. Further evaluate rock source (WNI meetings)</li> <li>ii. Address repair options</li> <li>iii. Construction to the extent possible</li> </ul>
8	Groundwater Sampling and Investigations as Budget Allows
<p>* Does not include unspent monies from Task Order 001 and 002 or future Title X reimbursements.  ** The total cost of the first six tasks is \$622,350. In the next Task Order to LA, these estimates will be refined to account for any uncertainties in the field. The remainder of the available funds after accomplishing Tasks 1 through 6 will be used for Tasks 7 and 8.</p>	

ANC URANIUM MILL TAILINGS SITE REPORT OF ENGINEERING EVALUATION / COST ANALYSIS AND  
PRIORITIZATION OF RECLAMATION ACTIVITIES

**Table 8.1 Reclamation Cost Estimate Comparison Matrix**

Estimate Item	2014 NRC Estimate	LA NRC Estimate*	Confidence Range LA Estimate
TP-1, incl. Dam Repair	\$2,621,902	\$6,745,000	\$5.9M- \$9M
Windblown Tailings	\$317,217	\$260,000	0.25M-\$0.5M
Diversions Channels			
TP-2 Rock Aprons	\$708,699	NA	NA
NW Channel		\$755,000	\$0.6M- \$1M
South Channel	\$1,893,163	\$554,000	\$0.5M-\$1M
Northeast Channel		\$196,000	\$0.2M-\$0.5M
Willow Springs Draw	NA	\$890,000	\$0.8-\$1.3M
Campsite Draw	NA	\$152,000	\$0.1M-\$0.3M
TP-2 Repair	\$2,471,750	NA	NA
Long Term Care Boundary Land Purchase	\$708,500	\$270,000	\$0.27-\$1M
Transfer Site to DOE	\$4,000,000	\$4,000,000	\$2M-\$6M
Contingency	\$3,180,300	Included	included
<b>Totals (2016 Price)</b>	<b>15,902,000**</b>	<b>\$13,812,000**</b>	<b>\$12.5-\$14.5M</b>
<b>Totals (2026 Price)***</b>	<b>20,354,000**</b>	<b>\$17,689,000</b>	<b>\$15.8-\$18.5M</b>
Notes: * 2016 cost estimate. ** Less the cost of monitor wells and sampling. *** 2026 costs assume no additional degradation or changes in site conditions from 2016.			

**Table 8.2 Major Differences Between NRC and LA Reclamation Estimates**

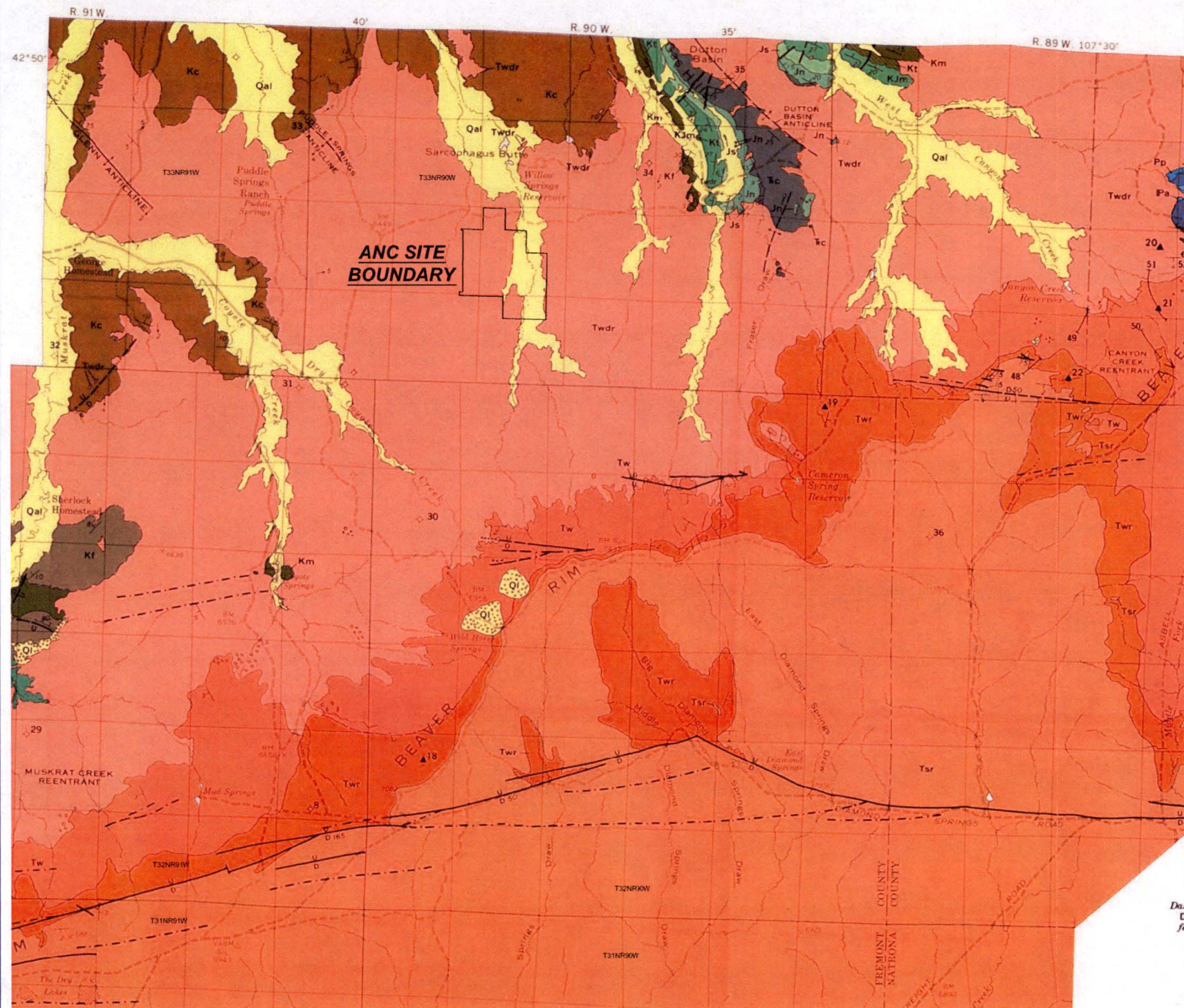
Estimate Item	2015 NRC Estimate	LA NRC Estimate
TP-1, incl. Dam Repair	Unrealistic rock locales and haul distances	No near rock sources; clay cost estimated based on Iron Springs Quarry
Windblown Tailings	Assumes 500 acres needing cleanup	Assumes 130 acres needing cleanup
<b>Diversions</b>		
TP-2 Rock Aprons	Armored aprons needed	Armored aprons not needed
Northwest Channel	Not addressed	Necessary to direct flow around TP-1
South Channel	Not addressed	Necessary to meet PMF requirements
Northeast Channel	Not addressed	Necessary to ensure drainage off TP-1
Willow Springs Draw	No work needed	Necessary to meet PMF requirements
Campsite Draw	No work needed	Additional riprap and failing channel need repair
TP-2 Repair	Assumes major repairs needed	Assumes no work needed
Long Term Care Boundary Land Purchase	Fair Market Value Assumed Acreage not known	Fair Market Value Assumed Acreage not known
Transfer Site to DOE	Assumes NRC numbers acceptable	Assumes NRC numbers
Contingency	25%	15%



## Figures

- Figure 1 Regional Geology and Site Map
- Figure 2 1995 Areas of Potential Windblown Contamination
- Figure 3 1997 Gamma Survey and Soil Sampling Results
- Figure 4 2015 Reconnaissance Gamma Survey
- Figure 5 Quarry Locations
- Figure 6 NRC Tailings Closure and Diversions - Overview
- Figure 7 NRC Tailings Closure and Northwest Diversion - Detail
- Figure 8 Willow Springs Draw Diversion
- Figure 9 South Diversion
- Figure 10 Northeast Diversion
- Figure 11 Profiles and Details





**LEGEND**

**EXPLANATION**

**Contact**  
Dashed where approximately located; dotted where inferred

**Fault**  
Dashed where approximately located; U, upthrown side; D, downthrown side. Number indicates number of feet displacement on downthrown side

**Vertical fault**  
Concealed major Laramide thrust fault  
T, upper plate

**Fracture system, jointing**  
Prominent line on aerial photographs  
Probably indicating trend of fractures and faults; nature and displacement unknown

**Anticline**  
Showing axis and direction of plunge. Dashed where approximately located; dotted where concealed

**Syncline**  
Showing axis and direction of plunge. Dashed where approximately located

**Strike and dip of beds**  
Strike and dip of overturned beds

**Horizontal beds**

**Qal**  
Alluvium, colluvium, slope-wash, and terrace deposits on low surfaces

**Ql**  
Landslide debris  
Composed of formation shown in parentheses

**Qtg**  
Terrace gravel

**Tsr**  
Split Rock Formation

**Twr**  
White River Formation  
Boulder symbol indicates localities where formation contains boulders more than 3 feet in diameter

**Tw**  
Wagon Bed Formation  
Boulder symbol indicates localities where formation contains boulders more than 3 feet in diameter

**Twdr**  
Wind River Formation  
Boulder symbol indicates localities where formation contains boulders more than 3 feet in diameter

**Kc**  
Cody Shale

**Kf**  
Frontier Formation

**Km**  
Mowry Shale

**Kt**  
Thermopolis Shale

**Kmt**  
Mowry and Thermopolis Shales, undivided

**Kjm**  
Cloverly and Morrison Formations, undivided

**Js**  
Sundance Formation

**Jn**  
Nugget Sandstone

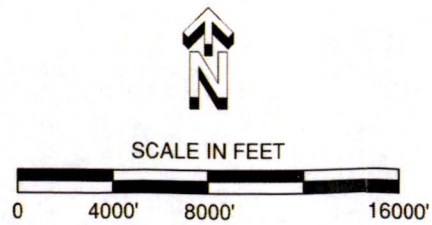
**Jc**  
Chugwater Formation

**Jd**  
Dinwoody Formation

**Pp**  
Phosphoria Formation

**Pst**  
Tensleep Sandstone

**Pa**  
Amsden Formation



**NOTES**

REFERENCE: FROM GEOLOGIC MAP AND SECTIONS OF BEAVER RIM AREA, FREMONT AND NATRONA COUNTIES, WYOMING.

USGS BULLETIN 1164

**Lidstone and Associates, Inc.**  
Engineering, Geology, & Water Resource Consulting

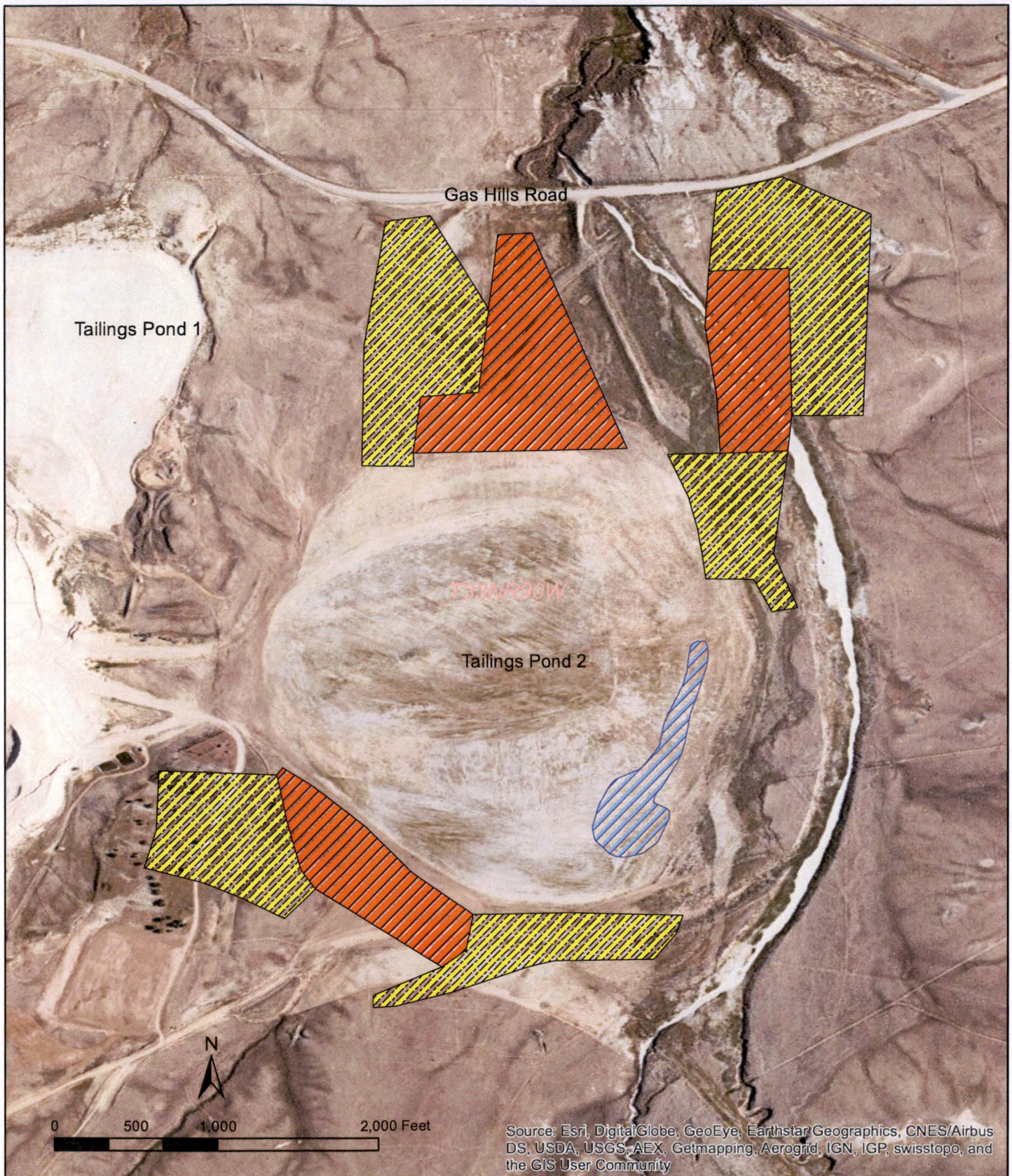
Wyoming Department of Environmental Quality  
Land Quality Division  
American Nuclear Corporation Tailings





PROJECT NUMBER: WYDEQ104	ENGINEER: PRH
DRAWN DATE: 3/9/16	CHECKED: PRH
APPROVED: CDL	
ACAD FILE: WYDEQ104 GEOLOGICAL FIGURES WY83-EF-F1.DWG	

**REGIONAL GEOLOGY AND SITE MAP**

REVISIONS:	<b>FIGURE 1</b>



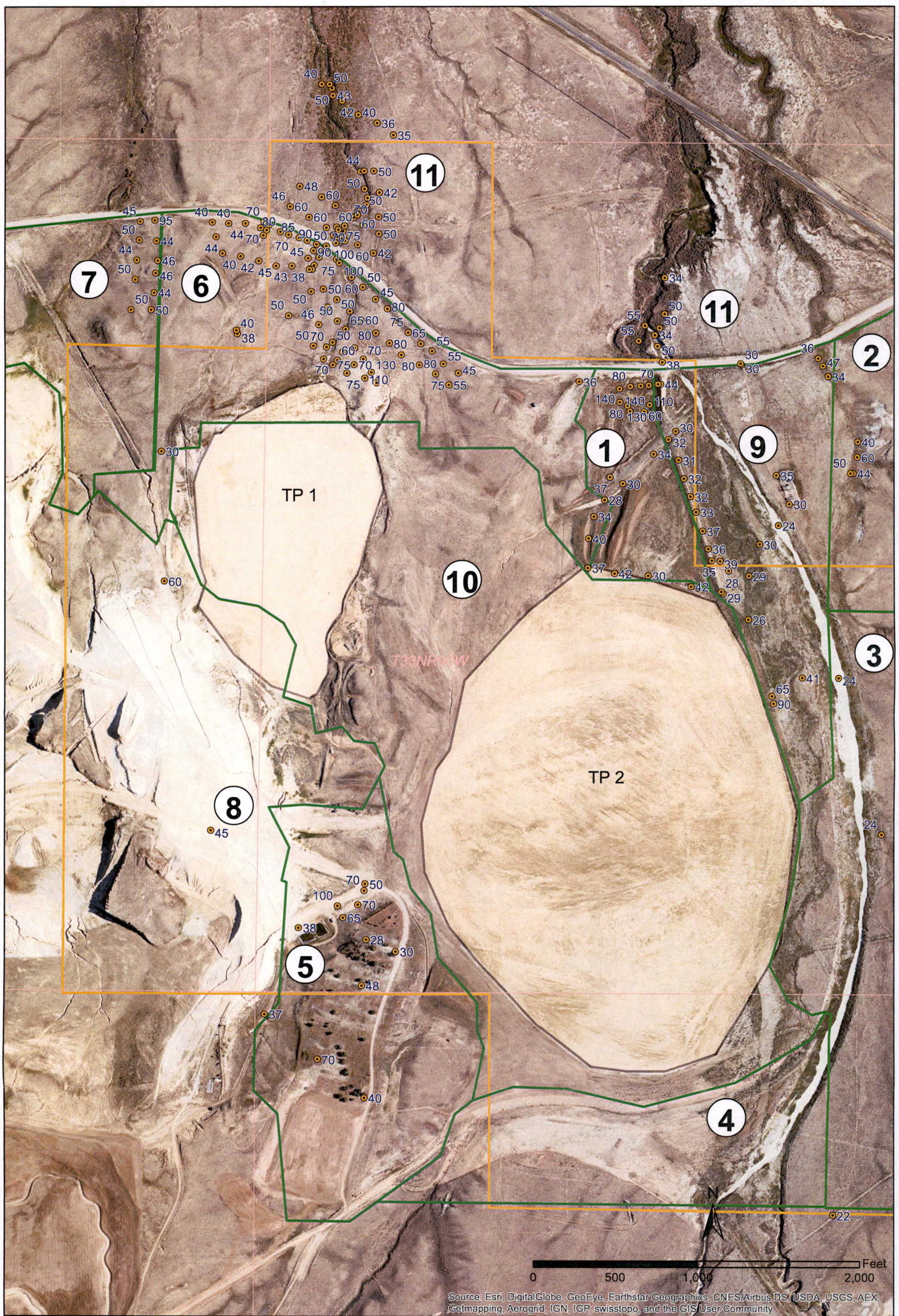


 <p>Lidstone and Associates, Inc. WENCK Lidstone and Associates - A Wenck Company</p>	PROJECT NUMBER	<p><b>Wyoming Department of Environmental Quality Land Quality Division</b></p> <p><b>American Nuclear Corporation Tailings</b></p> <p><b>Figure 2 1995 Areas of Potential Windblown Contamination</b></p>	<p><b>Legend</b></p> <p><b>WINDBLOWN CONTAMINATION AREA LAYER</b></p> <p> +75_mRhr</p> <p> 45-75_mRhr</p> <p> WINDBLOWN PLACEMENT AREA</p>
	DATE:		
	DESIGN:		
	CHECKED:		
	APPROVED:		
	<p><b>WYDEQ104 T2</b></p> <p>3/9/2016 3:19:30 PM</p> <p><b>PRH</b></p> <p><b>PRH</b></p> <p><b>CDL</b></p>		









Document Path: Z:\project\WYDEQ104\TASK ORDER 2\GIS\WYDEQ104 GAMMA READINGS-SOIL-F4-R.mxd

Wyoming Department of Environmental Quality  
Land Quality Division  
American Nuclear Corporation Tailings

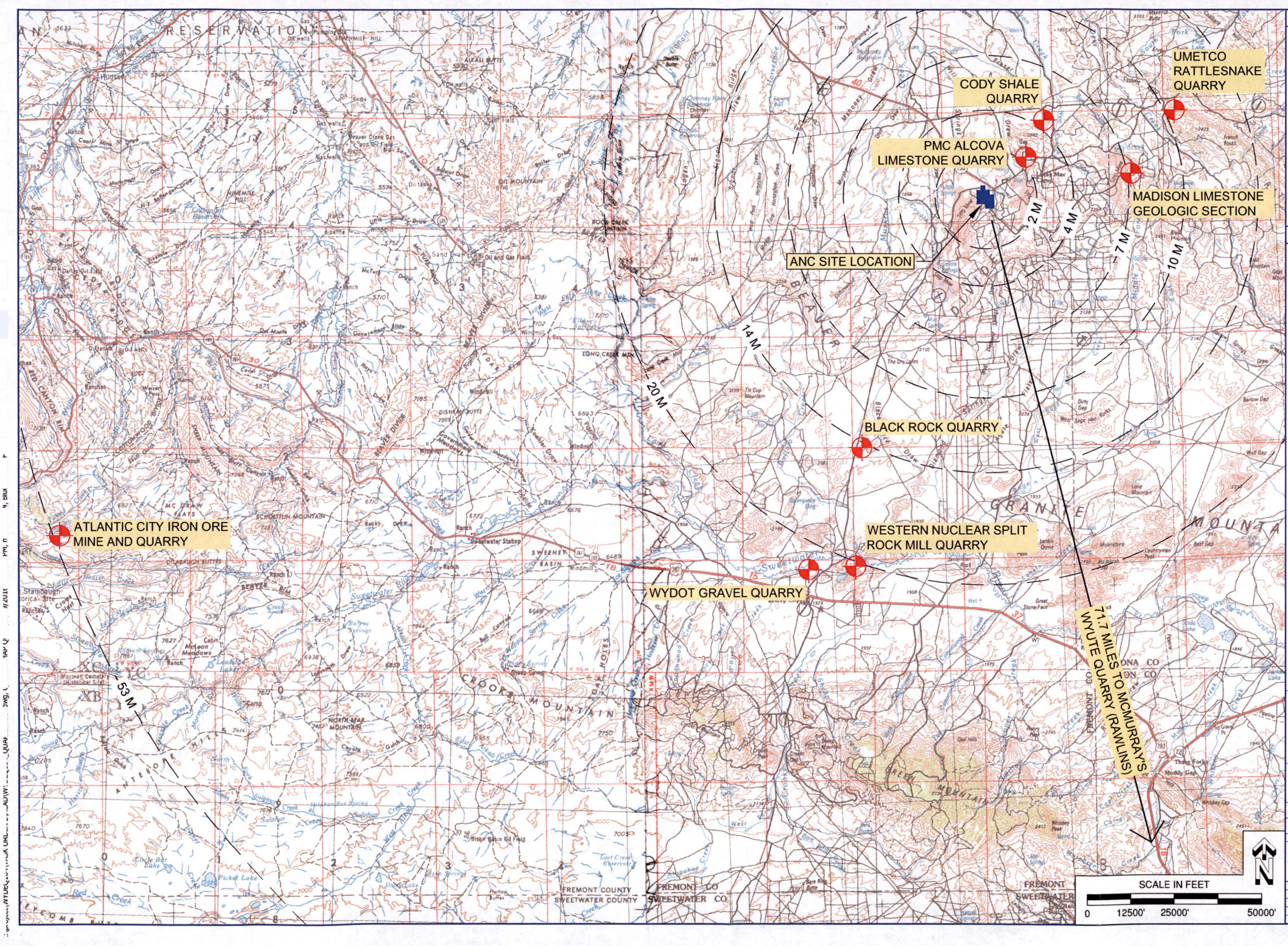
Figure 4  
2015 Reconnaissance Gamma Survey



#### Legend

- SOIL GAMMA READING LOCATION (MICRO R/hr)
- GAMMA SAMPLING AREAS
- ANC PERMIT BOUNDARY
- 4 1997 Areas of Potential Concern





LEGEND

GENERAL NOTES



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PROJECT NUMBER:	WYDEQ104	ENGINEER:	ZSB
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ACAD FILE:	Z:\PROJECT\WYDEQ104\TASK ORDER 24C40\WYDEQ104 QUARRY MAP.DWG	APPROVED:	CDL

QUARRY LOCATIONS

REVISIONS:

FIGURE

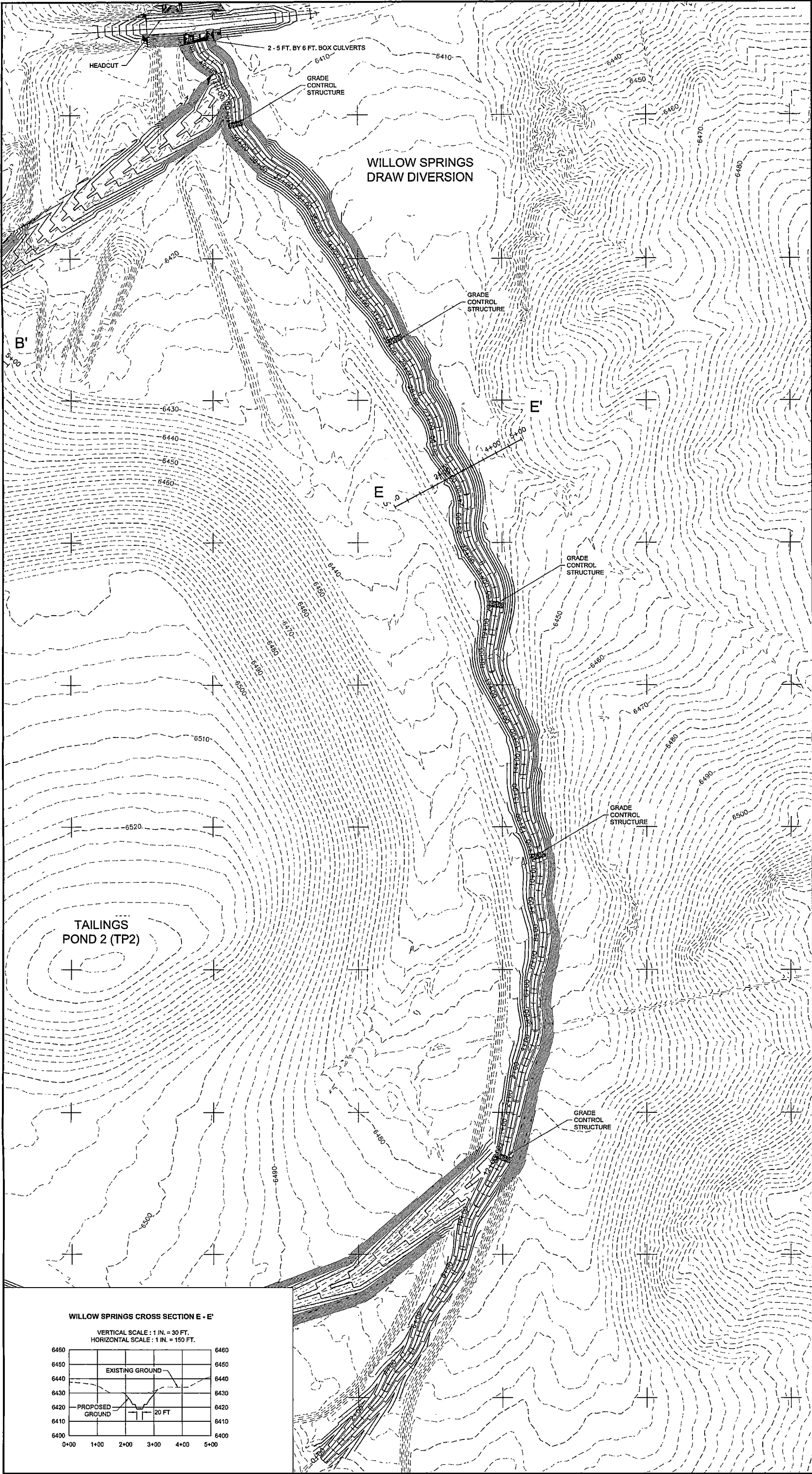
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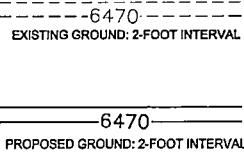








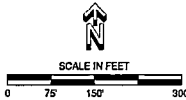
LEGEND



GENERAL NOTES

1. SEE FIGURE 11 FOR DIVERSION CHANNEL ALIGNMENT PROFILE

BASE MAPPING FROM DATA MAP DIGITAL SERVICES, INC., AUGUST 2015



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ACAD FILE:	PROJECT/WORK/FILES/PROJECTS/104/104_000.DWG		

WILLOW SPRINGS DRAW DIVERSION

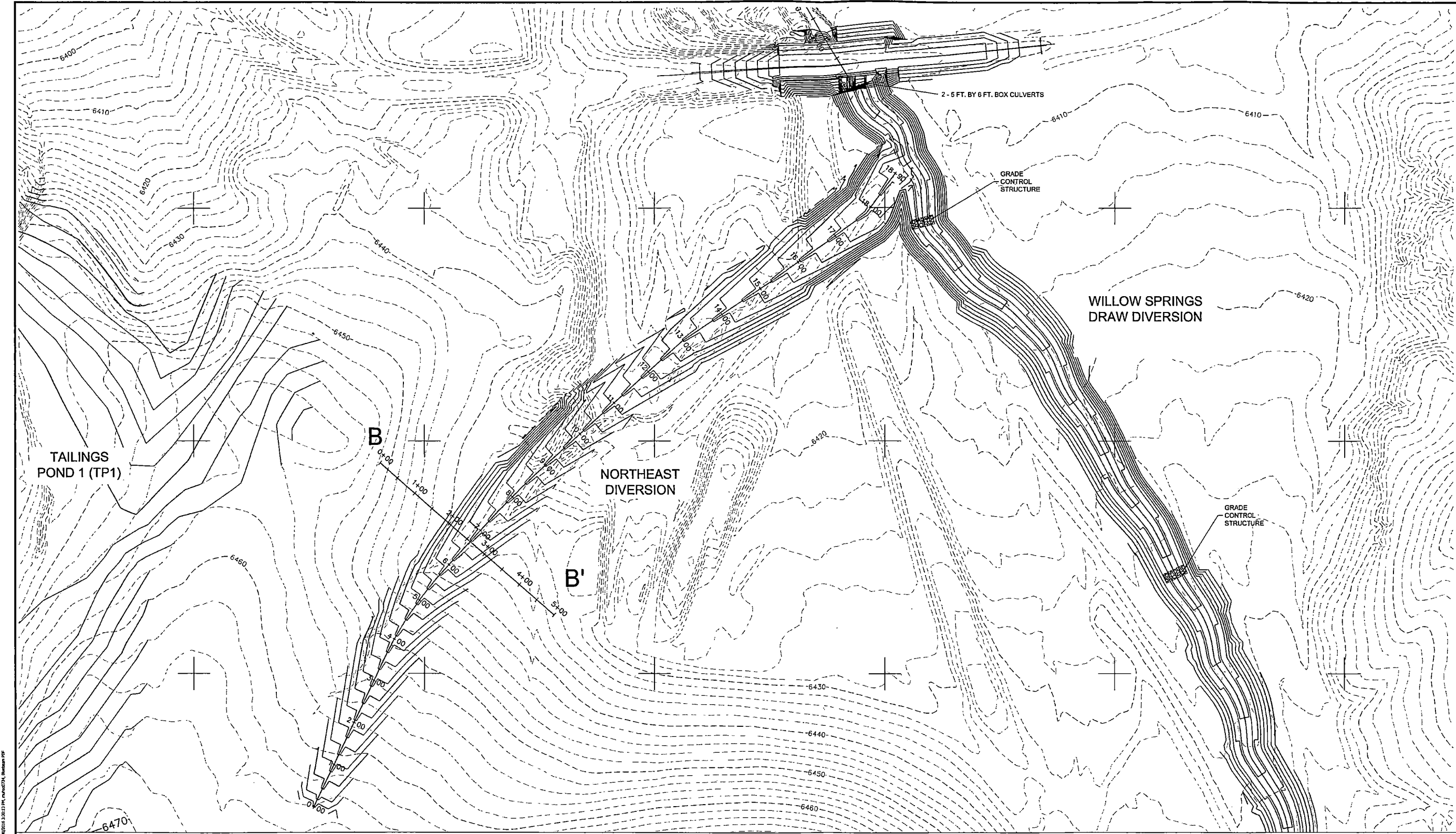
REVISIONS:

FIGURE

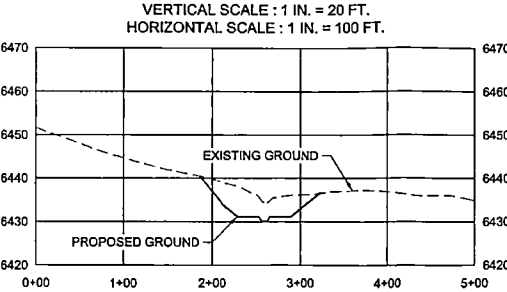
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NORTHEAST DIVERSION CROSS SECTION B - B'



LEGEND

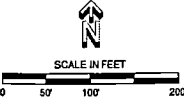
---6470---  
EXISTING GROUND: 2-FOOT INTERVAL

---6470---  
PROPOSED GROUND: 2-FOOT INTERVAL

GENERAL NOTES

1. SEE FIGURE 11 FOR DIVERSION CHANNEL ALIGNMENT PROFILE

BASE MAPPING FROM DATA MAP DIGITAL SERVICES, INC., AUGUST 2015



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Land Quality Division  
American Nuclear Corporation Tailings

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DRAWN/DATE:	3/30/16	CHECKED:	CDL
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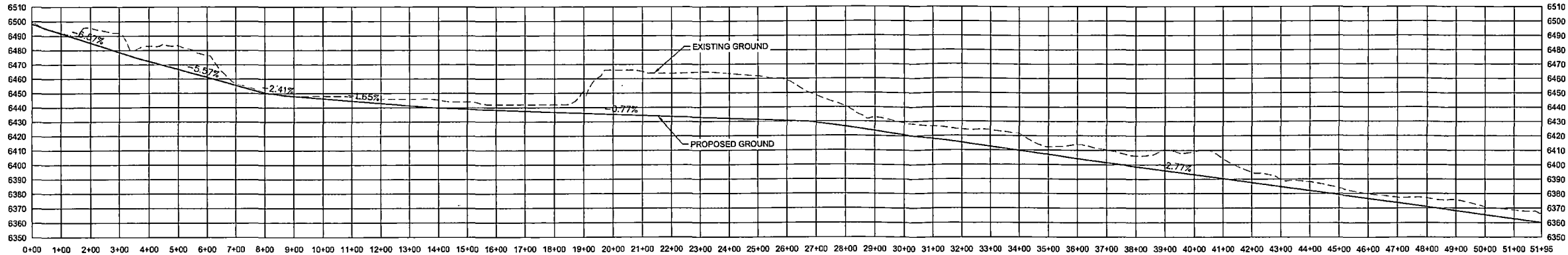
NORTHEAST DIVERSION

REVISIONS:

FIGURE  
10

**NORTHWEST DIVERSION DIVERSION**  
**CHANNEL ALIGNMENT PROFILE**  
(SEE FIGURE 7 FOR PLAN VIEW)

VERTICAL SCALE : 1 IN. = 40 FT.  
HORIZONTAL SCALE : 1 IN. = 200 FT.

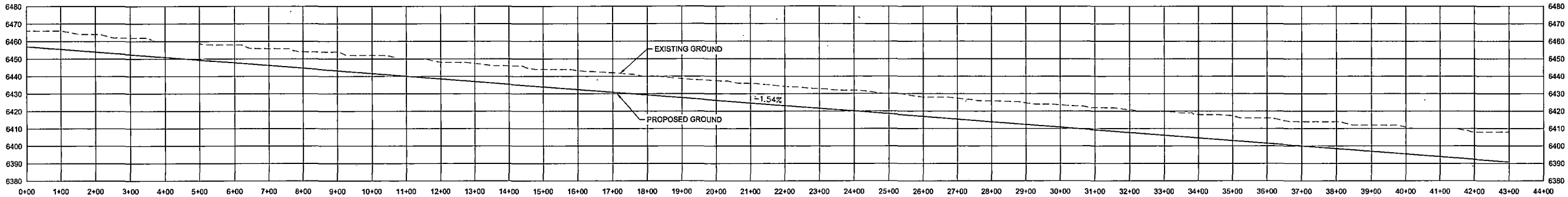


**LEGEND**

**GENERAL NOTES**

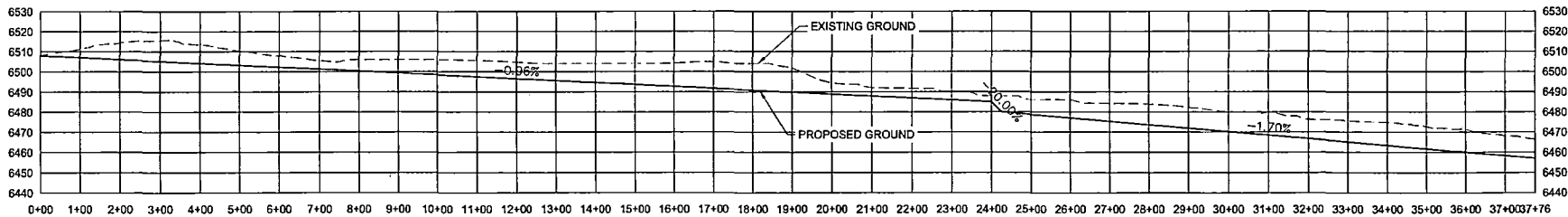
**WILLOW SPRINGS DRAW DIVERSION**  
**CHANNEL ALIGNMENT PROFILE**  
(SEE FIGURE 8 FOR PLAN VIEW)

VERTICAL SCALE : 1 IN. = 30 FT.  
HORIZONTAL SCALE : 1 IN. = 150 FT.



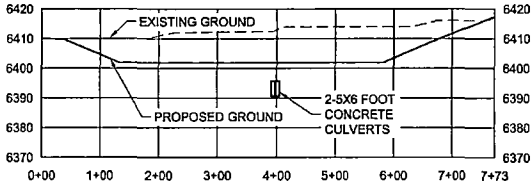
**SOUTH DIVERSION DIVERSION**  
**CHANNEL ALIGNMENT PROFILE**  
(SEE FIGURE 9 FOR PLAN VIEW)

VERTICAL SCALE : 1 IN. = 40 FT.  
HORIZONTAL SCALE : 1 IN. = 200 FT.



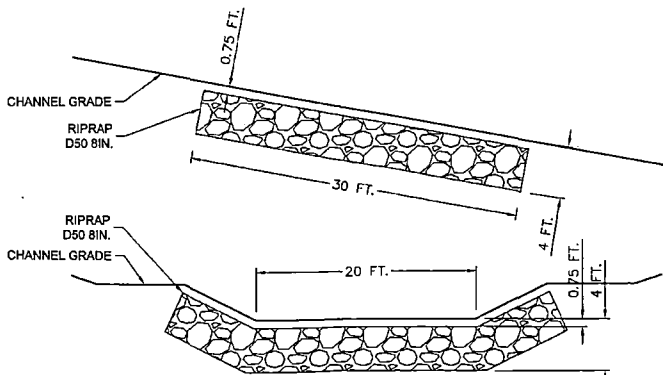
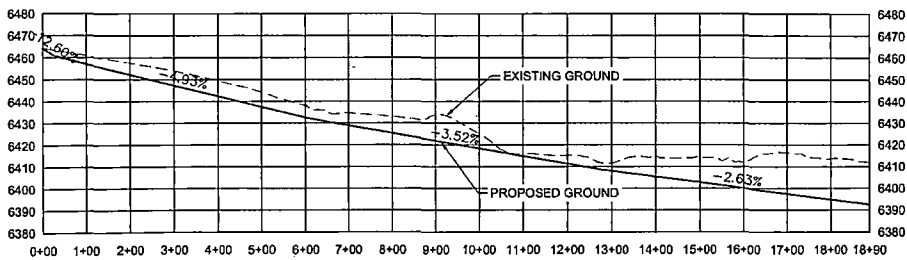
**PROPOSED ROAD CROSSING PROFILE**

VERTICAL SCALE : 1 IN. = 30 FT.  
HORIZONTAL SCALE : 1 IN. = 150 FT.



**NORTHEAST DIVERSION**  
**CHANNEL ALIGNMENT PROFILE**  
(SEE FIGURE 10 FOR PLAN VIEW)

VERTICAL SCALE : 1 IN. = 40 FT.  
HORIZONTAL SCALE : 1 IN. = 200 FT.



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Wyoming Department of Environmental Quality  
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American Nuclear Corporation Tailings

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ACAD FILE: PROJECTS\WYDEQ104\WYDEQ104.dwg APPROVED: CDL

**PROFILES AND DETAILS**

REVISIONS:

FIGURE

11



## Appendices

- Appendix A November 2014 Professional Services Contract  
Task Order 002
- Appendix B January 8, 2015 NRC Letter to WDEQ  
November 2014 NRC Reclamation Cost Estimate
- Appendix C Soils Sample Analysis from ANC TP-1 Drainage



# Appendix A

---

## **November 2014 Professional Services Contract Task Order 002**



**PROFESSIONAL SERVICES CONTRACT BETWEEN  
WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY  
AND LIDSTONE AND ASSOCIATES, INC.**

1. **Parties.** The parties to this Contract are Wyoming Department of Environmental Quality, (Agency), 122 West 25<sup>th</sup> Street, 4W, Cheyenne, Wyoming 82002, and Lidstone and Associates, Inc., (Contractor) whose address for the purposes of this Contract is 4025 Automation Way, Building E, Fort Collins, Colorado, 80525.

2. **Purpose of Contract.** As a result of RFP PS 0694 Contractor shall provide professional engineering, technical, and construction services to complete work associated with the reclamation of the American Nuclear Corporation (ANC) Uranium Mill Tailings site located in the Gas Hills in eastern Fremont County, Wyoming, as described in Attachment A, Scope of Work, Attachment B, Cost Schedule, and this Contract.

3. **Term of Contract and Required Approvals**

A. This Contract is effective when all parties have executed it and all required approvals have been granted (Effective Date). The term of the Contract shall be as stated in the Notice to Proceed. All services shall be completed during this term. This Contract may be renewed by agreement of both parties in writing and subject to the required approvals. There is no right or expectation of renewal and any renewal will be determined at the discretion of Agency.

B. By law, contracts for professional or other services must be approved by the Attorney General and A&I Procurement, Wyo. Stat. § 9-1-403(b)(v), and all contracts for services costing over one thousand five hundred dollars (\$1,500.00) must be approved by the Governor or his designee as well, Wyo. Stat. § 9-2-1016(b)(iv).

4. **Payment**

A. This is a Task Order Contract. All Task Orders will be based on Time and Materials unless stated otherwise in Task Order. The maximum total payment under this Contract shall not exceed one million one hundred ninety-nine thousand one hundred six dollars (\$1,199,106.00). The specified maximum total payment amount is a ceiling, not a guaranteed earning. Agency agrees to pay Contractor for the services described herein and in Attachment A, Scope of Work. Payment will be made for work actually performed at the rates specified in Attachment B, Cost Schedule, which shall be used by Agency to evaluate Task Order costs, invoices and progress. Funding for this project shall be from forfeited performance bonds from ANC, which became insolvent in 1994. **No payment shall be made for services performed before the date Agency issues a written Notice to Proceed.**

**B.** Travel and per diem (meals and incidental expenses) allowance shall not exceed the allowances specified in Wyo. Stat. § 9-3-102. When required to travel on behalf of the State, the Contractor shall be reimbursed at a rate not to exceed the rates specified in Wyo. Stat. § 9-3-103. Per diem will be adjusted based on current state rates at the time an Amendment is issued for this Contract. Per diem shall be charged at 75% of the daily allowable rate for the first and last days of travel, and receipts for per diem are not required. The allowable per diem and mileage rates for this Contract are specified in Attachment B, Cost Schedule. Lodging cost shall be invoiced at the actual rate and the pay request shall be accompanied by a hotel receipt.

**C.** Direct labor costs chargeable to this Contract shall be billed at the rates designated in Attachment B, Cost Schedule, to this Contract. The specified maximum total cost ceiling may not be exceeded without a prior formal written Amendment to this Contract. Direct non-labor costs chargeable to the project include disposable materials, equipment, and services directly required for the performance of this Contract; and other direct costs as allowed in Attachment B, Cost Schedule. Contractor or subcontractors will not receive a markup or handling charge for these items. All overhead costs associated with insurance, purchase and storage of materials or supplies, etc., and all profit shall be included in the Contractor's billing rates. After the Contractor has obtained bids for construction and equipment, an amendment request shall be submitted to the Agency project manager. The amendment request shall identify the amount of markup to be used and the calculation of the markup. No profit shall be realized in the markup. All fees, including profit and overhead, shall be included in the Contractor's standard billing rates. All non-consumable equipment with a purchase price in excess of Five Thousand Dollars (\$5,000.00) and a useful life of greater than one (1) year must receive Agency approval prior to purchase. Reimbursement shall not be allowed for any legal fees or other costs associated with this Contract.

**D.** Contractor shall establish and maintain a procedure for time and cost accounting that assures that direct labor hours and allowable direct costs are properly charged to this Contract. These records shall be available to Agency for audit for a period of three (3) years after completion of the Contract.

**E.** A Contract Payment is the monthly or progress payment payable to Contractor pursuant to a submitted payment request application and in accordance with the Attachment B "Cost Schedule" or as authorized by a Contract Amendment. A pay request shall not exceed the Contract Price. The Contract Price is the total moneys payable to Contractor under the Contract and shall be modified only by written Amendment to the Contract.

**F.** Contractor shall submit payment requests at monthly intervals based on the previous month's work completed. Payment requests shall be submitted to the Agency Project Manager within thirty (30) days of the end of the current billing period. Each request for payment must include: (1) an invoice on Contractor's letterhead, (2) a signed WOLF-102 State of Wyoming Payment Voucher for the amount of payment requested, (3) a Certificate for Payment, and (4) a continuation sheet showing the direct labor and non-labor costs by task for the billing period, cumulative costs to date by task, total budget by task, and budget remaining by task. Agency will



provide formats for these submittals. Note: The Wyoming Accounting System will not process requests for payment that do not include these elements. With all payment requests associated with this Contract, Contractor shall supply a Social Security Number (Sole Proprietor) or Tax Identification Number (Corporation), whichever is applicable.

**G.** Each request for payment shall include a "progress report" and a budget. The progress report shall include at a minimum:

(i) A brief description by major task of the work accomplished during the billing period.

(ii) A brief description by major task of any problems encountered or conditions that may necessitate disclosure under Section 7 of this Contract, Parts C (Changes in Contract Work or Contract Payment Terms) or J (Monitor Activities).

(iii) A brief description of the overall budget with respect to expenditures to date versus the work completed. The discussion shall address overruns in budget tasks and steps that can be taken to complete the work within Contract Price.

(iv) A summary table, charts, or graphs that show by major task the following information:

(a) The current budget

(b) Total expenditure to date

(c) Balance of the budget

(d) Percent of budget expended

(e) Percent of work completed

(f) Other illustrations to show work progress and budget information including, but not limited to, Gantt charts and cost curves.

**H.** Certified payroll required. In accordance with Wyo. Stat. § 16-6-205(b) the Contractor shall submit with each application for payment that includes construction-related work a payroll report for the Contractor and all subcontractors performing construction-related work in a form that is consistent with federally certified reporting requirements and includes residency status for each laborer (defined as any person not identified as a foreman).

I. Upon receipt of a complete and satisfactory payment request, Agency will cause payment to be made not later than forty-five (45) days after receipt of the request. No interest shall be paid on payments that are not made within this time frame.

J. In the event Agency questions a cost or the completeness of a progress report, justification will be requested from Contractor within fifteen (15) business days of receipt. Contractor shall respond to Agency's request within fifteen (15) business days of receipt. Payment may be delayed in whole or in part pending resolution of eligibility or justification.

K. The final payment request may be held by Agency until all work is completed and all submittals delivered and found acceptable.

L. No payment based on a percentage of actual or estimated construction cost shall be made under this Contract per Wyo. Stat. § 9-2-1032(e). There shall be no additional fee, percentage or otherwise, on direct costs or associated general/administrative charges.

M. Payment to Contractor will be made in accordance with provisions and rates set forth in Attachment B, "Cost Schedule," of this Contract. Unless otherwise allowed in Attachment B, "Cost Schedule," provisions shall be made in the Contractor's overhead rate for overtime pay in accordance with the Fair Labor Standards Act.

N. Subcontractors shall be paid within 30 days of receipt of invoice by the subcontractor.

O. **Retainage on Contractor's Construction and Equipment Subcontractors.** Agency will withhold 10% retainage on the Contractor's construction and equipment subcontractor's invoices. Retainage will be released when the Contractor meets substantial completion, which includes successful startup of the remediation systems, submits all lien waivers, and the Agency has advertised the project for 41 days.

5. **Responsibilities of Contractor.** The services to be provided by Contractor are described in Attachment A (Scope of Work), which is attached and made a part of this Contract. Additional responsibilities of the Contractor are described below.

A. **Practice of Professional Engineering and Surveying Services.** Contractor shall certify that any corporation providing professional engineering or land surveying services under this Contract has a certificate of authorization as required by Wyo. Stat. § 33-29-134, and that any individual providing professional engineering or land surveying services under this Contract has a certificate of registration as required by Wyo. Stat. § 33-29-124.

B. **Practice of Professional Geology.** Contractor shall certify that any individual providing Professional Geologist services under this Contract has a certificate of authorization as required by the Wyoming Geologists Practice Act.

C. **Site Visits.** Contractor shall visit the project sites as necessary to accomplish the work.

D. **Memorandum of Record.** Contractor shall make a memorandum of record for each meeting or conference. The memorandum need not be a complete transcript of the meeting, but shall summarize for the record any pertinent questions, instructions, or agreements. Each memorandum shall be numbered consecutively and a copy forwarded promptly to Agency and to each party concerned.

E. **Performance of Work**

(i) Contractor is responsible for the professional quality, technical accuracy, timely completion, and coordination of all designs, drawings, specifications, reports, and other services furnished by Contractor under this Contract. Contractor shall, without additional compensation, correct or revise any errors, omissions, or other deficiencies in designs, drawings, specifications, reports, and other services.

(ii) Agency approval of drawings, designs, specifications, reports, and incidental work or materials furnished hereunder shall not in any way relieve Contractor of responsibility for the technical adequacy of his/her work. Agency review, approval, acceptance, or payment for any of the services shall not be construed as a waiver of any rights under this Contract or of any cause of action arising out of the performance of this Contract.

(iii) Contractor shall be, and shall remain liable, in accordance with applicable law for all damages to the state caused by Contractor's negligent performance of any of the services furnished under this Contract, except for errors, omissions, or other deficiencies to the extent attributable to Agency, Agency-furnished data, or any third party. Contractor shall not be responsible for any time delays in the project caused by circumstances beyond Contractor's control.

(iv) Contractor's obligations under this clause are in addition to Contractor's other express or implied assurances under this Contract or state law and in no way diminish any other rights that Agency may have against Contractor for faulty materials, equipment, or work.

F. **Licenses, Permits and Taxes.** Contractor shall procure all permits and licenses; pay all charges, fees, and taxes; and give all notices necessary and incidental to the due and lawful prosecution of the work. Contractor will be responsible to pay all required federal, state, and local taxes or contributions imposed or required under Unemployment Insurance, Social Security, Income Tax, and Workman's Compensation laws with respect to this Contract.

G. **Access Agreements**

(i) Contractor shall secure the necessary site access for performance of Work on affected third party sites. The access agreement form shall be provided to the Contractor by the Agency project manager. If Contractor has difficulty obtaining an access agreement, the Agency project manager shall be notified. The agreement(s) will be in the name of Agency and will allow access by Agency employees and Agency's independent contractors. Access agreements are not necessary for source sites. However, Contractor shall obtain a signed "Source-Site Grantor Approval of Remediation Wells, Piping, Equipment and Appurtenances on Grantor's Property" agreement from the property owner. The agreement form shall be provided to the Contractor by the Agency Project Manager.

(ii) If wells, piping, enclosures, equipment, appurtenances, etc. are to be placed on a third party site, the Contractor shall obtain a signed "Grantor Approval of Remediation Wells, Piping, Equipment and Appurtenances on Grantor's Property" agreement from the property owner. The agreement form shall be provided to the Contractor by the Agency Project Manager.

(iii) At no additional cost to Agency, Contractor shall provide all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment, provided that Agency must approve operations on these lands as consistent with the overall objectives of this Work.

## **6. Responsibilities of Agency**

**A.** Agency will make available to Contractor copies of any available reports or other information prepared by Agency or by others for Agency concerning the project work, subject to confidentiality, privilege, or other provisions of law. Agency will provide, as available, references to materials that may be useful to the project. Contractor may request Agency to provide the use of any publications or maps available at Agency.

**B.** Agency will review all Contractor's submittals. However, Agency's review of Contractor's submittals is not an endorsement of the submittals.

**C.** Agency will furnish to Contractor the name of the Agency Project Manager responsible for this Project. The Project Manager will be the primary Agency point of contact of the Contractor on all matters concerning this Contract.

**D.** Agency will give prompt written notice to Contractor whenever Agency becomes aware of any development or condition that will affect the scope or timing of Contractor's services.

## **7. Special Provisions**

### **A. Access**

(i) It is expressly agreed by the parties to this Contract that continuation of the Contract is entirely contingent upon continued access to the site(s), which is not under the control of either party to this Contract. The Contractor understands that Agency is relying upon the landowner's or its agent's consent to proceed with the activity covered by the Contract for this project. In the event that access is denied or obstructed by the landowner or its agent, the parties will be released from performance or payment obligations to each other with respect to unperformed services and uncompleted work.

(ii) The Contractor must insure that representatives of the Agency will have access to the project work whenever it is in preparation or progress and must provide proper facilities for such access and inspection. The Contractor will provide Agency and its authorized representative(s) access to any books, documents, plans, reports, papers, and other records of the Contractor that are pertinent to the project. The Contractor must insure that a subagreement will afford access to such project work, sites, documents, and records.

**B. Administration of Federal Funds.** Contractor agrees its use of the funds awarded herein is subject to the Uniform Administrative Requirements of OMB Circulars A-102 and/or 2 C.F.R. Part 215; the cost principles set forth in OMB Circulars A-21, A-87 or A-122 and 48 C.F.R. Part 31; the audit requirements of OMB Circular A-133; and all applicable regulations published in the Code of Federal Regulations or other program guidance as provided to it by Agency.

**C. Changes in Contract Work or Contract Payment Terms.** Any changes in the work or payment terms shall be authorized only by prior written Amendment.

**D. Discovery of Archaeological and Other Historical Items.** In the event of an archaeological find during any phase of the work, the following procedure will be followed:

(i) Work shall be halted, with as little disruption to the archaeological site as possible.

(ii) The Contractor shall notify Agency who shall contact the State Historical Preservation Officer.

(iii) The State Historical Preservation Officer may decide to have an archaeologist inspect the site and make recommendations about the steps needed to protect the site before work is resumed.

(iv) The entire event should be handled as expediently as possible in order to hold the loss in time to a minimum while still protecting archaeological finds.

(v) A similar procedure should be followed with regard to more recent historical resources. Should any artifacts, housing sites, etc., be uncovered, the same procedure should be followed as for an archaeological find.



(vi) In the event archaeological/historical data are evaluated to meet National Register criteria, the Advisory Council on Historic Preservation may be notified and asked to comment by the Wyoming State Revolving Fund Program.

**E. Energy Conservation.** Contractor agrees to complete all activities in accordance with the mandatory standards and policies relating to energy efficiency outlined in the State energy conservation plan issued in compliance with Energy Policy and Conservation Act (P.L. 94-163).

**F. Environmental Policy Acts.** Contractor agrees all activities under this agreement will comply with the Clean Air Act; the Clean Water Act; the National Environmental Policy Act; other related provisions of federal environmental protection laws, rules or regulations; and the Wyoming Department of Environmental Quality Rules and Regulations.

**G. Funding.** Funding for this project is being provided by the State of Wyoming and/or the United States Government. However, neither the United States nor any of its departments, agencies, or employees are party to this Contract.

**H. Human Trafficking.** As required by 22 U.S.C. 7104(g) and 2 C.F.R. Part 175, this agreement may be terminated without penalty if a private entity that receives funds under this agreement:

(i) Engages in severe forms of trafficking in persons during the period of time that the award is in effect;

(ii) Procures a commercial sex act during the period of time that the award is in effect; or

(iii) Uses forced labor in the performance of the award or subawards under the award.

#### **I. Limitation of Payments**

(i) Agency's obligation to pay the Contractor for services rendered pursuant to this Contract is conditioned upon the availability of state or federal government funds that are allocated to pay the Contractor. If funds are not allocated and available for Agency to pay the Contractor for these services, Agency may terminate this Contract at the end of the period for which the funds are available.

(ii) Agency shall notify Contractor at the earliest possible time if this Contract will or may be affected by a shortage of funds. No liability shall accrue to Agency in the event this provision is exercised, and Agency shall not be obligated or liable for any future payments

due or for any damages as a result of termination under this section. This provision shall not be construed so as to permit Agency to terminate this Contract to acquire similar services from another party.

**J. Limitations on Lobbying Activities.** By signing this agreement, Contractor certifies and agrees that payments made from a federal grant shall not be utilized by Contractor or its subcontractors in connection with lobbying Congressmen, or any other federal agency in connection with the award of a federal grant, contract, cooperative agreement, or loan.

**K. Monitoring Activities.** Agency shall have the right to monitor all activities related to this agreement that are performed by Contractor or its subcontractors. This shall include, but not be limited to, the right to make site inspections at any time and with reasonable notice; to bring experts and consultants on site to examine or evaluate completed work or work in progress; to examine the books, ledgers, documents, papers, and records pertinent to this agreement; and, to observe personnel in every phase of performance of the related work.

**L. No Finder's Fees.** No finder's fee, employment agency fee, or other such fee related to the procurement of this Contract shall be paid by either party.

**M. Nondiscrimination.** The Contractor shall comply with the Civil Rights Act of 1964, the Wyoming Fair Employment Practices Act (Wyo. Stat. § 27-9-105 et seq.), the Americans With Disabilities Act (ADA), 42 U.S.C. § 12101, et seq., and the Age Discrimination Act of 1975 and/or any properly promulgated rules and regulations thereto and shall not discriminate against any individual on the grounds of age, sex, color, race, religion, national origin, or disability in connection with the performance under this agreement. Federal law requires the Contractor to include all relevant special provisions of this agreement in every subcontract awarded over Ten Thousand Dollars (\$10,000.00) so that such provisions are binding on each subcontractor.

**N. Notice to Proceed and Health and Safety Plan.** Upon execution of this Contract by both parties and approval by the Wyoming Department of Administration and Information, Division of Procurement Services, Agency will issue to Contractor a written "Notice to Proceed." Following receipt of the written Notice to Proceed, Contractor will submit to the Agency within fifteen (15) days, the Project Management Plan and the Health and Safety Plan. Contractor shall proceed with the tasks and services described in Attachment A, "Scope of Work," upon receipt of Task Orders under this Contract.

**O. Price Reduction for Defective Cost or Pricing Data.** Contractor assures that the cost and pricing data submitted by it, and by its subcontractors, for evaluation with respect to negotiation of prices for negotiated contracts, lower tier subagreements, and amendments are based on current, accurate, and complete data supported by their books and records. If Agency or the federal grantor agency, if applicable, determines that any price (including profit) negotiated in connection with this Contract or lower tier subagreement or amendment thereunder was increased by any significant sums because the data provided was incomplete, inaccurate, or not current at the time

of submission, such price or cost or profit shall be reduced accordingly and the Contractor shall modify the subagreement in writing to reflect such action. Failure to agree on a reduction shall be subject to the remedies clause of this Contract. This paragraph does not apply to contracts and subagreements awarded on the basis of effective price competition. This paragraph applies to:

- (i) Any contract in excess of Twenty-Five Thousand Dollars (\$25,000);
- (ii) Amendments in excess of Five Thousand Dollars (\$5,000) affecting the price of formally advertised, competitively awarded, fixed price contract, or
- (iii) Any lower tier subagreement or purchase order in excess of Five Thousand Dollars (\$5,000) under a subagreement other than a formally advertised, competitively awarded, fixed price subagreement.

**P. Property Management Standards**

(i) Real and Personal Property. Contractor shall comply with property management standards as presented in OMB Common Rule. All property costing Five Hundred Dollars (\$500) or more per unit purchased with Contract funds shall be reported to Agency and remains the property of Agency. Property costing less than Five Hundred Dollars (\$500) per unit purchased with Contract funds and with a fair market value exceeding One Thousand Dollars (\$1,000) in aggregate at the end of the Contract period shall also be reported to Agency and remain the property of Agency. The final report from Contractor shall contain an inventory of all property purchased with Contract funds along with the purchase price and present value.

(ii) Inventions and Patents. If this Contract produces patentable items, patent rights, processes, or inventions in the course of Work, Contractor shall fully and promptly report that fact to Agency. Agency will report said fact to the Federal Grantor Agency. Unless there is a prior agreement between Agency and the Federal agency on the disposition of such items, the Federal agency shall determine whether protection on the invention or discovery shall be sought. The Federal agency will also determine how the rights in the invention or discovery, including rights under any patent issued thereon, shall be allocated and administered in order to protect the public interest consistent with "Government Patent Policy" (President's Memorandum for Heads of Executive Departments and Agencies, August 23, 1971, and statement of Government Patent Policy as printed in 36 FR 16889).

(iii) Patent Fees and Royalties. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work of any invention, design, process, product, or device that is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Contractor its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Contractor to Agency and included in the Contract

Documents. Contractor shall indemnify and hold harmless Agency and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

(iv) If this Contract involves research, developmental, experimental, or demonstration work and any discovery or invention arises or is developed in the course of or under this Contract, such invention or discovery shall be subject to the reporting and right provisions of the "Government Patent Policy" (President's Memorandum for Heads of Executive Departments and Agencies, August 23, 1971, and Statement of Government Patent Policy as printed in 36 CFR 16889). In such case, Contractor shall report the discovery or invention to Agency, and shall otherwise comply with Agency's responsibilities in accordance with applicable federal grantor agency regulations. Contractor hereby agrees that the disposition of rights to inventions made under this Contract shall be in accordance with the terms and conditions of aforementioned applicable Federal Regulations. Contractor shall include provisions appropriate to effectuate the purposes of this condition in all subcontracts involving research, developmental, experimental, or demonstration work.

(v) Copyrights. Except as otherwise provided in the terms and conditions of this Contract, the author or Contractor is free to copyright any books, publications, or other copyrightable materials developed in the course of this Contract, but the Federal agency and Agency shall reserve a royalty-free nonexclusive and irrevocable right to reproduce, publish, or otherwise use, and to authorize others to use the work for official purposes.

(vi) The State of Wyoming shall have unrestricted authority to publish, disclose, distribute, and otherwise use in whole or in part any reports, data, or other materials prepared by Contractor under this Contract. Until the State of Wyoming publishes, discloses, distributes, uses, or makes any of the information developed or compiled by Contractor public, Contractor agrees that the information is confidential and, therefore, will not disclose it.

(vii) Contractor may retain for its use copies of any materials developed under this Contract except as limited by other parts of this Contract.

## **Q. Publicity**

(i) Any publicity given to the program or services provided herein, including, but not limited to, notices, information, pamphlets, press releases, research, reports, signs, and similar public notices prepared by or for the Contractor, and related to the services and work to be performed under this agreement, shall identify Agency as the sponsoring agency and shall not be released without prior written approval from Agency.

(ii) When approached by the media, Contractor may only discuss general technical matters of the system design and operation. This may include the system design and the system purpose, e.g. reduction of product and/or vapors, etc. Any questions related to how the system will affect health and safety will be referred to Agency Project Manager. Any questions about what mitigation actions will be taken in a given situation, or questions concerning remediation program administration, will also be referred to Agency Project Manager. Contractor will notify Agency immediately after any discussion with the media to report the questions asked and the responses given.

**R. Record Keeping.** Contractor agrees to maintain books, records, documents, and other evidence directly related to performance on all activities under this Contract that are supported by state and federal funds in accordance with generally accepted accounting principles and practices consistently applied and:

(i) The Retention and Custodial Requirement For Records specified in the "Common Rule For Uniform Administrative Requirements for Grants and Cooperative Agreements With State And Local Governments," which requires Contractor to retain all financial records, supporting documents, statistical records, and all other records pertinent to this Contract for a period of three (3) years subject to the qualifications contained in paragraph 2, subparagraphs a. through c. of the circular.

(ii) Contractor shall maintain the financial information and data used in its preparation or support of the cost submission required by the state and the federal government (Cost and Price Considerations) in effect on the date of execution of this Contract and a copy of the cost summary submitted to Agency.

(iii) Contractor agrees to provide free access to any pertinent books, documents, and papers to Agency, the Federal Grantor Agency, the Comptroller General of the United States, the United States Department of Labor, or any of their duly authorized representatives for the purposes of inspection, audit, and copying. Contractor agrees to provide proper facilities for such access and inspection.

(iv) Contractor agrees to:

(a) Maintain records that identify adequately the source and applications of funds provided under this Contract (such records shall contain information pertaining to funds awarded and authorizations, obligations, unobligated balances, assets, liabilities, outlays and income);

(b) Maintain effective control over and accountability for all funds, property, and other assets and assure that they are used solely for authorized purposes;



(c) Periodically compare actual project outlays with budgeted amounts in the Contract to determine relation of fiscal information with performance data to insure outlays stay within budget limits;

(d) Establish procedures for determining that all program outlays are costs deemed reasonable, allowable, and allocable as defined in OMB Circular A-87; and

(e) Assure all outlays of state and/or federal funds provided by this Contract are supported by source documentation.

(f) Contractor agrees to include Section 7.Q. of this Contract in all subcontracts in excess of Twenty-Five Thousand Dollars (\$25,000) that are in performance of this Contract.

(v) Contractor agrees to furnish Agency with certified copies of:

(a) Time and distribution records (time sheets) for all personnel that have incurred personal service costs against this Contract; and

(b) Monthly expenditure reports prepared in the normal course of business that relate to expenditures incurred against this Contract.

(c) Contractor further agrees to retain all source documents that substantiate time and costs.

**S. Site Erosion and Sediment Control Measures** Every effort shall be made by the Contractor and subcontractors to prevent and correct problems associated with erosion and runoff processes that could occur during and after project construction. The efforts should be consistent with applicable local ordinances and the Nonpoint Source Pollution Control Guidance. Whenever appropriate, the Contractor's efforts shall reflect the following engineering principles:

(i) When appropriate, land grading and excavating should be kept at a minimum to reduce the possibility of creating runoff and erosion problems that require extensive control measures.

(ii) Whenever possible, topsoil should be removed and stockpiled before grading begins.

(iii) Land exposure should be minimized in terms of area and time.

(iv) Exposed areas subject to erosion should be covered as quickly as possible by means of mulching or vegetation.

- (v) Natural vegetation should be retained whenever feasible.
- (vi) Early completion of stabilized drainage systems (temporary and permanent systems) will substantially reduce erosion potential.
- (vii) Roadways and parking lots should be paved or otherwise stabilized as soon as feasible.
- (viii) Clearing and grading should not be started until a firm construction schedule is known and can be effectively coordinated with grading and clearing activity.

**T. Site Safety Plan and Protection of Property**

(i) Contractor shall implement all necessary state and federal Occupational Health and Safety regulations concerning activities associated with the Work, in accordance with the Site Safety Plan.

(ii) Each person on the project team who will be on site must be current with their OSHA 29 CFR 1910.120 Hazardous Waste Site Worker Training requirements. Each person must have their 8-hour OSHA refresher course within one month of the anniversary date of their previous refresher training.

(iii) Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. To the extent it is within Contractor's control, the Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

(a) All employees on the Work and other persons who may be affected thereby;

(b) All Work and all materials or equipment to be incorporated therein, whether in storage on or off site; and

(c) Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of project activities.

(iv) Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss. Contractor shall erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for its safety and protection. Contractor shall notify owners of adjacent utilities when prosecution of the Work may affect them. All damage, injury, or loss to any property referred to in paragraphs (ii) and (iii) of this clause above,

caused directly or indirectly, in whole or in part, by Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, shall be remedied by Contractor; except damage or loss attributable to acts or omissions of Agency, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is satisfactorily completed.

**U. Small, Minority, and Women Business Enterprises Utilization Requirements of 40 CFR §35.3145(d)**

(i) Requirements. The Contractor will exercise good faith efforts to attract and utilize small, minority, and women's business enterprises primarily through outreach, recruitment, and race/gender neutral activities; at a minimum, fulfillment of the six affirmative steps set forth below:

(a) Including small, minority and women's businesses on solicitation lists;

(b) Assuring that small, minority and women's businesses are solicited whenever they are potential sources;

(c) Dividing total requirements, when economically feasible, into small tasks or quantities to permit maximum participation by small, minority, and women's businesses;

(d) Establishing delivery schedules, when the requirements of the work permit, which will encourage participation by small, minority and women's businesses;

(e) Using the services of the Small Business Administration and the Office of Minority Business Enterprise of the U.S. Department of Commerce, as appropriate; and

(f) Require (a) through (e) above to be taken if subcontracts are awarded.

(ii) Fair Share Objective. The fair share objective for this project is one percent (1%) MBEs and two percent (2%) WBEs.

(iii) Definitions.

(a) Minority Business Enterprise (MBE) is a business concern that is:

(1) Certified as socially and economically disadvantaged by the Small Business Administration;

(A) Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities.

(B) Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to compete in the free enterprise system is impaired due to diminished capital and credit opportunities, as compared to others in the same business area who are not socially disadvantaged. In determining the degree of diminished credit and capital opportunities, the Small Business Administration shall consider, but not be limited to, the assets and net worth of such socially disadvantaged individuals. Individuals who certify that they are members of named groups (Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans), are to be considered socially and economically disadvantaged. Economically and socially disadvantaged individuals are deemed to include women.

(2) Certified as a minority business enterprise by a State or Federal agency; or

(3) An independent business concern which is at least fifty-one (51) percent owned and controlled by minority group member(s).

(A) A minority group member is an individual who is a citizen of the United States and one of the following:

- 1) Black American;
- 2) Hispanic American (with origins from Puerto Rico, Mexico, Cuba, South or Central America);
- 3) Native American (American Indian, Eskimo, Aleut, native Hawaiian); or
- 4) Asian-Pacific American (with origins from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, Taiwan, or the Indian subcontinent).

(B) In order to satisfy this third criteria of the MBE definition, the minority ownership's interest must be real, substantial and continuing. Such interest is characterized by:

1) Risk of loss/share of profit commensurate with the proportional ownership; and

2) Receipt of the customary incidents of ownership, such as compensation (i.e., salary and other personnel compensation).

(C) A minority owner must have and exercise control of the business decisions. Characteristics of control include, but are not limited to:

1) Authority to sign bids and contracts;

2) Decisions in price negotiations;

3) Incurring liabilities for the firm;

4) Final staffing decisions;

5) Policy-making; and

6) General company management decisions.

(D) Only those firms performing a useful business function according to custom and practice in the industry, are qualified as MBEs. Acting merely as a passive conduit of funds to some other firm where such activity is unnecessary to accomplish the project does not constitute a "useful business function according to custom and practice in the industry." The purpose of this approach is to discourage the use of MBE "fronts" and limit the creation of an artificial supplier and broker marketplace.

(b) Women's Business Enterprise (WBE) is a business which is certified as such by a State or Federal agency, or which meets the following definition:

"A women's business enterprise is an independent business concern which is at least 51 percent owned by a woman or women, who also control and operate it. Determination of whether a business is at least 51 percent owned by a woman or otherwise qualified WBE which is 51 percent owned by a married woman in a community property State will not be disqualified because her husband has a 50 percent interest in her share. Similarly, a business which is 51 percent owned by a married man and 49 percent owned by an unmarried woman will not become a qualified WBE by virtue of his wife's 50 percent interest in his share of the business."

As in the case of a MBE, only United States citizens will be deemed to be WBEs. Similar to the MBE criteria, WBE should meet the criteria cited in subparagraphs (iii)(a)(3)(B), (C), and (D).



(c) Fair Share or Fair Share Objective. A fair share or a fair share objective is an amount of funds reasonably commensurate with the total project funding and the availability of qualified MBEs and WBEs, taking into account experience on EPA-funded projects and other comparable projects in the area. A fair share objective does not constitute an absolute requirement, but a commitment on the part of the bidder to exercise good faith efforts as defined in this section to use MBEs and WBEs to achieve the fair share objective.

(d) Small Business (SBE). Any business entity, including its affiliates, that is independently owned and operated, and not dominant in its field of operations in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards set forth in 13 CFR Part 121.

(e) Small Business in a Rural Area. A small business in a rural area (SBRA) is a business entity meeting the definition of a small business, and is located and conducts its principal operations in a geographical area (county) listed in the Small Business Administration's Listing of Non-Metropolitan Counties by State.

(f) Recipient. A party receiving SRF financial assistance.

(g) Project. The scope of work from which an SRF loan is awarded.

(h) Bidder. A party seeking to obtain a contract with a recipient through a competitive, advertised, sealed bid process.

(i) Offeror. A party seeking to obtain a contract with a recipient through a negotiative procurement process.

(j) Prime Contractor. A party that has obtained a contract with a recipient through a competitive, advertised, sealed bid process.

(k) Good Faith Efforts. Good faith efforts by a recipient, prime contractor, and/or bidder/offeror means efforts to attract and utilize SBEs, MBEs, and WBEs primarily through outreach, recruitment, and race/gender neutral activities. The following are examples of activities to assist recipients, prime contractors and/or bidders/offerors to comply with good faith efforts.

(1) Include qualified SBEs, MBEs, and WBEs on solicitation lists.

(A) Maintain and update a listing of qualified SBEs, MBEs, WBEs, and SBRA's that can be solicited for supplies, construction and/or services.

(B) Provide listings to all interested parties who requested copies of the bidding or proposing documents.

(C) Contact appropriate sources within your geographic area and State to identify qualified MBEs and WBEs for placement on your minority and women's business listings.

(D) Utilize other MBE/WBE listings such as those of the State's Minority Business Office, the Small Business Administration, Minority Business Development Agency, US EPA- Office of Small and Disadvantaged Business Utilization (OSDBU) and the Department of Transportation.

(E) Have the State environmental agency personnel review this solicitation list.

(2) Assure that SBEs, MBEs, and WBEs are solicited.

(A) Conduct meetings, conferences, and follow-ups with SBEs, MBEs, WBEs, and SBRAs, small, minority and/or women's business associations, minority media, etc., to inform these groups of opportunities to provide supplies, services, and construction.

(B) MBE Utilization is facilitated if the Contractor advertises through the minority media. Such advertisements may include, but are not limited to, contracting and subcontracting opportunities, hiring and employment, or any other matter related to the project.

(C) Conduct pre-bid, pre-solicitation, and post-award conferences to ensure that consultants, suppliers, and builders solicit SBEs, MBEs, WBEs, and SBRAs.

(D) Provide bidders and offerors with listings of qualified SBEs, MBEs, WBEs, and SBRAs and establish that a fair share of contracts/procurements should be awarded to these groups.

(E) Advertise in general circulation, trade publications, State agency publications of identified source, minority or women's business focused media, etc., concerning contracting opportunities on your projects. Maintain a list of minority or women's business-focused publications that may be utilized to solicit MBEs or WBEs.

(F) Provide interested SBEs, MBEs, WBEs, or SBRAs with adequate information about plans, specifications, timing, and other requirements of the proposed projects.

(G) Provide SBE, SBRA, MBE, or WBE trade organizations with succinct summaries of solicitations.

(H) Notify SBEs, MBEs, WBEs, or SBRAs of future procurement opportunities so that they may establish bidding solicitations and procurement plans.

(3) Divide total requirements when economically feasible, into small tasks or quantities to permit maximum participation of SBEs, MBEs, WBEs, and SBRAs.

(A) Perform an analysis to identify portions of work that can be divided and performed by qualified SBEs, MBEs, WBEs, and SBRAs.

(B) Scrutinize the elements of the total project to develop economically feasible units of work that are within the bonding range of SBEs, MBEs, WBEs, and SBRAs.

(C) Analyze bid packages for compliance with the good faith efforts to afford SBEs, MBEs, WBEs, and SBRAs maximum participation.

(4) Establish delivery schedules, where requirements of the work permit, which will encourage participation by SBEs, MBEs, WBEs and SBRAs.

(A) Consider lead times and scheduling requirements often needed by SBE, MBE, WBE, or SBRA participation.

(B) Develop realistic delivery schedules which may provide for greater SBE, MBE, WBE, or SBRA participation.

(5) Use the services and assistance of the Small Business Administration and the Minority Business Development Agency of the US Department of Commerce, as appropriate.

(A) Use the services of outreach programs sponsored by the Minority Business Development Agency and/or the Small Business Administration to recruit bona fide firms for placement on SBEs', MBEs', WBEs', or SBRAs' bidders' lists to assist these firms in the development of bid packaging.

(B) Seek out Minority Business Development Centers (MBDCs) to assist recipients and prime contractors in identifying MBEs for potential work opportunities on this project.

(iv) Reporting

(a) The Contractor must submit "DBE Notification of Intent to Sub-Contract," to Agency within ten (10) days of Notice of Acceptance of Bid.

(b) Bidders/Offerors shall demonstrate compliance with good faith efforts in order to be deemed responsible. Demonstration of compliance includes completing the "Disadvantaged Business Enterprise - Bidder Good Faith Effort Documentation" form.

**V. Subcontracting**

(i) Contractor shall receive prior written approval from Agency for use of any subcontractors on this project. Identification of sub-contractors in a Task Order constitutes approval. Contractor shall obtain and provide to the Agency Project Manager advance written agreement from every subcontractor to refrain from placing any lien against the project site or project equipment or installations or any other property of the Agency or any third party due to subcontractor's claim(s) against the Contractor for nonpayment or otherwise. Agency approval of subcontractors will not relieve the Contractor from any responsibilities for ultimate compliance with terms and specifications outlined in this Contract.

(ii) Contractor shall be responsible for the Contract performance, whether or not subcontractors are used. Contractor agrees to comply with the procurement regulations that reflect applicable state and local law, rules, and regulations provided that such procurement regulations adhere to the applicable standards set forth in federal regulations, Office of Management and Budget Common Rule.

(iii) Contractor agrees that all subcontracts that are awarded funds provided by this Contract shall include, in addition to provisions to define a sound and complete agreement, the applicable provisions set forth in Federal Regulations, Office of Management and Budget, Common Rule.

(iv) Contractor shall not employ any Subcontractor or other person or organization (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom Agency may have reasonable objection. A Subcontractor or other person or organization identified in writing to Agency by Contractor prior to the Notice of Award and not objected to in writing by Agency prior to the Notice of Award will be deemed acceptable to Agency. Acceptance of any Subcontractor, other person, or organization by Agency shall not constitute a waiver of any right of Agency to reject defective Work or Work not in conformance with the Contract Documents. If Agency, after due investigation, has reasonable



objection to any Subcontractor, other person, or organization proposed by Contractor after the Notice of Award, Contractor shall submit an acceptable substitute. Contractor shall not be required to employ any Subcontractor, other person, or organization against whom it has reasonable objection. Contractor shall not without the consent of Agency make any substitution for any Contractor, other person, or organization that has been accepted by Agency.

(v) Contractor shall be fully responsible for all acts and omissions of its Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that it is responsible for the acts and omissions of persons directly employed by Contractor. Nothing in the Contract Documents shall create any contractual relationship between Agency and any Subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of Agency to pay or to see to the payment of any monies due any Subcontractor or other person or organization, except as may otherwise be required by law. Agency may furnish to any Subcontractor or other person or organization, to the extent practicable, evidence of amounts paid to Contractor on account of specific work done in accordance with the schedule of values.

(vi) Contractor agrees to bind specifically every Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of Agency.

(vii) All Work performed for Contractor by a Subcontractor shall be pursuant to an appropriate agreement between Contractor and the Subcontractor which shall contain provisions that waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by insurance except such rights as they may have to the proceeds of such insurance.

(a) Profits for Subcontractors

(1) Contractor agrees that only fair and reasonable profits may be earned by subcontractors. For the purpose of this Contract, profit included in a formally advertised, competitively bid, fixed price contract (lump sum or unit price) awarded to a low, responsive, responsible bidder is presumed to be reasonable.

(2) Contractor agrees that the objective of negotiations shall be the exercise of sound business judgment and good administrative practice including determination of a fair and reasonable profit based on the subcontractor's assumption of risk and contribution to total performance and not merely the application of a predetermined percentage factor. (Note: For the purpose of this Contract, profit is defined as the net proceeds obtained by deducting all allowable costs, direct and indirect, from the price. Because this definition of profit is based on Federal procurement principles, it may vary from the subcontractor's definition of profit for other purposes). Profit on a subcontract and each amendment to a subcontract should be sufficient to attract a proposer who possesses talents and skills necessary for the accomplishment of project

objectives, and to stimulate efficient and expeditious completion of the project. Where cost review is performed, the estimate of profit should be reviewed by Contractor as are all other elements of price.

(b) Types of Subcontracts

(1) Contractor agrees that the cost-plus-percentage-of-cost and the percentage-of-construction-cost types of subcontracts shall not be used for any subcontract procurement.

(2) Contractor agrees that each formally advertised subcontract will be a fixed price (lump sum or unit price or a combination of the two) contract.

(viii) Cost and Price Considerations for Subcontracts. It is the policy of Agency that the cost or price of all subcontracts shall be considered prior to award or execution.

(a) Contractor is responsible for conducting a cost review of all subcontracts and Contract Amendments of One Hundred Thousand Dollars (\$100,000) or less but in excess of Twenty-Five Thousand Dollars (\$25,000).

(b) Contractor agrees to conduct a cost review of all proposed subcontract costs as follows:

(1) As a minimum, proposed subcontract costs shall be presented on Federal Form, "Cost or Price Summary Format for Subcontracts Under Federal Grants." The selected subcontractor shall certify on this form that proposed costs reflect complete, current, and accurate costs and pricing data applicable to the date of anticipated subcontract award.

(2) In addition to the specific elements of cost, the estimated amount of profit shall be set forth separately in the cost summary for fixed price contracts and a maximum total dollar amount of profit shall be set forth separately in the cost summary for cost reimbursement contracts.

(3) More detailed cost data than is required by the summary format may be required of Contractor to substantiate the reasonableness of proposed subcontract costs. Such detailed documentation is normally required by Agency when the selected subcontractor is unable to certify that the cost and pricing data used are complete, current, and accurate. Agency may, on a selected basis, perform a pre-award cost analysis on any subcontract.

(c) Normally, a provisional overhead rate will be agreed upon prior to contract award.

(ix) Solicitation Statements for Subcontracts

(a) Contractor agrees that invitations for bids or requests for qualifications or proposals will include the following statement, as well as the proposed terms of the subcontract:

"Any contract awarded under this invitation for bids or request for qualifications/proposals is expected to be funded by state funds and/or federal funds. This procurement will be subject to regulations contained within;

(1) The State of Wyoming, Department of Administration and Information, Procurement Services Division's "Administrative Procedures Manual";

(2) The Office of Management and Budget's "Common Rule Uniform Administrative Requirements For Grants and Cooperative Agreements With State and Local Governments";

(3) The Office of Management and Budget Circular A\_87, "Cost Principles Applicable to Grants and Contracts With State and Local Government"; and,

(4) Applicable Federal Grantor Agency Regulations."

(b) Contractor agrees that each subcontract in excess of Twenty-Five Thousand Dollars (\$25,000) must include the provisions contained in all sections of this Contract. If any of the provisions of this Contract cannot be defined adequately for later tasks at the time of subcontract execution, those tasks shall not be included in the Contract initially, but may be the subject of an Amendment when adequate definition is possible.

**W. Suspension and Debarment.** By signing this agreement, Contractor certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction nor from federal financial or non-financial assistance, nor are any of the participants involved in the execution of this agreement suspended, debarred, or voluntarily excluded by any federal department or agency in accordance with Executive Order 12549 (Debarment and Suspension) and CFR 44 Part 17, or are on the disbarred vendors list maintained by the federal government. Further, Contractor agrees to notify Agency by certified mail should it or any of its agents become debarred, suspended, or voluntarily excluded during the term of this agreement.

**X. Suspension of Work.** Agency may, at any time and without cause, suspend the Contract work or any portion thereof for a period of not more than one hundred twenty (120) days by notice in writing to Contractor. Written notice shall be provided not less than seven (7) days prior to date of suspension. The Contract work shall resume after written notice is received from

Agency. Written notice shall be provided not less than seven (7) days prior to date to resume Contract work. Contractor shall resume work on the date so fixed. A retainer shall not be given to Contractor for the time of suspension.

**Y. Violating Facilities (Prohibition Against Listed Violated Facilities).**

**(i) Requirements**

(a) To comply with all the requirements of section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Pub. L. 92-604) and section 308 of the Clean Water Act (33 U.S.C. 1251, as amended), respectively, which relate to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract.

(b) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency list of violating facilities on the date when this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from the listing.

(c) To use his best efforts to comply with clean air and clean water standards at the facilities in which the contract is being performed.

(d) To insert the substance of the provisions of this clause, including this paragraph (d), in any nonexempt subcontract.

**(ii) Definitions**

(a) Air Act means the Clean Air Act, as amended (42 U.S.C. 1857 et seq.).

(b) Water Act means the Clean Water Act, as amended (33 U.S.C. 1251 et seq.).

(c) Clean Air Standards means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 (d) of the Air Act (42 U.S.C. 1857c-5(d)), an approved implementation procedure or plan under section 111 (c) or section 111(d), or an approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

(d) Clean Water Standards means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated under the Water



Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by a local government to ensure compliance with pretreatment regulations as required by section 307 of Water Act (33 U.S.C. 1317).

(e) Compliance means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency in accordance with the requirements of the Air Act or Water Act and regulations.

(f) Facility means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor or subcontractor, to be used in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are located in one geographical area.

**Z. Wyoming Department of Workforce Services, Labor Standards Program Registration.**

(i) The Contractor shall meet all requirements of the Wyoming Preference Act, Wyo. Stat. § 16-6-201, as it relates to the work. The Act applies to all construction-related work completed under this Contract, including but not limited to drilling, trenching, system construction, etc. The Act applies to this Contract and all lower-tier subcontracts.

(ii) The Contractor shall register with the Wyoming Department of Workforce Services before the Notice to Proceed and, in the case of nonresident employers, shall secure the necessary bonding as required by Wyo. Stat. § 27-1-106.

(iii) Pursuant to Wyo. Stat. § 16-6-201, Wyoming labor (defined as all workers not identified as a foreman) shall be used except that other laborers may be used when Wyoming laborers are not available for employment from within the state or are not qualified to perform the work involved. Laborers are required to have 40-hour OSHA Hazwopper (hazardous waste training) certificates with current 8-hour updates to work on this project. Contractor may employ other than Wyoming laborers if the Wyoming Department of Workforce Services office certifies that the need for laborers cannot be filled from those listed as of the date the information is filed. Eleven days before starting work the Contractor shall notify the Department of Workforce Services office nearest where the work is to be completed.

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## 8. General Provisions

**A. Amendments.** Any changes, modifications, revisions, or amendments to this Contract that are mutually agreed upon by the parties to this Contract shall be incorporated by written instrument, executed and signed by all parties to this Contract.

**B. Americans with Disabilities Act.** The Contractor shall not discriminate against a qualified individual with a disability and shall comply with the Americans with Disabilities Act, 42 U.S.C. § 12101, *et seq.*, and any properly promulgated rules and regulations related thereto.

**C. Applicable Law/Venue.** The construction, interpretation, and enforcement of this Contract shall be governed by the laws of the State of Wyoming. The Courts of the State of Wyoming shall have jurisdiction over this Contract and the parties, and the venue shall be First Judicial District, Laramie County, Wyoming.

**D. Assignment/Contract Not Used as Collateral.** Neither party shall assign or otherwise transfer any of the rights or delegate any of the duties set forth in this Contract without the prior written consent of the other party. The Contractor shall not use this Contract, or any portion thereof, for collateral for any financial obligation, without the prior written permission of Agency.

**E. Assumption of Risk.** The Contractor shall assume the risk of any loss of state or federal funding, either administrative or program dollars, due to Contractor's failure to comply with state or federal requirements. Agency shall notify the Contractor of any state or federal determination of noncompliance.

**F. Audit.** Agency and any of its representatives shall have access to any books, documents, papers, and records of Contractor that are pertinent to this Contract. The Contractor shall, immediately upon receiving written instruction from Agency, provide to any independent auditor, accountant, or accounting firm, all books, documents, papers, and records of Contractor that are pertinent to this Contract. Contractor shall cooperate fully with any such independent auditor, accountant, or accounting firm, during the entire course of any audit authorized by Agency.

**G. Award of Related Contracts.** Agency may undertake or award supplemental or successor contracts for work related to this Contract. Contractor shall cooperate fully with other contractors and Agency in all such cases.

**H. Compliance with Law.** Contractor shall keep informed of and comply with all applicable federal, state, and local laws and regulations in the performance of this Contract.

**I. Confidentiality of Information.** All documents, data compilations, reports, computer programs, photographs, and any other work provided to or produced by Contractor in the performance of this Contract shall be kept confidential by Contractor unless written permission is granted by Agency for its release.

**J. Conflicts of Interest.** Contractor shall not engage in providing consultation or representation of clients, agencies, or firms that may constitute a conflict of interest that results in a disadvantage to Agency or a disclosure that would adversely affect the interests of Agency. Contractor shall notify Agency of any potential or actual conflicts of interest arising during the course of the Contractor's performance under this contract. This contract may be terminated in the event a conflict of interest arises. Termination of the contract will be subject to a mutual settlement of accounts. In the event the contract is terminated under this provision, the Contractor shall take steps to insure that the file, evidence, evaluation, and data are provided to Agency or its designee. This does not prohibit or affect the Contractor's ability to engage in consultations, evaluations, or representation under agreement with other agencies, firms, facilities, or attorneys so long as no conflict exists. A conflict of interest warranting termination of the contract includes, but is not necessarily limited to, representing a client in an adversarial proceeding against the State of Wyoming, its agencies, boards, commissions, or the University of Wyoming; or initiating suits in equity including injunctions, declaratory judgments, writs of prohibition, or quo warranto.

**K. Copyright License and Patent Rights.** Contractor acknowledges that EPA, the State of Wyoming, and Agency reserve a royalty-free, non-exclusive, unlimited, and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for federal and state government purposes: (1) the copyright in any work developed under this agreement; and (2) any rights of copyright to which Contractor purchases ownership using funds awarded under this agreement. Contractor must consult with Agency regarding any patent rights that arise from, or are purchased with, funds awarded under this agreement.

**L. Entirety of Contract.** This Contract, consisting of thirty-four (34) pages; Attachment A, Scope of Work, consisting of five (5) pages; and Attachment B, Cost Schedules, consisting of one (1) page, represents the entire and integrated Contract between the parties and supersedes all prior negotiations, representations, and agreements, whether written or oral. In the case of conflict between language in this Contract and that of its attachments, Contract language shall take precedence, followed by Attachment A, then Attachment B.

**M. Ethics.** Contractor shall keep informed of and comply with the Wyoming Ethics and Disclosure Act (Wyo. Stat. § 9-13-101, *et seq.*), and any and all ethical standards governing Contractor's profession.

**N. Force Majeure.** Neither party shall be liable for failure to perform under this Contract, if such failure to perform arises out of causes beyond the control and without the fault or negligence of the nonperforming party. Such causes may include, but are not limited to, acts of God or the public enemy, fires, floods, epidemics, quarantine restrictions, freight embargoes, and unusually severe weather. This provision shall become effective only if the party failing to perform immediately notifies the other party of the extent and nature of the problem, limits delay in performance to that required by the event, and takes all reasonable steps to minimize delays. This

provision shall not be effective unless the failure to perform is beyond the control and without the fault or negligence of the nonperforming party.

**O. Indemnification.** The Contractor shall indemnify, defend, and hold harmless the State, Agency, and their officers, agents, employees, successors, and assignees from any and all claims, lawsuits, losses, and liability arising out of Contractor's failure to perform any of Contractor's duties and obligations hereunder; or in connection with the negligent performance of Contractor's duties or obligations, including but not limited to any claims, lawsuits, losses, or liability arising out of Contractor's malpractice.

**P. Independent Contractor.** The Contractor shall function as an independent contractor for the purposes of this Contract, and shall not be considered an employee of the State of Wyoming for any purpose. Consistent with the express terms of this Contract, Contractor shall be free from direction as to detail of performance of services under this Contract. Contractor shall assume sole responsibility for any debts or liabilities that may be incurred by Contractor in fulfilling the terms of this Contract, and shall be solely responsible for the payment of all federal, state, and local taxes that may accrue because of this Contract. Nothing in this Contract shall be interpreted as authorizing the Contractor or its agents and/or employees to act as an agent or representative for or on behalf of the State of Wyoming or Agency, or to incur any obligation of any kind on the behalf of the State of Wyoming or Agency. Contractor agrees that no health/hospitalization benefits, workers' compensation, unemployment insurance, and/or similar benefits available to State of Wyoming employees will inure to the benefit of the Contractor or the Contractor's agents and/or employees as a result of this Contract.

**Q. Kickbacks.** Contractor certifies and warrants that no gratuities, kickbacks, or contingency fees were paid in connection with this agreement, nor were any fees, commissions, gifts, or other considerations made contingent upon the award of this agreement. If Contractor breaches or violates this warranty, Agency may, at its discretion, terminate this agreement without liability to Agency, or deduct from the agreed upon price or consideration, or otherwise recover, the full amount of any commission, percentage, brokerage, or contingency fee.

**R. Notices.** All notices arising out of, or from, the provisions of this Contract shall be in writing and given to the parties at the address provided under this Contract, either by regular mail or delivery in person.

**S. Notice and Approval of Proposed Sale or Transfer of the Contractor.** Contractor shall provide Agency with the earliest possible advance notice of any proposed sale or transfer or any proposed merger or consolidation of the assets of Contractor. Such notice shall be provided in accordance with the notice provision of this Contract. If Agency determines that the proposed merger, consolidation, sale, or transfer of assets is not consistent with the continued satisfactory performance of Contractor's obligations under this Contract, Agency may, at its option, terminate or renegotiate the Contract.



**T. Ownership of Documents/Work Product/Materials.** All documents, reports, records, field notes, data, samples, specimens, and materials of any kind resulting from performance of this Contract are at all times the property of Agency.

**U. Prior Approval.** This Contract shall not be binding upon either party, no services shall be performed under the terms of this Contract, and the Wyoming State Auditor shall not draw warrants for payment on this Contract until this Contract has been reduced to writing, approved as to form by the Office of the Attorney General, filed with and approved by A&I Procurement, and approved by the Governor of the State of Wyoming or his designee if required by Wyo. Stat. § 9-2-1016(b)(iv)(D).

**V. Proof of Insurance.** Contractor shall not commence work under this Contract until it has obtained all the insurance required by Agency and such insurance has been accepted by Agency. Acceptance of insurance by Agency shall not relieve or decrease the liability of the Contractor. The Contractor shall file a Certificate of Insurance with Agency and A&I Procurement (Herschler Building, Cheyenne, WY 82002) verifying each type of coverage required.

(i) Worker's Compensation and Employers' Liability Insurance. The Contractor shall provide proof of workers' compensation coverage for all its employees who are to work on the project described in this Contract. Contractor's insurance shall include Employer's Liability "Stop Gap" coverage in an amount not less than Five Hundred Thousand Dollars (\$500,000.00) per employee for each accident and disease. The Contractor shall also supply to A&I Procurement proof of worker's compensation and employer's liability insurance on each and every subcontractor before allowing that subcontractor on the job site. Proof of Worker's Compensation insurance may be in the form of a "Letter of Good Standing" from the Wyoming Workers' Compensation Division (307-777-6763). Requests for Certificates of Good Standing can now be made online at the website maintained by the relevant state government office. If the Contractor is not a Wyoming firm, Contractor shall provide proof of good standing from the Worker's Compensation Division in the state where the Contractor resides.

(ii) Commercial General Liability Insurance. The Contractor shall provide coverage, during the entire term of the Contract, against claims arising out of bodily injury, death, damage to or destruction of the property of others, including loss of use thereof, and including underground, collapse and explosion (XCU) and products and completed operations, in an amount not less than One Million Dollars (\$1,000,000.00) per occurrence and Two Million Dollars (\$2,000,000.00) general aggregate.

(iii) Business Automobile Liability. The Contractor shall maintain, during the entire term of the Contract, automobile liability insurance in an amount not less than Five Hundred Thousand Dollars (\$500,000.00) per occurrence.

(iv) Professional Liability or Errors and Omissions Liability Insurance. The Contractor shall provide proof of professional liability insurance or errors and omissions liability

insurance to protect against any and all claims arising from the Contractor's alleged or real professional errors, omissions, or mistakes in the performance of professional duties in an amount not less than Five Hundred Thousand Dollars (\$500,000.00).

(v) Unemployment Insurance. The Contractor shall be duly registered with the Employment Security Commission, Unemployment Compensation Division. The Contractor shall provide a "Letter of Good Standing" from the Department of Employment (307-235-3200) indicating that the Contractor is in compliance with the Wyoming Employment Security Law. Contractor shall provide a similar "Letter of Good Standing" on each and every subcontractor before beginning work under this Contract. If the Contractor is not a Wyoming firm, Contractor shall provide similar proof of good standing from the state in which the Contractor resides.

(vi) Payment of Premiums and Notice of Revocation. All policies required under this Contract shall be in effect for the duration of this Contract and project. All policies shall be primary and not contributory. Contractor shall pay the premiums on all insurance policies and all insurance certificates must include a clause stating that the insurance may not be revoked, canceled, amended, or allowed to lapse until the expiration of at least thirty (30) days advance written notice to Agency.

(vii) Agency May Insure for Contractor. In case of the breach of any provision of this Section, Agency may, at Agency's option, purchase and maintain, at the expense of the Contractor, such insurance in the name of the Contractor, or subcontractor, as Agency may deem proper and may deduct the cost of obtaining and maintaining such insurance from any sums that may be found to be due or become due to the Contractor under this Contract.

(viii) Agency's Right to Reject. The state reserves the right to reject a certificate of insurance, if the Contractor's insurance company is widely regarded in the insurance industry as financially unstable. This includes, but is not limited to, insurance companies with an "Omit" rating in the A.M. Best insurance rating guide.

(ix) Agency's Right to Contact Insurer. Agency shall have the right to consult with the Contractor's insurance agent for disclosure of relevant policy information. Relevant information includes, but is not limited to:

- (a) Exclusions, and
- (b) Claims in progress that could significantly reduce the annual aggregate limit.

(x) With the exception of Professional Liability, "Claims made" policies will not be accepted by Agency.

**W. Severability.** Should any portion of this Contract be judicially determined to be illegal or unenforceable, the remainder of the Contract shall continue in full force and effect, and either party may renegotiate the terms affected by the severance.

**X. Sovereign Immunity.** The State of Wyoming and Agency do not waive sovereign immunity by entering into this Contract and specifically retain all immunities and defenses available to them as sovereigns pursuant to Wyo. Stat. § 1-39-104(a) and all other applicable law. Designations of venue, choice of law, enforcement actions, and similar provisions should not be construed as a waiver of sovereign immunity. The parties agree that any ambiguity in this Contract shall not be strictly construed, either against or for either party, except that any ambiguity as to sovereign immunity shall be construed in favor of sovereign immunity.

**Y. Taxes**

(i) Contractor shall pay all taxes and other such amounts required by federal, state, and local law, including but not limited to federal income and social security taxes, workers' compensation, unemployment insurance, and sales taxes.

(ii) Non-resident firms must register the project with the Wyoming Department of Revenue (DOR). Resident firms using non-resident subcontractors or using resident subcontractors using non-resident subcontractors must register the project with the DOR. Contractor must retain 4% of payment to non-resident subcontractors and notify DOR when the project is complete. DOR will notify the Contractor when retainage can be released to the subcontractors.

**Z. Termination of Contract.** This Contract may be terminated without cause by Agency upon thirty (30) day's written notice. This Contract may be terminated immediately for cause by Agency if the Contractor fails to perform in accordance with the terms and conditions of this Contract. Should the Contractor fail to perform in a manner consistent with the terms and conditions set forth in this Contract, payment under this Contract may be withheld until such time as the Contractor performs its duties and responsibilities.

**AA. Third Party Beneficiary Rights.** The parties do not intend to create in any other individual or entity the status of third party beneficiary and this Contract shall not be construed so as to create such status. The rights, duties, and obligations contained in this Contract shall operate only between the parties to this Contract and shall inure solely to the benefit of the parties to this Contract. The provisions of this Contract are intended only to assist the parties in determining and performing their obligations under this Contract. The parties to this Contract intend and expressly agree that only parties signatory to this Contract shall have any legal or equitable right to seek to enforce this Contract, to seek any remedy arising out of a party's performance or failure to perform any term or condition of this contract, or to bring an action for the breach of this Contract.

**BB. Time is of the Essence.** Time is of the essence in all provisions of the Contract.

**CC. Titles Not Controlling.** Titles of paragraphs are for reference only and shall not be used to construe the language in this Contract.

**DD. Waiver.** The waiver of any breach of any term or condition in this Contract shall not be deemed a waiver of any prior or subsequent breach. Failure to object to a breach shall not be deemed to be a waiver.

**EE. Wyoming Department of Employment, Labor Standards Program Registration.**

(i) The Contractor's construction subcontractor shall register with the Wyoming Department of Employment, Worker's Safety and Compensation Division before the Notice to Proceed and, in the case of nonresident employers, shall secure the necessary bonding as required by Wyo. § 27-1-106.

(ii) In accordance with W.S. 16-6-201, Wyoming labor shall be used except other laborers may be used when Wyoming laborers are not available for the employment from within the state or are not qualified to perform the work involved. Contractor's subcontractor may employ other than Wyoming laborers if the state employment office certifies that the need for laborers cannot be filled from those listed as of the date the information is filed. Before starting work the Contractor's construction subcontractor shall notify the employment office nearest where the work is to be completed.

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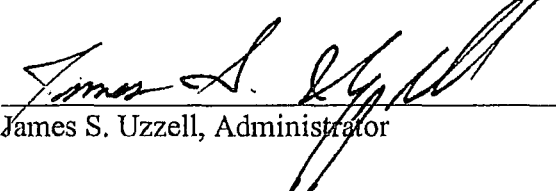


9. **Signatures.** By signing this Contract, the parties certify that they have read and understood it, that they agree to be bound by the terms of the Contract, and that they have the authority to sign it.

This Contract is not binding on either party until approved by A&I Procurement and the Governor of the State of Wyoming or his designee if required by Wyo. Stat. § 9-2-1016(b)(iv).

The effective date of this Contract is the date of the signature last affixed to this page.

**WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY:**

  
James S. Uzzell, Administrator


11/06/14  
Date

**LAND QUALITY DIVISION:**

  
Nancy Nuttbrock, Administrator

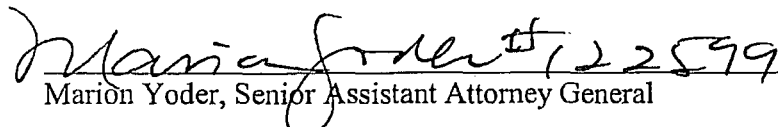
11/3/14  
Date

**LIDSTONE AND ASSOCIATES, INC.:**

  
Christopher D. Lidstone, President

11/06/14  
Date

**ATTORNEY GENERAL'S OFFICE APPROVAL AS TO FORM:**

 #122599  
Marion Yoder, Senior Assistant Attorney General

Oct. 23, 2014  
Date

**ATTACHMENT A  
SCOPE OF WORK  
American Nuclear Corporation (ANC) Uranium Mill Tailings Site - PS 0694**

**PROJECT GOALS**

- Goal 1:** Collect additional data for the characterization of the Site hydrogeology that includes installation of additional groundwater monitor wells, collect and analyze hydrology data, and provide technical reports summarizing the findings.
- Goal 2:** Develop and recommend plans that would prioritize, based upon DEQ parameters, the best use of the available budget to reclaim the Site.
- Goal 3:** Implement and/or oversee the reclamation activities, if any.
- Goal 4:** Provide other professional, technical and/or construction services as deemed reasonable and necessary for the project within the scope, and budget.

The Agency understands that the entire plan associated with Goals 2, 3 and 4 cannot be determined, developed and implemented until all of the relevant data is obtained. Therefore, the focus of this Scope of Work (SOW) will be limited to a detailed proposal to address Goal 1 and a broad discussion of a conceptual plan for Goals 2, 3 and 4.

The Contractor shall work with the Agency for the entire project duration addressing all the above four goals. Subsequent to the completion of Goal 1, the scope of work and tasks associated with Goals 2, 3 and 4 shall be identified and developed by the Contractor and the Agency. Subsequent to the completion of Task Order #1 by the Contractor, the Agency intends to issue additional written Task Orders necessary to complete the project within the scope and budget. These subsequent Task Orders will be based on a clearly defined scope of work and schedule to address Goals 2, 3 and 4.

**OBJECTIVES**

- Objective 1:** The first objective of this project is to provide a current, accurate site conceptual model defining the horizontal and vertical extent and nature of the contamination that originated from ANC tailing ponds. This proposed hydrogeologic investigation at the ANC Site would need to determine the hydrogeologic setting and controls associated with the current migration rate (if any) of the contaminated groundwater. Details of the scope and deliverables are listed below.

**TASKS**

- Task 1:** Provide recommendations on the proposed groundwater monitor well and surface water sample collection locations:
1. Conduct a site visit to assess current conditions.
  2. Review existing data and reports to identify data gaps and determine how to meet the requirements of Objective 1.

3. Prepare an Investigation Work Plan (IWP) designed to meet Objective 1 that includes a detailed description of project design, project plans, and project management.
4. Installation of permanent groundwater monitoring wells needed to delineate sources and determine the groundwater flow direction in the investigation area. Monitoring well construction must satisfy the requirements of Chapter 26 of the Water Quality Division Rules and Regulations. Include field data that will be collected during well installation and any proposed soil collection and sampling activities. Include the estimated depth of wells and well completion and development procedures. The Agency understands that an exact number of wells and locations cannot be determined until all of the preliminary data is obtained, however provide a general estimate based on current data and a cost per well in the interview.
5. Provide any other data collection technologies that will assist in meeting the goals of Objective 1.

**Task 2:** Drilling and installation of groundwater monitor wells at the Site in the Agency approved locations identified from Task 1:

1. Contract a State of Wyoming licensed drilling contractor.
2. Oversee the drilling, installation and development of the groundwater monitor wells that can provide groundwater level and groundwater quality data.
3. Each well (including existing monitor wells) shall be surveyed for horizontal location in latitude/longitude coordinates to six decimal degrees of accuracy and referenced to NAD1983, top of casing (measuring point) elevation (in feet mean sea level to the nearest 0.01 foot), and ground surface elevation (in feet mean sea level to 0.1 foot).
4. Provide field data that will be collected during the well installations and any proposed soil collection and sampling activities. The contractor shall provide an accurate log of each borehole. This documentation shall be provided by, or under the direct supervision of, a Wyoming licensed Professional Geologist.
5. The Contractor shall be responsible for acquiring all applicable permits, and meeting all requirements to carry out the drilling, installation and sampling of the monitor wells.
6. Description of the planned storage, characterization, and disposal of Investigation Derived Waste generated at the site during investigation activities.

**Task 3:** Provide data on groundwater levels, groundwater quality and surface water quality:

1. Propose a detailed sampling plan (including the groundwater quality parameters) to determine the lateral and vertical extent of groundwater contamination.



2. Please include cost per sample in the Cost Proposal and a proposed schedule for sampling.

3. Prepare a Quality Assurance/Quality Control (QA/QC) Plan document, to be included in the work plan. The QA/QC should include the procedures for collection of QA/QC samples, and completion of data evaluation on samples collected for the project. All handling procedures must be carefully established, followed, and recorded. Proper chain-of-custody (COC) procedures must be followed. Field blanks, duplicate samples, trip blanks, laboratory spikes, etc. will be utilized as part of the QA/QC program. The Contractor must supply all COC reports and lab reports, including QA/QC reports, to Agency in the applicable report.

**Task 4:** Provide a technical report that summarizes and interprets the information collected in Tasks 1, 2 and 3:

1. Preparation and submittal of a final report that documents all activities conducted in Tasks 1, 2 and 3.

2. The technical report should clearly address all the requirements of Objective 1.

3. Hydrogeologic interpretation of the extent of the groundwater contamination including a revised interpretation of the map presented in the 2014 Agency technical analysis.

4. Include analytical data, documentation and log books for field activities, including maps with GPS coordinates of the well locations, borehole documentation, well completion diagrams and all other applicable information.

5. The report should include a recommendation for next steps, identified data gaps (if any) and future steps to address project Goals 2, 3 and 4.

**Task 5:** Participate in the meetings with the Agency and the NRC staff during the project period.

1. Participate in specific monthly phone calls with the NRC as requested.

2. Attend the scheduled site visits with the LQD and NRC staff as requested

3. Prepare a presentation on the results of the study to the Agency and NRC before the finalization of the technical report.

**Objective 2:** The Agency understands that Goals 2, 3 and 4 cannot be addressed until the Contractor completes Objective 1 and participates in a series of discussions with the Agency and the NRC. The intent is to get a preliminary presentation of the methodology to address Goals 2, 3 and 4 of the project based on the experience of the consultant with sites that had a regulatory framework similar to this project.

1. Describe any proposed cost saving measures to address the project goals based on past experience.

**Project Management and Qualifications of Key Personnel:** Submit a Project Management Plan that identifies key project personnel, equipment, and major subcontractors anticipated for use on this project. Include, at a minimum, project director, project manager, project engineer/geologist, key field personnel, subcontractors, and equipment. The Agency will require a Wyoming Professional Engineer and a Wyoming Professional Geologist to assist in preparation of project plans, and to review all applicable activities under this SOW.

**Additional Considerations:**

1. Contractor and subcontractors are not authorized to act as agents of Agency, but rather, are to engage in communication with third parties strictly in performance of their duties as negotiated in the contract.

**Removal of Equipment When No Longer Necessary.** Equipment utilized by the contractor and/or subcontractors will be removed from the site within 48 hours when the Agency project manager notifies Contractor in writing, that there is no further need for the equipment.

**Changes in Key Contractor Personnel:** If key personnel originally identified by name by the Contractor (or subcontractor) in the proposal are replaced by another employee, this change in staffing must be approved by the Agency project manager prior to the change going into effect. If the staff change is not approved by the Agency project manager and no other qualified staff is available for consideration, as determined by the Agency project manager, the contract may be terminated for cause at the Agency project manager's discretion.

**Site Erosion and Sediment Control Measures:** Every effort shall be made by the Contractor and subcontractors to prevent and correct problems associated with erosion and runoff processes that could occur during and after project construction. The efforts should be consistent with applicable local ordinances and the Nonpoint Source Pollution Control Guidance. Where applicable, the Contractor shall obtain a Storm Water Permit from the WDEQ/WQD. Whenever appropriate, the Contractor's efforts shall reflect the following engineering principles:

- (i) When appropriate, land grading and excavating should be kept at a minimum to reduce the possibility of creating runoff and erosion problems that require extensive control measures.
- (ii) Whenever possible, topsoil should be removed and stockpiled before grading begins.
- (iii) Land exposure should be minimized in terms of area and time.
- (iv) Exposed areas subject to erosion should be covered as quickly as possible by means of mulching or vegetation.
- (v) Natural vegetation should be retained whenever feasible.
- (vi) Early completion of stabilized drainage systems (temporary and permanent systems) will substantially reduce erosion potential.

- (vii) Roadways and parking lots should be paved or otherwise stabilized as soon as feasible where needed.
- (viii) Clearing and grading should not be started until a firm construction schedule is known and can be effectively coordinated with grading and clearing activity.



**ATTACHMENT B  
COST SCHEDULE  
ANC Uranium Mill Tailings Site, PS 0694**

**Fee Schedule**

<b>Labor Category</b>	<b>Company</b>	<b>Hourly Rate</b>
Senior Technical Reviewer 1	EA	\$190.00
Senior Technical Reviewer 2	Respec	\$150.00
Principal Scientist/Engineer	LA/EA	\$145.00
Principal Engineer	LA/AVI/Respec	\$135.00
Senior Scientist/Engineer	LA, EA	\$125.00
Senior Engineer	LA/Respec	\$120.00
Project Engineer/Scientist 1	Respec	\$115.00
Project Engineer/Scientist 2	LA/Respec/EA	\$110.00
Project Engineer/Scientist 3	Respec/AVI	\$105.00
Surveyor/Party Chief	Respec/AVI	\$100.00
Project Engineer/Scientist 4	AVI/Respec	\$100.00
Principal Investigator	LTA	\$95.00
Senior CAD Designer/GIS Specialist	LA/Respec/AVI	\$95.00
Construction Manager 1	LA	\$95.00
Surveyor 2	LA/AVI/Respec	\$85.00
Administration 1	LA,EA	\$80.00
Construction Manager 2	AVI/LA/Respec	\$85.00
Technician 1 (CAD/GIS/Survey)	Respec	\$75.00
Principal Investigator/Biologist	Real West	\$70.00
Technician 2 (Survey, CAD, GIS, CM)	LA/AVI/Respec	\$70.00
Technician 3 (Survey, CAD, GIS, CM)	LA/AVI/Respec	\$65.00
Project Coordinator/Crew Chief/Field Supervisor	LTA	\$60.00
Administration 2 (Clerical/Bookkeeping)	AVI,Respec, LTA,	\$45.00
Technician 4 (CAD,GIS, Survey Crew, Arch.)	LTA, AVI	\$35.00

**Other Direct Costs**

	<b>Rate</b>
Mileage	\$0.65/mile
Airfare	@ Cost
Per Diem	\$34/day
Lodging (hotel)	@ Cost
Lodging (rental house)	\$75/day/person
Computer/Plotter	\$50/day
Black and White Copies	\$0.15/each or @ Cost
Color Copies	\$0.90/each or @ Cost
Transparent and Color Bond, Blue Lines	\$3/each or @ Cost
Waterproof Plots	\$3/each or @ Cost
Mylar's	\$15/each or @ Cost
Total Station and Data Recorder	\$100/day
Consumables (lath, stakes, etc.)	@ Cost
ATV (4-wheeler)	\$100/day
Scintillometer	\$125/month
RTK Differential GPS Unit	\$500/day
Water Monitoring Equipment	Rental Rate
Contract Services/Subcontractors	@ Cost
Field Water Testing	@ Cost

Attachment B to the Professional Services Contract Between Wyoming Department of Environmental Quality  
And Lidstone & Associates, Inc.

PS 0694 ANC Uranium Mill Tailings site in Gas Hills



Matthew H. Mead, Governor

## Department of Environmental Quality

*To protect, conserve and enhance the quality of Wyoming's  
environment for the benefit of current and future generations.*



Todd Parfitt, Director

July 8, 2015

Mr. Chris Lidstone  
Lidstone and Associates, Inc.  
4025 Automation Way, Building. E  
Fort Collins, CO 80525

RE: DEQ Land Quality Division (LQD) Task Order 002: American Nuclear Corporation Site  
Engineering Evaluation and Cost Analysis (EE/CA) and Prioritization of Reclamation Activities

Dear Mr. Lidstone,

This Task Order shall serve as your authorization to proceed upon your acceptance of this Task Order. Your commencement of work shall be deemed acceptance of this Task Order. This Task Order shall be performed under the Services Contract dated November 7, 2014 between DEQ and Lidstone and Associates, Inc., MSA number 05SC0206036.

Modifications or changes to the specific terms of this Task Order 002 shall be made by written amendment and only upon mutual agreement by the parties. Contractor may engage the services of sub-contractors to facilitate the execution of the project. The work to be accomplished under this Task Order and deliverables is described in Attachment A, attached to and made a part of this Task Order by this reference.

The Contractor designates Christopher D. Lidstone of Lidstone and Associates, Inc. (LA) as a point of contact for all activities related to this Task Order 002. LA shall be responsible for coordinating all services relating to the project and providing the deliverables of this project.

The end date of this Task Order 002 is April 30, 2017. This Task Order will be paid on a Time and Materials basis using the billing rates established in the Contract. The total payment for this Task Order shall not exceed \$284,000. Contractor may bill monthly. Invoices should be sent to DEQ Administration, Attn: Lara Kay Asbury, 122 West 25th Street, Cheyenne, Wyoming.

The Land Quality Project Officer is Muthu Kuchanur and you may contact him if you have any questions at 307-777-7132.

Sincerely,

Kyle Wendtland  
Administrator, Land Quality Division

cc: Jessica Wales  
Muthu Kuchanur  
Carol Bilbrough  
PT 352C



**ATTACHMENT A**  
**SCOPE OF SERVICES AND DELIVERABLES - TASK ORDER NO. 2**

**BACKGROUND**

The American Nuclear Corporation (ANC) Uranium Mill Tailings Site is located in the Gas Hills Uranium Mining District, eastern Fremont County, Wyoming, approximately 45 miles east of Riverton and 70 miles west of Casper. This NRC licensed site was used for uranium mining and milling activities performed between 1959 and 1981, first on behalf of the U.S. Atomic Energy Commission, followed by milling of uranium for sale to several electrical utilities, and finally, for the Tennessee Valley Authority. Mining and milling activities were discontinued in 1981 for economic reasons.

Between 1982 and 1994, ANC completed partial decommissioning and reclamation of the site, including: (1) demolition and reclamation of the mill, (2) re-routing of Willow Springs Draw away from Tailings Pond No. 2, (3) reshaping and placement of an interim earthen cover over the tailings of both tailings ponds, and, (4) groundwater quality investigation down gradient of the tailings ponds to determine the extent of seepage from Tailings Pond No. 1, and subsequent submission to NRC of an ACL application.

ANC announced on May 9, 1994, that it was discontinuing operations and going out of business. The company subsequently forfeited its reclamation performance bond to the State of Wyoming in October 1994. The Wyoming Department of Environmental Quality (WDEQ)/Land Quality Division (LQD) assumed responsibility for redesigning and implementing the reclamation plan for the Site. A Confirmatory Order between NRC and the WDEQ describing the requirements for reclamation activities was agreed upon by both parties and was issued in October 1996. The confirmatory order was modified in 2009 and again in 2012, which resulted in reducing certain commitments provided in the 1996 document. Reclamation activities completed by WDEQ/AML between 1996 and 2009 include: (1) reclamation of the Bullrush Heap Leach site and deposition of contaminated materials into Tailings Pond No. 2, and (2) reclamation of Tailings Pond No. 2. Since 2009, site activities have included: (1) annual sampling of down gradient monitoring wells, (2) operation of the Tailings Pond No. 1 pump back system, (3) monitoring of settlement monuments at Tailings Pond No. 1, and (4) review and analysis of the down gradient monitoring well analytical data to determine extent and amount of down gradient impact on the alluvial aquifer.

The confirmatory order was modified again in June 2014 suspending every requirement excepting surface water and groundwater monitoring. The main impetus for this modification was the acknowledgement by both entities that there are insufficient funds to complete site reclamation to federal standards. NRC and WDEQ agreed that the most effective use of the remaining funds would be to install additional surface water sampling locations and monitoring wells and continue the sampling and analysis program. On November 6, 2014, Lidstone and Associates, Inc. (LA) were selected by LQD as a professional services contractor to assist LQD in addressing the 2014 confirmatory action order.

Task Order 1 was approved by LQD on November 14, 2014 with a primary objective of installing up to 16 additional monitor wells and perform a sampling and analysis program on all wells and surface water sampling locations to determine (1) the existence and extent of groundwater impacts, (2) determine the existence and extent of impacted groundwater movement, and (3) determine any possible outside sources of potential groundwater impacts.

On January 8, 2015, the NRC sent LQD their 2014 cost estimate for completely reclaiming and decommissioning the ANC site, which amounted to a total of approximately 16 million dollars. NRC has indicated that their preference would be for WDEQ to pursue obtaining additional federal or state funds that would allow for the complete reclamation of the site and turning it over to DOE for long term surveillance and maintenance.



## **PURPOSE AND NEED FOR TASK ORDER NO. 2**

The initial driving force for proposed Task Order No. 2 is closely tied to the above described NRC cost estimate (January 8, 2015). Following receipt and review of this cost estimate, it became apparent that there is a need for accurate planning, review of reasonable reclamation options and more importantly development of an accurate funding level Engineers Opinion of Probable Costs. Specifically this Task Order (No. 2) will provide LQD and their consultant accurate mapping and photogrammetry, which will allow calculation of earthwork quantities, identification and delineation of windblown contamination and more importantly, the ability to present several reclamation options that will be based on a risk based analysis. With an effort to save project costs and utilize historical and already developed information, the LA project team for this Task Order includes the following subconsultants:

1. RDE was Radiation Safety Officers, water samplers analytical analysts for American Nuclear in the late 1980s and early 1990s. This firm has been able to bring historic information as well as records from ANC files to address windblown contamination and water quality. They will be responsible for delineation of windblown contamination.
2. AVI, PC was under contract to LQD to complete the Tailings Pond No. 2 Design and Tailings Pond No. 1 Preliminary Design. AVI was also involved in land surveying activities for both AML and LQD, including the previous subsidence monitoring effort. AVI will be responsible for establishing ground control (cadastral survey) for the aerial mapping effort and will assist in the review and development of reclamation plans for Tailings Pond No. 1 and Tailings Pond No. 2.
3. RESPEC personnel performed construction administration of Tailings Pond No. 2 reclamation, windblown cleanup and the relocation of the Bullrush Heap Leach. RESPEC will assist in the review and development of reclamation plans for Tailings Pond No. 1 and Tailings Pond No. 2 and cleanup needs related to windblown tailings.

LA (Contractor) shall be responsible for coordinating all services relating to the project, collaborating with LQD personnel on necessary permitting activities and providing all deliverables associated with this Task Order. **Figure 1** shows the area to be included in Task Order 2 and in particular, the mapping and photogrammetry limits. **Figure 2** provides an estimated schedule for completing Task Order 2 activities assuming that Contractor receives Notice to Proceed on or before August 1, 2015.

With respect to specific duties, LA shall be responsible for the groundwater portion of the Task Order 2 study, ultimate development and presentation of all reclamation options, conceptual level earthwork quantities, review of surface water hydrology, conceptual design of required diversions and accurate presentation of unit costs and alternative sources. LA will work closely with LQD in the assessment of funding options and the prioritization of Work.

## **SCOPE OF SERVICES**

### **Task 1: Aerial Mapping**

#### **Task Objective**

The purpose of Task 1 is to provide updated mapping of the project area to facilitate engineering planning and construction of required reclamation structures. The existing 1996 mapping data is outdated and does not cover the entire project area under investigation for this project. Considerable reclamation activities have occurred within and near the project area since 1996 that are not reflected on the existing mapping. Additionally, the 1996 data is in a format that is no longer supported by the program manufacturer and will require considerable field work and data manipulation to make it usable. Based on cost estimates received, it has been determined that it will be more cost effective to obtain new mapping utilizing aerial photogrammetric techniques. Mapping shall include potential work areas, such as borrow areas,

windblown contamination areas, locations of required fill (Tailings Pond Nos. 1 and 2), locations of cut (diversion areas) among other areas. It is equally important that the mapping effort be expandable.

### **Task Discussion**

Contractor will subcontract with AVI to provide surveyed ground control for the aerial photography, and tie the ground control into existing area mapping, including work completed for LQD in their previous NRC submittals. The area to be included in the aerial photography is shown in the attached **Figure 1** and includes approximately 2,584 acres within portions of Sections 16, 17, 21, 28, 29, 32, and 33 of T33N, R90W. **Figure 1** also shows approximate locations of 22 target points to be used as ground control for the aerial photography and mapping. The additional target area allows the mapping to be expandable. Contractor shall subcontract with DataMap to fly the entire project area, including the area of the proposed monitor wells described in Task Order 1. The aerial photography shall be ortho-rectified. Using the flight and photo information, DataMap shall produce an updated topographic map(s), which meets National Mapping Accuracy Standard (NMAS) for 2-foot contours. The updated topographic map shall be a digital topographic map in AutoCad format and will incorporate the lands that might be disturbed (or may require further reclamation) for this project. Mapping shall include approximately 1,192 acres within Sections 28, 29, 32, and 33 (see **Figure 1**). This mapping will allow Contractor to perform an engineering evaluation of the site and calculate earthwork volumes and determine final topographic configuration. To conserve costs, mapping of the remainder of the area flown shall not be performed unless it is determined to be needed at a later date.

### **Task Deliverable**

Deliverables for this task shall include digital and hard copy aerial photographs of the area of interest described above and digital topographic mapping at 2-foot contour intervals of the area of interest described above. Contractor shall also provide LQD with a GIS file. Using the digital information, Contractor shall develop maps that will be used for developing reclamation plans and construction as-builts for the site.

## **Task 2: Soils Characterization**

### **Task Objective**

During 1983, ANC conducted cleanup of windblown tailings materials prior to the placement of the temporary stabilization cover on Tailings Pond No. 2. The windblown cleanup was conducted in accordance with the plan approved by NRC in Amendment 15 to SUA-667 on December 28, 1983. Any soil registering greater than 30  $\mu\text{R/hr}$  was removed and deposited in Tailings Pond No. 2. The results of the cleanup were reported to NRC by letter dated February 24, 1984. NRC subsequently approved the cleanup with issuance of Amendment 16 to SUA-667 on May 17, 1984. During the reclamation of Tailings Pond No. 2 by LQD in the late 1990s, additional windblown cleanup was performed upwind and downwind around the toe of Tailings Pond No. 2. Notwithstanding this work, NRC remains concerned that a windblown contamination problem remains at the site. The objective of Task 2 will be to address the NRC concerns, evaluate the areas downwind of Tailings Pond No. 1, as well as Tailings Pond No. 2 and confirm the presence or absence of windblown contamination at the site. The proposed windblown survey will provide sufficient guidance on the absence or presence of windblown, but will not meet NRC standards for a windblown survey in advance of a clean-up requirement.

### **Task Discussion**

Contractor will subcontract with RDE to perform a reconnaissance-level radiometric surface soils survey and sampling program upwind and downwind of Tailings Pond No. 1 and Tailings Pond No. 2. The survey shall be performed utilizing a handheld GPS and a gamma scintillation meter to confirm whether additional windblown tailings problems remain at the site. Photo documentation of the survey shall be

provided. All surveyed and/or sampled locations shall be plotted on a site map. The survey shall include locations upwind of the tailings facilities to establish background for the area. Survey locations exhibiting an anomalously high gamma signature above background shall be sampled and analyzed for natural uranium and radium-226. Ten percent of the samples collected shall also be analyzed for thorium-230 and lead-210. Contractor estimates that approximately 20 near surface soil samples will be collected and analyzed at the contract laboratory.

#### **Task Deliverable**

Contractor shall produce a draft and final report providing the survey and soil sampling data, conclusions and initial recommendations based upon an analysis of the data. The report shall include a sample location map indicating the gamma and soil analytical data for each survey/sample location. Based upon the results of this task, Contractor, in consultation with LQD and NRC, will determine whether additional sampling (performed in accordance with NRC protocols) will be necessary to further determine the limits of windblown radioactive materials.

### **Task 3: Groundwater Impacts Updates**

#### **Task Objective**

The objective of Task 3 will be to continue groundwater and surface water monitoring and sampling semi-annually during 2016 to increase the data set and validate the existing data collected during Task Order 1 (2015 sample year).

#### **Task Discussion**

Contractor shall sample all surface and groundwater sampling locations during the fourth quarter of 2015 (Task Order No. 1) and semi-annually during 2016. All samples shall be analyzed at the contracted analytical laboratory for the list of parameters found in Guideline 8, Appendix 1, Sections IV and V. Sampling procedures shall be in accordance with the Project IWP and will include chain of custody and QA/QC procedures to maintain consistency and sample integrity. Cost estimate includes laboratory analytical costs.

#### **Task Deliverable**

Contractor shall perform additional data analysis and provide a draft and final technical report updating or expanding the conclusions developed during Task Order 1. The analysis and report shall also assist in the determination of potential water impacts from outside sources and if the development and submittal of an ACL application would be applicable. Costs for developing an ACL application are not included in this Task Order 2 cost estimate.

### **Task 4: Engineering Evaluation and Cost Analysis (EE/CA) and Prioritization of Reclamation Activities**

#### **Task Objective**

In 2014, NRC provided LQD with their analysis of the reclamation tasks remaining to be completed at the ANC site and their estimated costs. NRC estimated a cost of approximately \$16,000,000 to complete the following reclamation tasks:

- Repair of Tailings Pond No. 1 rock dam;
- Cover and final reclamation of Tailings Pond No. 1;
- Construction of diversion channels and rock aprons at Tailings Pond No. 2;
- Repair of Tailings Pond No. 2;
- Installation of monitoring wells and water sampling;



- Windblown tailings cleanup;
- Determination of long-term care boundary;
- Transfer of NRC license to DOE.

The objectives of Task 4 are three-fold. The first objective will be to analyze the validity of the NRC reclamation assessment in terms of costs and actual tasks that are necessary to complete to maintain environmental protection and public health and safety. The second objective will be to prioritize the tasks remaining considering the budgetary constraints within the LQD. The third objective will be to analyze potential sources of additional funds that may be used in conjunction with the remaining LQD funds to complete the reclamation to NRC standards.

### **Task Discussion**

Contractor shall review the NRC reclamation task list and cost estimate and evaluate the validity of costs, tasks and assumptions used in developing the NRC cost estimate. This analysis shall include:

- A preliminary (or funding level) design for repair and reclamation of Tailings Pond No. 1, including an analysis of potential suitable borrow material locations and estimated costs of suitable clay and rock sources. This analysis shall include refined and updated earthwork quantities (unclassified excavation), imported material quantities (Rock and Clay) and updated unit costs.
- A review of clay and rock sources and permitting requirements to open a new source, if applicable. Discussions with State Lands and BLM as applicable.
- Preliminary design and earthwork quantities to complete and/or remediate required channel diversions to ensure the long-term stability of Tailings Pond Nos. 1 and 2. Riprap requirements will be addressed in this evaluation.
- A preliminary design of repairs needed to Tailings Pond No. 2.
- Willow Springs Draw repair to ensure long-term stability.
- Potential costs (if applicable) for windblown cleanup to meet NRC versus environmental and public health and safety requirements.
- Development of a revised ACL application, if applicable.
- Land purchase or swap with BLM and, as applicable, State Lands and private lands.
- Determination of long-term care boundary.
- Transfer of NRC license to DOE.
- A groundwater cleanup program, if applicable.

Contractor shall evaluate and revise as necessary the unit costs and assumptions used by NRC for estimating costs and develop a reclamation (funding level) cost estimate that accurately reflects today's costs for materials and labor. The above-described work items will be addressed in three ways: (1) sufficient to meet current NRC standards; (2) sufficient to meet long term public health and safety requirements- typical AML requirements; and, (3) risk assessment of the Do Nothing alternative.

Based upon the remaining available funds, and the priority to protect the environment and public health and safety, Contractor will prioritize reclamation activities that can be conducted with the available funds. This shall be accomplished by constructing a matrix that will compare the costs and risk involved of completing the reclamation to federal standards versus reclamation using a risk based corrective action approach (RBCA) versus conducting a monitoring program only without any additional reclamation. Contractor shall also assist LQD in determining the best approach for obtaining additional funds for reclamation should that option be considered preferential.

#### **Task Deliverable**

Contractor shall develop a draft and final report that addresses the NRC reclamation task and cost estimate and analyzes true costs for each of the elements listed above. The report shall include a matrix that provides a reclamation cost- benefit comparison between performing reclamation to NRC standards versus reclamation based on a risk based basis and essentially giving the property back to NRC after exhaustion of available funds. Assuming a start date prior to August 1, 2015, the Contractor shall prepare a draft report for the Task 4 Deliverable prior to April 30, 2016.

#### **Task 5: Meetings**

Contractor will attend four meetings in Cheyenne with LQD to discuss preliminary findings and different funding mechanisms that may be available for LQD. NRC may attend one or several of these meetings. The cost estimate for Task 5 shall also include the Contractor's attendance at five phone meetings with the NRC and LQD. The overall planning associated with this task order and the nature of the meetings will address:

- Giving the site back to NRC after the available funds have been exhausted, as allowed by the confirmatory action letter.
- Working with Wyoming's congressional legislators to obtain funds from Congress to complete the reclamation to federal standards using UMTRCA funding.
- Working with the Wyoming Legislature to obtain funds so that LQD can complete the reclamation themselves or with assistance from AML. Under this scenario, it is anticipated that there will be NRC concurrence with the reclamation approach and that the Wyoming Legislature will provide project specific state funding alone or a combination of AML and project specific state funding.

**TASK ORDER NO.2 GRAND TOTAL: \$284,000.00**

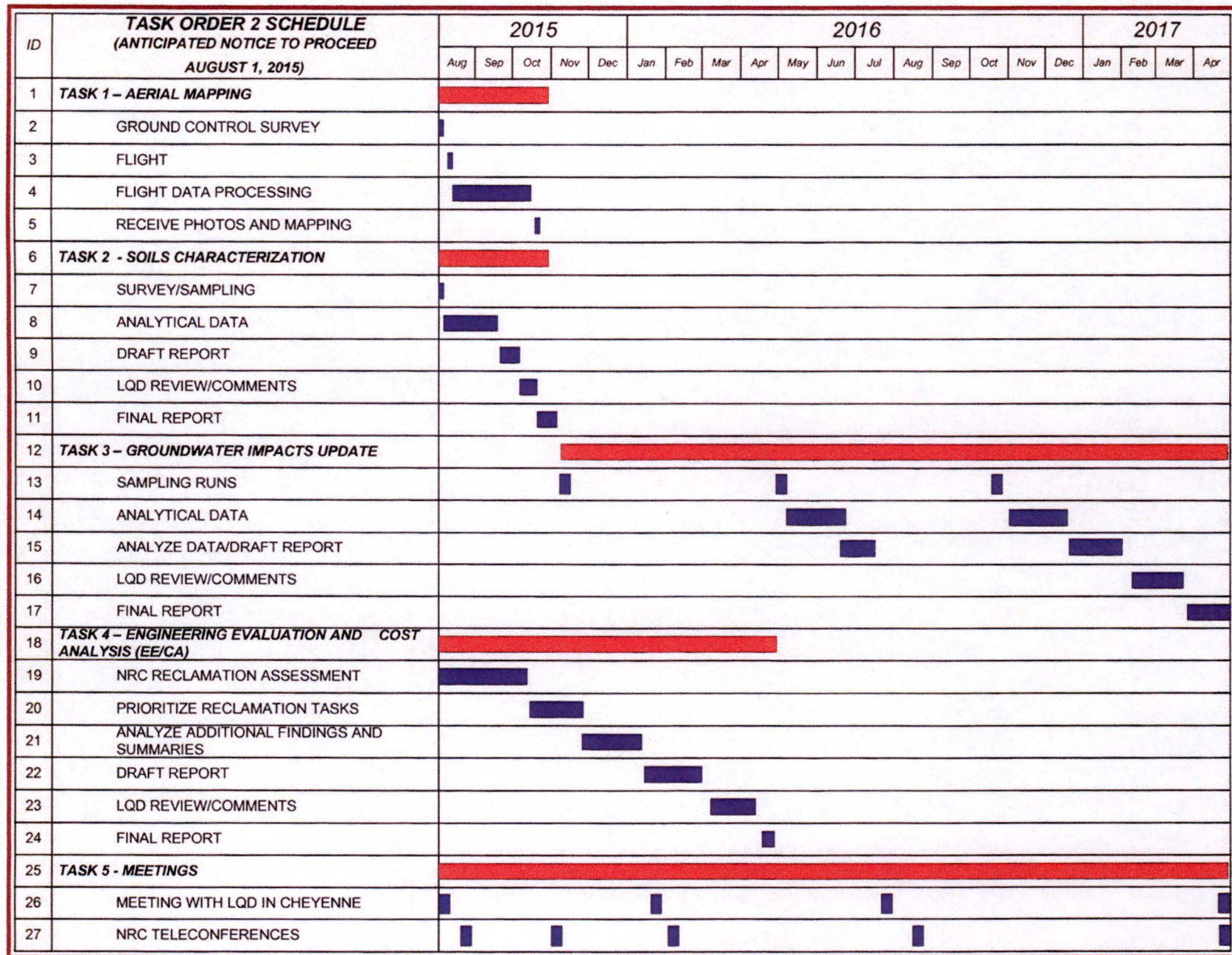


FIGURE 2



## Appendix B

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### **January 8, 2015 Letter to WDEQ November 2014 NRC Reclamation Cost Estimate**





January 8, 2015

Ms. Nancy Nuttbrock, LQD Administrator  
Wyoming Department of Environmental Quality  
122 West 25<sup>th</sup> St.  
3<sup>rd</sup> Floor West  
Herschler Building  
Cheyenne, WY 82002

SUBJECT: COST ESTIMATE FOR DECOMMISSIONING THE AMERICAN NUCLEAR  
CORPORATION GAS HILLS SITE

Dear Ms. Nuttbrock:

On May 9, 1994, the American Nuclear Corporation (ANC) announced that it intended to discontinue operations at its Gas Hills Site and go out of business. The company forfeited its \$3.2 million reclamation bond to Wyoming Department of Environmental Quality (WDEQ) in October 1994, and WDEQ subsequently undertook reclamation activities at the site using these funds. The site encompasses about 550 acres of land, and consists of two former tailings impoundments.

In 1996, the WDEQ accepted and agreed to the terms of Confirmatory Order (Order) issued by the U.S. Nuclear Regulatory Commission (NRC) for the reclamation of the ANC Gas Hills site. The Order was signed by the NRC and WDEQ in October 1996 (Agencywide Document Access Management System (ADAMS) Accession No. ML071520354). In response to a request by WDEQ, the Order was subsequently modified by letter dated August 11, 2009 (ADAMS Accession No. ML091330303). By letter dated May 29, 2012, the NRC proposed additional modifications to the Order that would result in the temporary suspension of a majority of the Parts of the Order until financial issues affecting WDEQ's remediation could be resolved (ADAMS Accession No. ML120670346). WDEQ agreed to these additional modifications by letter dated July 30, 2012 (ADAMS Accession No. ML14122A199). The Order was modified again on June 12, 2014 (ADAMS Accession No. ML14106A328), and WDEQ agreed to the modifications on July 1, 2014 (ADAMS Accession No. ML14206A590). The Order now requires only that ground water sampling be continued and the results reported to NRC.

Since the Order was last modified, WDEQ and the NRC have maintained a dialog on the financial and technical issues related to the reclamation of the ANC Gas Hills site. Both parties acknowledge that there are insufficient funds to finish the decommissioning of the site. NRC has estimated the amount needed to complete the decommissioning and transfer of the site to the U.S. Department of Energy (DOE) and is enclosing this estimate for WDEQ's planning purposes. Note that NRC has not discussed the long-term care and maintenance activities that may be necessary after transfer of the site to DOE or the long-term care fee for the site with the DOE. Thus, the estimate provided in the attached spreadsheet for the long-term care of the site should be used carefully and should not be considered or represented as the final long-term care fee for the site.

N. Nuttbrock

2

If you have any questions, please contact Tom McLaughlin, the Project Manager for the site, at [Thomas.McLaughlin@nrc.gov](mailto:Thomas.McLaughlin@nrc.gov) or (301) 415-5869.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedures," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Andrew Persinko, Deputy Director  
Division of Decommissioning, Uranium Recovery,  
and Waste Programs  
Office of Nuclear Material Safety  
and Safeguards

Docket No: 04004492

Enclosure:  
Decommissioning Cost Estimate

cc: Mathu Kuchanur, WDEQ  
Brian Wood, WDEQ



If you have any questions, please contact Tom McLaughlin, the Project Manager for the site, at [Thomas.McLaughlin@nrc.gov](mailto:Thomas.McLaughlin@nrc.gov) or (301) 415-5869.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedures," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of ADAMS. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Andrew Persinko, Deputy Director  
Division of Decommissioning, Uranium Recovery,  
and Waste Programs  
Office of Nuclear Material Safety  
and Safeguards

Docket No: 04004492

Enclosure:  
Decommissioning Cost Estimate

cc: Mathu Kuchanur, WDEQ  
Brian Wood, WDEQ

DISTRIBUTION:

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**ML14343A144**

OFFICE	MDB/PM	MDB/LA	OGC	MDB/BC	DUWP/DD
NAME	TMcLaughlin	CHolston	BJones	MNorato	APersinko
DATE	12/09/14	12/16/14	12/26/14	12/30/14	1/ 8/15

**OFFICIAL RECORD COPY**

## Summary of Estimated Remaining Reclamation Costs, ANC Gas Hills Site, Fremont County, Wyoming

### Background:

ANC Gas Hills is a 550-acre UMTRCA Title II site located ~85 miles west of Casper, WY.

TP1 refers to Tailings Pond 1 (40 acres); TP2 refers to Tailings Pond 2 (80 acres).

Original tasks were outlined initially by Tom McLaughlin and modified based on discussions with other NRC staff.

Cost estimate reflects input and guidance from Lifeng Guo, Ted Johnson, Robert Johnson, Doug Mandeville, Tom McLaughlin, and Paul Michalak, all from NRC. Additional input and guidance received from Brian Wood (District 2 Assistant District Supervisor, WDEQ/LQD, Lander Field Office) and Muthu Kuchanur (Geology Supervisor, WDWEQ/LQD, Cheyenne).

Main tasks summarized below correspond to workbook tab numbers.

Main Tasks	Cost Estimate (\$)
1. Repair Rock Dam on Tailings Pond 1	517,243
2. Place Cover on Tailings Pond 1	2,104,659
3. Cleanup Windblown Tailings	317,217
4. Construct Diversion Channels and Rock Aprons	2,601,862
5. Repair Tailings Pond 2	2,471,750
6. Determine Final Long-Term Care Boundary	708,500
7. Install Monitoring Wells and Conduct Water Sampling	384,653
8. Transfer License to DOE	4,000,000
<b>Subtotal</b>	<b>13,105,885</b>
Contingency of 25%	3,276,471
<b>Total (2014 \$):</b>	<b>16,382,356</b>



## 1. Repair Rock Dam on Tailings Pond 1

### Background Info:

Need input from engineer to finalize the design for closure of TP1.

In addition to finalizing design for cover, need to repair TP1 rock dam.

Ted Johnson (1/11/12): Dam is in poor condition and needs significant repair.

Need to test surficial soils on TP1 to determine level of contamination/activity.

### Assumptions :

*For repair of dam structure:*

Current slope of dam face is ~2H:1V. Needs rebuilding with 5H:1V slope (Ted Johnson).

Dam height is ~60 feet from WDEQ Phase III Pond #1 Grading Plan (1996).

From air photo, dam length is ~850' long.

850' is about right on top; narrower on bottom, say 500' (TJ).

Average dam width is  $(850+500)/2 = 675'$ .

Use 8 inches of D50 4" rock on dam face (comparable to "small riprap" in 2003 Pathfinder estimate).

With 5H:1V slope, new dam face will be  $675' \times 306'$ .

100% of rectangular face equivalent needs to be replaced.

Costs from Pathfinder estimate (2003) are perfectly appropriate to use here (TJ).

*Source of unit costs: Pathfinder Mines Corporation, letter from Hardgrove to Janosko, October 14, 2003*

*ref: Docket No. 40-6622, Source Material License N. SUA-442*

Volume of clean fill needed for dam structure described in "Assumptions" above (in CY):	225,000
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Rock volume needed for dam face (in CY):	5,100
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### Cost Estimate

Activity	Quantity	Unit	Unit Cost (\$)	Cost (\$)
Reconstruct Dam				
Sand	225,000	CY	1.16	261,000
Rock: 8" of D50=4"	5,100	CY	23.70	120,870
Subtotal				381,870
Contractor profit, mob/demob @ 10%				38,187
Total contractor cost for reconstruction of TP1 dam				420,057
Construction management @5%				19,094
2003 Total (not including contingency)				400,964
Adjustment for inflation (Oct 2003 - Sep 2014)				1.29
<b>Cost Estimate Total (2014 \$):</b>				<b>517,243</b>



## 2. Place Cover on Tailings Pond 1

### Background Info:

10 CFR Part 40, Appendix A, Criterion 6 requires placement of an earthen cover over the tailings that will control radiological hazards for up to 1,000 years and limit average radon release rates to not  $>20 \text{ pCi/m}^2\text{s}$ .

ANC Gas Hills docs: **ML110700649** on Adams (includes original design drawings by Shepherd Miller, Inc. from 1996).

Final UMETCO design: see **ML 072190021** on Adams.

TP2 profile shows 3 feet of mine spoil, 3 feet of clean borrow, and 3 inches of riprap on top.

(Shepherd Miller Pond #2 Baseline Cross Section, 3/20/96).

Spraying water from contaminated groundwater plume has contaminated surface of existing cover materials.

Doug Mandeville (1/19/12): clay is best material for cover; consider Cody Shale used at Pathfinder.

DM: Can also assume same cover at ANC Gas Hills as at Umetco. Umetco has a very good design that was nicely implemented.

Pathfinder estimate from 2000 specifies Cody shale and provides a rate of \$2.69/CY that consists of:

Prewetting (\$0.18/CY); Excavation & Haul of 1/3 to 1 mile (\$2.07/CY); and Mixing & Compacting Fill (\$0.44/CY).

DM: Best to add new material on top of existing at TP1. Most radon barriers are 1' to 7' thick, depending on activity level.

Units costs are from Pathfinder 2003 estimate are perfectly OK to use (Ted Johnson).

There was a need to continue monitoring settlement at 4 locations on TP1 to ensure that settlement of at least 90% is achieved.

(In March 2011, settlement was close to the 90% standard and NRC approved DEQ's request to do annual testing.)

There is no longer a need to continue monitoring settlement at 4 locations on TP1. On 6/12/14, NRC noted in a letter to WDEQ (**ML14106A328**) that Pond #1 has reached 90% settlement and that the groundwater corrective action program should be discontinued.

### Assumptions:

Ted Johnson (1/11/12): ~6 to 12 inches of 1 to 2 inch D50 rock on top and on side slopes. May need additional earth cover as well.

TJ: 1 foot of clay on top is reasonable.

Area of TP1 cover is 40 acres, per NRC facility information.

(<http://www.nrc.gov/info-finder/decommissioning/uranium/american-nuclear-corporation.html>)

48-acre area includes side slopes (seems reasonable, based on photos).

Assume side slopes for TP1 account for 20% of total TP1 area (8 acres).

TJ: Mine spoils can be used for construction of frost protection layer.

Source of unit costs is Pathfinder 2003 estimate; source of "clay" is the Cody Shale, ~2 miles from ANC site.

"Cody Shale is the main surface geologic unit in the area from the tailings impoundments to the north."

Source: US DOE, Long-Term Surveillance Plan for the Gas Hills North Disposal Site, Fremont County, WY, December 2011.

**Source of unit costs: Pathfinder Mines Corporation, October 14, 2003, letter from Hardgrove to Janosko**

**Cost Estimate**

1 foot of clay is needed on top of existing surface of TP1 to provide source control (a low-permeability layer)

3 feet of additional clean sand is needed on top of the Cody shale for frost protection

12 inches of 1-2" D50 rock needed on top of clean soil (not needed on side slopes)

Activity	Quantity	Unit	Unit Cost (\$)	Cost (\$)
Placement of 1 foot clay cover	77,440	CY	1.74	134,746
Placement of 3 feet clean sand	232,320	CY	1.16	269,491
Cost for 6 inches small rip rap	32,267	CY	23.70	764,720
Placement of rip rap	32,267	CY	7.55	243,613
Subtotal:				1,412,570
Contractor profit, mob/demob (10%)				141,257
Total reclamation contractor cost for TP1 cover				1,553,827
Construction management @5%				77,691
2003 Total (not including contingency)				1,631,519
Adjustment for inflation (Oct 2003 - Sep 2014)				1.29
<b>Cost Estimate Total (2014 \$):</b>				<b>2,104,659</b>



### 3. Cleanup Windblown Tailings and Placement on Tailings Pond 1

#### Background Info:

Radon flux limit from disposal area to atmosphere is 20 pCi/m<sup>2</sup>/s for a period of 1,000 years, or in any case, at least 200 years.  
 Prevailing winds are from the southwest (<http://www.wrds.uwyo.edu/sco/climateatlas/wind.html>).  
 Contamination is often hard to distinguish from background; not black and white (Ted Johnson).

#### Proposed Activities:

Survey neighboring private lands for evidence of radioactivity.  
 Collect soil samples and analyze.  
 Remove contaminated soils and place on TP1 prior to installation of cover.  
 Test to ensure that U/Rn dose standards are being met.

#### Assumptions:

Unit costs at ANC Gas Hills for windblown work are comparable to Rio Algom (June 2009).  
 From topo map showing land ownership, there are ~320 acres of private lands north of site.  
 Assume comparable costs (prorated to Rio Algom) to place excavated soil on TP1 prior to placement of clay cover.  
 Windblown areas to be excavated to a typical depth of 12" with replacement of 6" of soil.  
 WDEQ drawing (3/20/96) shows "Actual field windblown areas" described as 46.5 acres, both N and S of TP2.

**Source of Unit Costs:** *Rio Algom Mining LLC, June 21, 2009. Letter from Fletcher to McLaughlin*

*Ref: Ambrosia Lake Facility, License SUA-1473, Docket N. 40-8905, License Condition #22, Annual Surety Update*

#### Cost Estimate:

160 acres of private lands need to be surveyed, excavated, and placed on TP1.

Activity	Cost (\$)
Costs to excavate and cover 160 acres of windblown area	68,902
Total cost to perform radiation surveys	14,648
Overall laboratory costs	28,830
Total revegetation costs	176,000
<b>Total cost</b>	<b>288,379</b>
Adjustment for inflation (Jun 2009 - Sep 2014)	1.10
<b>Cost Estimate Total (2014 \$):</b>	<b>317,217</b>



## 4. Construct Diversion Channels and Rock Aprons

### Background Info:

A large diversion channel diverts the flows from Campsite Draw around the disposal cell (Ted Johnson).

Technical Evaluation Report for TP2 (Dec 2, 1997) shows results of PMF calculations from HEC-1 model (COE, 1990).

Max flow rates of 1896 cfs, 1061 cfs, 163 cfs for Campsite Draw, SW Channel, and TP1 East channel, respectively.

Staff concluded that peak flow calculations are reasonable estimates of 1/2 of the PMF and are, therefore, acceptable.

Need to estimate costs for excavation and regrading of channels prior to placement of rip rap; excavation not necessary for aprons.

WDEQ plans show 12" layer of rip rap on Campsite Draw (Class 8).

WDEQ drawing for Southwest Diversion Channel is probably good; use it (TJ).

Runoff from TP2 is issue; need rock toe to prevent erosion and WDEQ agrees.

### Assumptions:

#### Southwest Diversion Channel:

Southwest Diversion Channel shown on ANC Spoils Grading Plan (3/20/96) should provide adequate drainage (per TJ).

2280' long, 30' wide, side slopes of 3H:1V, 8' deep (average), apply 12" of D50=24" rock.

Excavation volume assumes entire volume (dimensions above) needs to be excavated and graded prior to placement of rip rap.

*Note: this large channel will not necessarily accommodate 1,000 years of erosion from the adjacent mine spoils. See options in Mine Spoils tab.*

Additional excavation and grading shown on WDEQ's ANC Spoils Grading Plan (1996) was not calculated.

Optimistic estimate uses statement from this Plan: "...This contract will require excavation of channel, approximately 150,000 cu yds."

Conservative estimate uses this statement from this Plan:

"...North of this line approximately 800,000 cubic yards of material will be removed by AML 16B-II Contractor..."

#### Rock Apron on NE Side of TP2

~2,000 feet long, 30 feet wide, and 1 to 2 feet thick and composed of D50 8-12 inch rock.

#### Continuous Rock Apron on N and NW Sides of TP2:

~1,700' long, 30' wide, and a 1 foot layer of D50=8" rock (assume large rip rap).

WDEQ plans for a riprap apron on the north toe of TP2 show it to 400 feet long with a 12-inch layer of D50 Class 8 rock.

TJ: 400' is not long enough; need to extend along NW and part of W side of TP2, as well.

Upper Willow Draw Channel is OK as is; not natural, but adequate to accommodate flows from Campsite Draw (TJ).

Campsite Draw Channel is very large and is in pretty good shape. No need to modify; leave as is (TJ).

*Source of unit costs: Pathfinder Mines Corporation, October 14, 2003, letter from Hardgrove to Janosko  
ref: Docket No. 40-6622, Source Material License N. SUA-442.*

**Cost Estimate**

800,000 CY additional excavation and grading; 3' thick NE apron; 2' thick N and NW apron.

Activity	Quantity	Unit	Unit Cost (\$)	Cost (\$)
<b>1. Southwest Diversion Channel</b>				
Excavation of channel	29,387	CY	1.48	43,492
Additional excavation and grading	800,000	CY	1.48	1,184,000
Purchase of large rip rap for channel	5,742	CY	24.50	140,684
Placement of rip rap in channel	5,742	CY	7.55	43,354
<b>2. Rock Apron NE of TP2</b>				
Purchase of large rip rap for apron (3' thick)	6,667	CY	24.50	163,333
Placement of rip rap in channel	6,667	CY	7.55	50,333
<b>3. Rock Apron N and NW of TP2</b>				
Purchase of large rip rap for apron (2' thick)	3,778	CY	24.50	92,556
Placement of rip rap in channel	3,778	CY	7.55	28,522
<b>Subtotal:</b>				<b>1,746,275</b>
Contractor profit, mob/demob (10%)				174,627
Total contractor cost for SW Diversion Channel and 2 Rock Aprons				1,920,902
Construction management @5%				96,045
2003 Total (not including contingency)				2,016,948
Adjustment for inflation (Oct 2003 - Sep 2014) = 1.29				1
<b>Cost Estimate Total (2014 \$):</b>				<b>2,601,862</b>



## 5. Repair Tailings Pond 2

### Background:

Reclamation was completed in 1998.

Need to evaluate extent to which existing cover needs to be redone. Poor quality rock was used and side slopes need protection from erosion.

WDEQ proposed a 3" rock layer on top with average size (D50) of 1.25 inches; NRC concurred (TER for TP2, 12/2/97).

WDEQ plans show 3 feet of mine spoils, 3 feet of clean borrow, and 3 inches of rip rap on top of TP2 (TJ Options paper says 4 inch layer was placed).

WDEQ proposed a 6" layer of rock on side slopes with D50 of 3 inches. NRC concurred on adequacy (TER for TP2, 12/2/97).

Cover on TP2 was poorly constructed. NRC neither approved nor disapproved the construction (NRC knows WDEQ is short of funds).

Geology grad students may test a portion of the cap to evaluate competency of the rock and adequacy for intended purpose.

Rock quality and placement is poor; additional rock is needed to meet specs. Rock aprons are needed (TJ Options paper).

Scenarios based on percentage of rock that needs to get replaced are not very realistic (TJ concurrence).

Better to prepare scenarios that involve covering the entire surface (and east side) with varying thicknesses of rock.

Rock source is Rattlesnake quarry, on a 600-ft hill just east of Dry Creek Road, ~10 miles from ANC Gas Hills Site.

*"The Rattlesnake Quarry contains hard, durable quartzite that meets the NRC requirements for reclamation activities at Umetco's East Gas Hills facility."*

*Source of above info: Umetco Minerals Corporation, Surety Update, January 10, 2001 [p. 26].*

Quarry is leased by Umetco from BLM; ANC likely can work out a deal.

### Assumptions:

Units costs from Umetco, Dec 2000, seem reasonable. Assume same cost for ANC, but increase by 10% to account for greater haul distance (Ted Johnson).

Add in additional costs (in Umetco) for placement on above-grade tailings.

Proposed rock aprons on NE and N/NW sides of TP2 will mitigate erosion concerns on sides of TP2 (included in Tab 4).

Existing diversion channels along Campsite Draw and Upper Willow Draw will mitigate erosion concerns on E and S sides.

Need additional rock cover on eastern side of TP2 where tailings extend into the sloped area.

Biggest need for rock on side slope is on east side where tailings extend into the sloped area and construction was especially poor (TJ).

Need only D50 rock of 0.5 to 1.0 inch on top (TJ).

Downstream portions of side slopes of disposal cell need to be more heavily armored to minimize effects of stream action on contaminated materials.

Contractor overhead and profit are shown in the Umetco 2000 cost estimate at 10% each (20% total).

**Source of unit costs and overhead/profit info: Umetco Minerals Corporation, December 20, 2000. Letter from Gieck to Ting**

**Re: Gas Hills, License Number SUA-648, docket #40-0299, Surety Update.**

### Cost Estimate:

6" of D50=3-4" rock on entire surface of TP2; 8 acres on east side with 12" of D50=3-4" rock.

Activity	Quantity	Unit	Unit Cost (\$)	Cost (\$)
Installation of 6" of D50=3" rock on TP2	64,533	CY	19.42	1,252,915
Installation of 12" of D50=3" rock on east side of TP2	12,907	CY	19.42	250,583
Subtotal				1,503,498
Contractor overhead and profit @20%				300,700
2000 Total (not including contingency)				1,804,197
Adjustment for inflation (Dec 2000 - Sep 2014)				1.37
<b>Cost Estimate Total (2014 \$):</b>				<b>2,471,750</b>



## 6. Determine Final Long-Term Care Boundary

### Background:

Site has an ongoing groundwater recovery and corrective action program.  
 Issue is ongoing need for groundwater monitoring that may require long-term access to private lands.  
 Extent and rate migration rate of groundwater contamination plume are not known.  
 Pumping of plume occurs now for 5 mo/yr when ground is not frozen (all pipes are above ground).  
 NRC will need to track, delineate, and remediate plume of contaminants (Paul Michalak).  
 Need to establish ACLs for groundwater Point of Compliance (POC) and Point of Exposure (POE) wells.  
 Depending on findings, may need to move LTC boundary further north and drill new wells.  
 NRC's 8/11/2009 letter to Mark Moxley (WDEQ) references a 1996 Confirmatory Order and addresses waivers proposed by WDEQ.  
 NRC requires WDEQ to submit an annual use survey of the area within 5 miles of the restricted area boundary.  
 Purpose of use survey is to ensure that private and public water sources are not affected by contaminants from the site.  
 If contamination is found, Wyoming will need to purchase private lands to ensure unencumbered access in future.  
 Section 16 of the Order states that the State must pay.

### Other Relevant Information:

"The East Gas Hills site is located in a sparsely populated area within Natrona and Fremont counties in central Wyoming. The majority of the land within five miles of the site is public domain under Bureau of Land Management jurisdiction. The nearest residence, the JE Ranch, is approximately five miles northeast of the site. It is occupied for one to two weeks per year. The nearest full-time residents are located approximately eight miles to the west-southwest at the Puddle Spring Ranch."

Source: *Environmental Assessment for Umetco Minerals Corporation, Gas Hills Reclamation Project, (2011):*

#### Other sources:

Above-Grade Tailings Impoundment and A-9 Repository Erosion Projection Enhancement Design Report  
 Fremont and Natrona Counties, Wyoming (not dated).

Source Materials License SUA-648, Docket No. 40-0299

<http://adamswebsearch2.nrc.gov/webSearch2/doccontent.jsp?doc={B06334DE-06E2-41B8-BD96-85081A54BCF8}>.

### Assumptions:

Active treatment of groundwater is being phased out at the site and is not being considered as an option going forward  
 (Telecon between Ken Rock, ICF, and Lifeng Guo, Hydrogeologist, NRC, 11/6/14).  
 Latest data suggest plume is migrating north. Additional monitoring wells have been proposed to study plume status and estimate potential future areal extent.  
 Estimate assumes that Wyoming DEQ would purchase land that is roughly equivalent to the size of the existing ANC site (~500 acres)  
 (Telecon between Ken Rock, ICF, and Dr. Muthu Kuchanur, P.E. Geology Supervisor, WDEQ/LQD, 11/11/14).

### Cost Estimate

Land Costs of Properties for Sale in Fremont County, WY on November 13, 2014:		Cost/Acre (\$)
Property 1: \$329,000 for 321 acres: <a href="http://www.landwatch.com/Fremont-County-Wyoming-Land-for-sale/pid/301433755">http://www.landwatch.com/Fremont-County-Wyoming-Land-for-sale/pid/301433755</a>		1,025
Property 2: \$667,200 for 417 acres: <a href="http://www.landwatch.com/Fremont-County-Wyoming-Land-for-sale/pid/301433738">http://www.landwatch.com/Fremont-County-Wyoming-Land-for-sale/pid/301433738</a>		1,600

6. Determine Final LTC Boundary

Property 3: \$1,200,000 for 480 acres: <a href="http://www.landwatch.com/Fremont-County-Wyoming-Land-for-sale/pid/301433736">http://www.landwatch.com/Fremont-County-Wyoming-Land-for-sale/pid/301433736</a>	2,500
Property 4: \$1,200,000 for 2,216 acres: <a href="http://www.landwatch.com/Fremont-County-Wyoming-Farms-and-Ranches-for-sale/pid/289082272">http://www.landwatch.com/Fremont-County-Wyoming-Farms-and-Ranches-for-sale/pid/289082272</a>	542
<b>Average price/acre:</b>	<b>1,417</b>

Wyoming DEQ purchase of 500 acres of contaminated land at average cost of \$1,417/acre	708,500
<b>Cost Estimate Total (2014 \$):</b>	<b>708,500</b>



7. Install New Monitoring Wells and Conduct Water Sampling		
Long-Term Surveillance Activities	Costs (\$)	Assumptions
<b>Cost Estimate for Installation of 12 New Monitoring Wells<sup>1</sup></b>		
Construction of New Monitoring Wells (one-time cost)	\$240,000	1) cost for each of the 4" monitoring wells with flush joint casing: \$20,000/well, <sup>2</sup> reflecting a well depth assumed to be 80 feet with a 4" PVC flush joint casing, slotted at the desired sampling depth 2) portable pump to be used for sampling; no pumps to be left in the wells
Pump Replacement (one-time cost)	\$22,871	Assumes purchase of 4 Grendfos RediFlo two-inch Submersible Well Sampling Pumps and two sets of all associated equipment (for backup and replacement purposes as existing and new pumps fail). Costs for each are as follows: <sup>3</sup> 1) 2" Rediflo-II pump: \$1,835 2) control box (VTF converter to operate pump): \$2,769 3) hand reel: \$250 4) check valves: \$150 5) pump shroud (needed for a 4" or larger hole): \$250 6) assume tax and shipping: \$250
<b>Total for 12 New Monitoring Wells (2014 \$):</b>		<b>262,871</b>
<b>Cost Estimate for Each Short-Term Sampling Event (including labor and other costs)</b>		
Monitoring -- Labor	\$2,538	Total labor hours (for two technicians) include: 1) receipt of coolers and containers from lab, and preparation of portable pumps and ancillary equipment (8 person hours); 2) roundtrip travel for 2 technicians traveling from Grand Junction, CO to the ANC Gas Hills site, a distance of 360 miles each way (32 person hours); 3) collection of groundwater samples from 3 surface water locations, 12 new monitoring wells, and 10 existing monitoring wells; preparation (including filtration in field) and shipment of samples to lab for analysis (80 person hours); 4) labor provided by Environmental Science and Protection Technicians (BLS Occupation Code 19-4091) @ \$21.15/hr. <sup>4</sup>
Monitoring -- Lodging and Meals & Incidental Expenses	\$1,640	Per diem for 2 technicians for 7 days and 6 nights (lodging @ \$83/day; meal & IE @ \$46/day). <sup>5</sup>



Monitoring -- Rental of 4-wheel Drive Vehicle, and Other Direct Costs	\$2,697	<p>1) rental of full-size SUV in Grand Junction: \$97/day (including taxes) for 6 days; assume \$210 in fuel costs (900 miles round trip);</p> <p>2) misc. expenses for ice to use in coolers, pens/pencils, batteries, and other needed items not provided by the laboratory are assumed to be \$200;</p> <p>3) shipping costs for sending coolers (2 samples per cooler) to Energy Laboratories, Inc. in Casper, WY: assume 13 coolers (including 6 duplicate or blank samples for QA purposes) @ \$12/cooler for ground shipping;</p> <p>4) tubing (cost of 100' roll = \$60; need 1 roll for each groundwater sample to prevent contamination; include 3 extra backup rolls).</p>
Laboratory Analysis	\$11,532	Sampling suite includes major ions, physical properties, metals - dissolved, metals - total, and radionuclides - dissolved, as specified by NRC. <sup>6</sup> Cost reflects analysis of <b>22 GW samples, 3 SW samples, and 6 duplicate or blank samples</b> (for QA purposes).
Data Evaluation and Reporting	\$1,890	Assumes 64 hours of labor to prepare Annual Inspection Report (covering both all wells and surface water sampling locations) as follows: <p>1) Hydrologist (BLS occupation code 19-2043): 40 hours @ \$34.56/hr</p> <p>2) Environment Science Technician (BLS occupation code 19-4091): 24 hours @ \$21.15/hr<sup>1</sup></p>
<b>Total Costs per Sampling Event</b>	<b>\$20,297</b>	<b>Annual sampling costs, assuming one sampling event per year.</b>
<b>Total for 6 Annual Sampling Events (2014 \$):</b>		<b>121,782</b>
<b>Cost Estimate Total (2014 \$):</b>		<b>384,653</b>
<p><sup>1</sup>. 12 new monitoring wells, all north of MW-16, are proposed as part of a new groundwater monitoring study. Per telecon between Ken Rock ICF, and Dr. Muthu Kuchanur, P.E., Geology Supervisor, WDEQ/LQD, 11/11/14.</p> <p><sup>2</sup>. Cost info provided to Ken Rock, ICF, in a telecon with Tom McLaughlin, NRC, 11/6/14.</p> <p><sup>3</sup>. Cost information from Geotechnical Services, Inc., Tustin, CA; 714-832-5610. Pump described at: <a href="http://www.geotechnical.net/rediflo-2-pump.shtml">http://www.geotechnical.net/rediflo-2-pump.shtml</a> (last accessed 7/11/12). 2012 costs have been updated to 2014 costs based on the CPI-U.</p> <p><sup>4</sup>. Labor rates are from Bureau of Labor Statistics, Occupational Employment Statistics, May 2013 State Occupational Employment and Wage Estimates, Wyoming. Mean hourly wage rates have been adjusted to reflect September 2014 rates relative to the May 2013 rates based on the CPI-U (factor of 238.0/232.9 = 1.022%) .</p> <p><sup>5</sup>. Per diem rates for Wyoming: <a href="http://www.gsa.gov/portal/category/100120">http://www.gsa.gov/portal/category/100120</a> = \$83 lodging and \$46 (M &amp; IE) (last accessed 11/5/14).</p> <p><sup>6</sup>. Laboratory analytical costs from Energy Laboratories, Inc., Casper, WY; cost per sample is \$372, including all of the analytes required by WDEQ (quotation is from Tessa Parke, Project Manager, Energy Laboratories, Inc. Casper, WY, 11/5/14). List of analytes is included in a letter from NRC to WDEQ, dated 6/12/14 (<b>ML14106A328</b>) and exactly matches the laboratory analyses currently being performed by Analytical Laboratories, Inc. for samples collected at the site.</p>		

**8. Transfer License to DOE****Costs (\$)****Assumptions**

NRC is estimating the transfer cost for use by Wyoming Department of Environmental Quality for planning purposes.

**Cost Estimate Total (2014 \$):****4,000,000**



# Consumer Price Index Data from 1970 to 2014

excerpted from: <http://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/>

The **Consumer Price Index** (CPI-U) data is provided by the U.S. Department of Labor Bureau of Labor Statistics.

The table of data is based upon a 1982 base of 100. What does this mean? A CPI of 195.3, as an example from 2005, indicates 95.3% inflation since 1982.

## All Urban Consumers – (CPI-U) 1970-2014

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Avg	Dec-Dec	Avg-Avg
1970	37.8	38	38.2	38.5	38.6	38.8	39	39	39.2	39.4	39.6	39.8	38.8	5.6	5.7
1971	39.8	39.9	40	40.1	40.3	40.6	40.7	40.8	40.8	40.9	40.9	41.1	40.5	3.3	4.4
1972	41.1	41.3	41.4	41.5	41.6	41.7	41.9	42	42.1	42.3	42.4	42.5	41.8	3.4	3.2
1973	42.6	42.9	43.3	43.6	43.9	44.2	44.3	45.1	45.2	45.6	45.9	46.2	44.4	8.7	6.2
1974	46.6	47.2	47.8	48	48.6	49	49.4	50	50.6	51.1	51.5	51.9	49.3	12.3	11
1975	52.1	52.5	52.7	52.9	53.2	53.6	54.2	54.3	54.6	54.9	55.3	55.5	53.8	6.9	9.1
1976	55.6	55.8	55.9	56.1	56.5	56.8	57.1	57.4	57.6	57.9	58	58.2	56.9	4.9	5.8
1977	58.5	59.1	59.5	60	60.3	60.7	61	61.2	61.4	61.6	61.9	62.1	60.6	6.7	6.5
1978	62.5	62.9	63.4	63.9	64.5	65.2	65.7	66	66.5	67.1	67.4	67.7	65.2	9	7.6
1979	68.3	69.1	69.8	70.6	71.5	72.3	73.1	73.8	74.6	75.2	75.9	76.7	72.6	13.3	11.3
1980	77.8	78.9	80.1	81	81.8	82.7	82.7	83.3	84	84.8	85.5	86.3	82.4	12.5	13.5
1981	87	87.9	88.5	89.1	89.8	90.6	91.6	92.3	93.2	93.4	93.7	94	90.9	8.9	10.3
1982	94.3	94.6	94.5	94.9	95.8	97	97.5	97.7	97.9	98.2	98	97.6	96.5	3.8	6.2
1983	97.8	97.9	97.9	98.6	99.2	99.5	99.9	100.2	100.7	101	101.2	101.3	99.6	3.8	3.2
1984	101.9	102.4	102.6	103.1	103.4	103.7	104.1	104.5	105	105.3	105.3	105.3	103.9	3.9	4.3
1985	105.5	106	106.4	106.9	107.3	107.6	107.8	108	108.3	108.7	109	109.3	107.6	3.8	3.6
1986	109.6	109.3	108.8	108.6	108.9	109.5	109.5	109.7	110.2	110.3	110.4	110.5	109.6	1.1	1.9
1987	111.2	111.6	112.1	112.7	113.1	113.5	113.8	114.4	115	115.3	115.4	115.4	113.6	4.4	3.6
1988	115.7	116	116.5	117.1	117.5	118	118.5	119	119.8	120.2	120.3	120.5	118.3	4.4	4.1
1989	121.1	121.6	122.3	123.1	123.8	124.1	124.4	124.6	125	125.6	125.9	126.1	124	4.6	4.8
1990	127.4	128	128.7	128.9	129.2	129.9	130.4	131.6	132.7	133.5	133.8	133.8	130.7	6.1	5.4
1991	134.6	134.8	135	135.2	135.6	136	136.2	136.6	137.2	137.4	137.8	137.9	136.2	3.1	4.2
1992	138.1	138.6	139.3	139.5	139.7	140.2	140.5	140.9	141.3	141.8	142	141.9	140.3	2.9	3
1993	142.6	143.1	143.6	144	144.2	144.4	144.4	144.8	145.1	145.7	145.8	145.8	144.5	2.7	3
1994	146.2	146.7	147.2	147.4	147.5	148	148.4	149	149.4	149.5	149.7	149.7	148.2	2.7	2.6



1995	150.3	150.9	151.4	151.9	152.2	152.5	152.5	152.9	153.2	153.7	153.6	153.5	152.4	2.5	2.8
1996	154.4	154.9	155.7	156.3	156.6	156.7	157	157.3	157.8	158.3	158.6	158.6	156.9	3.3	3
1997	159.1	159.6	160	160.2	160.1	160.3	160.5	160.8	161.2	161.6	161.5	161.3	160.5	1.7	2.3
1998	161.6	161.9	162.2	162.5	162.8	163	163.2	163.4	163.6	164	164	163.9	163	1.6	1.6
1999	164.3	164.5	165	166.2	166.2	166.2	166.7	167.1	167.9	168.2	168.3	168.3	166.6	2.7	2.2
2000	168.8	169.8	171.2	171.3	171.5	172.4	172.8	172.8	173.7	174	174.1	174	172.2	3.4	3.4
2001	175.1	175.8	176.2	176.9	177.7	178	177.5	177.5	178.3	177.7	177.4	176.7	177.1	1.6	2.8
2002	177.1	177.8	178.8	179.8	179.8	179.9	180.1	180.7	181	181.3	181.3	180.9	179.9	2.4	1.6
2003	181.7	183.1	184.2	183.8	183.5	183.7	183.9	184.6	185.2	185	184.5	184.3	184	1.9	2.3
2004	185.2	186.2	187.4	188	189.1	189.7	189.4	189.5	189.9	190.9	191	190.3	188.9	3.3	2.7
2005	190.7	191.8	193.3	194.6	194.4	194.5	195.4	196.4	198.8	199.2	197.6	196.8	195.3	3.4	3.4
2006	198.3	198.7	199.8	201.5	202.5	202.9	203.5	203.9	202.9	201.8	201.5	201.8	201.6	2.5	3.2
2007	202.4	203.5	205.4	206.7	207.9	208.4	208.3	207.9	208.5	208.9	210.2	210	207.3	4.1	2.8
2008	211.1	211.7	213.5	214.8	216.6	218.8	220.0	219.1	218.8	216.6	212.4	210.2	215.3	0.1	3.8
2009	211.1	212.2	212.7	213.2	213.9	215.7	215.4	215.8	216.0	216.2	216.3	215.9	214.5	2.7	-0.4
2010	216.7	216.741;	217.6	218.0	218.2	218.0	218.0	218.3	218.4	218.7	218.8	219.2	218.1	1.5	1.6
2011	220.2	221.309;	223.5	224.9	226.0	225.7	225.9	226.5	226.9	226.4	226.2	225.7	224.9	3	3.2
2012	226.7	227.7	229.4	230.1	229.8	229.5	229.1	230.4	231.4	231.3	230.2	229.6	229.6	1.7	2.1
2013	230.3	232.2	232.8	232.5	232.9	233.5	233.6	233.9	234.1	233.5	233.1	233.0	233.0	1.5	1.5
2014	233.9	234.8	236.3	237.1	237.9	238.3	238.3	237.9	238.0						

## Pathfinder Mines Corporation, Lucky Mc Site, October 14, 2003, letter from Hardgrove to Janosko

Activity	Quantity	Unit	Unit Cost	Cost
Regrading and Channels Excavation	1,720,420	CY	\$ 1.48	\$ 2,546,222
Radon Barrier Placement				
Clay	284,090	CY	\$ 1.74	\$ 494,317
Sand	284,090	CY	\$ 1.16	\$ 329,544
Rock Mulch and Filter Bed				
Large Rip Rap	9,390	CY	\$ 24.50	\$ 230,055
Small Rip Rap	7,240	CY	\$ 23.70	\$ 171,588
Rock Mulch	27,510	CY	\$ 20.00	\$ 550,200
Filter Bed	37,420	CY	\$ 16.40	\$ 613,688
Rip Rap Placement	16,630	CY	\$ 7.55	\$ 125,557
Rock Mulch/Filter Bed Placement	64,930	CY	\$ 3.25	\$ 211,023
Topsoil Placement	436,410	CY	\$ 1.17	\$ 510,600
Revegetation (labor & eq = \$57.50/AC; seed = \$40/AC)	328	AC	\$ 97.50	\$ 31,980
Subtotal				\$ 5,814,772
Contractor profit, mob/demob (10%)				\$ 581,477
Total Reclamation Contractor Cost				\$ 6,396,250
Construction Management			Lump Sum	
Materials Testing			Lump Sum	\$ 130,890
Groundwater Restoration			Lump Sum	\$ 144,528
Solution Evaporation			Lump Sum	\$ 12,376
Fencing			Lump Sum	\$ 31,625
Radiological Surveys			Lump Sum	\$ 40,000
Total				\$ 6,755,669



Contingency @15%		\$	1,013,350
Site Surveillance (calculation not shown)		\$	681,684
<b>Grand Total</b>		<b>\$</b>	<b>8,450,703</b>

**Pathfinder Mines Corporation, Lucky Mc Tailings and Mill Site Reclamation (Sept 29, 2000 letter to Gillen, NRC)**

(excerpted)

**Radiological Survey and Environmental Monitoring**

Post Reclamation Ra 226 Survey	50	AC	\$	1,000.00	\$	50,000
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**Environmental Monitoring**

Labor/Program Admin (1 tech 36 hrs/mo for 5 years)	5	YRS	\$	6,480.00	\$	32,400
Admin/Gen OH/Engr Oversight	5	YRS	\$	10,800.00	\$	54,000
Materials/Supplies (@400/mo)	5	YRS	\$	4,800.00	\$	24,000
Analytical Work (sum of 6 types of analyses)	5	YRS	\$	23,800.00	\$	119,000
<b>Total</b>					<b>\$</b>	<b>229,400</b>

Radon Barrier Placement	603,500	CY	\$	2.69	\$	1,623,415
Rate consists of:						
Prewetting (\$0.18/CY)						
Excavation & Haul of 1/3 to 1 mile (\$2.07/CY)						
Mixing & Compacting Fill (\$0.44/CY)						



**Umetco Minerals Corporation, Surety Update, December 20, 2000**
**Quarrying, Processing, and Delivery of Erosion Protection -- Average Cost of 8 Bidders (Table 3)**

D <sub>50</sub> = 0.5"	\$	14.04	CY
D <sub>50</sub> = 3"	\$	13.40	CY
D <sub>50</sub> = 6"	\$	13.95	CY
D <sub>50</sub> = 16"	\$	16.55	CY
D <sub>50</sub> = 30"	\$	17.56	CY

**Additional Cost for Placement on Above-Grade Tailings**

D <sub>50</sub> = 0.5"	\$	4.60	CY
D <sub>50</sub> = 3"	\$	4.25	CY
D <sub>50</sub> = 6"	\$	4.01	CY
D <sub>50</sub> = 16"	\$	8.85	CY
D <sub>50</sub> = 30"	\$	9.94	CY

**Note: Conversion factor of 1.35 tons/CY**

**Financial Surety Baseline Estimate, Gas Hills Reclamation Project, Umetco Minerals Corporation, July 2004**

UMETCO 2004 Annual Gas Hills Groundwater Sampling Costs, 13 wells, 1 Spring [p. 25 of 69]

Task	Quantity	Unit	Unit Cost	OH & Profit*	Annual Cost
Field Sampling					
10 days/yr x 10 hr/day x \$35/hr	3,500	LS	\$ 3,500	\$	3,500
Laboratory analysis**	1,815	LS	\$ 1,815	\$ 363	\$ 2,178
Report Preparation	2,500	LS	\$ 2,500	\$ 500	\$ 3,000
<b>Total annual cost, including contractor overhead &amp; profit:</b>				\$	<b>8,678</b>

\* OH & Profit = 20%

\*\* Parameters are: U-nat, Sulfate, Chloride (semi-annual); and As, Be, Pb, Ni, Ra-226, RA-228, Se, TH-230 (annual)

**Rio Algom costs, June 21, 2009****Costs for windblown tailings, summarized below for 554 acres (Rio Algom, June 2009):**

\$ 238,572	Costs to excavate and cover area N and E of Pond 1
	Excavation costs: 25 acres, 1" deep excavation, scraper cost of \$3.91/CY = \$157,703
	Cover costs: 25 acres, 6" of cover, \$4.01/CY to scrape (\$3.91/CY) and spread (\$0.10/CY) = \$80,868
\$ 50,718	Total cost to perform radiation surveys
\$ 99,824	Overall laboratory costs
\$ 609,400	Total revegetation costs
<u>\$ 998,514</u>	Total cost



# Appendix C

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## Soils Sample from ANC TP-1 Drainage







**Inter-Mountain Labs**  
Sheridan, WY and Gillette, WY

# - CHAIN OF CUSTODY RECORD -

Page of

All shaded fields must be completed.

This is a legal document: any misrepresentation may be construed as fraud.

# 154031

Client Name <b>RAND ENTERPRISES, INC.</b>		Project Identification <b>ANC-WAT 2015</b>		Sampler (Signature/Attestation of Authenticity) <b>R.A. Garling / R.A. Garling</b>		Telephone # <b>307-237-4188</b>	
Report Address <b>P.O. BOX 3321 CASPER, WY 82402</b>		Contact Name <b>R.A. GARLING</b>		ANALYSES / PARAMETERS  <b>PER QUOTE 1087 ATT</b>			
Invoice Address <b>LIDSTONE ASSOCIATES 4025 AUTOMATION WAY BLDG E FT. COLLINS CO 80525-3448</b>		Email <b>RAGARLING@RAEINC.BIZ</b>					
Phone <b>307-277-3861</b>		Purchase Order #		Quote # <b>1087</b>		REMARKS <b>L&amp;A 970-223-4705 CT. PR HILDENBRAND</b>	
ITEM		LAB ID (Lab Use Only)		DATE			
SAMPLE IDENTIFICATION		Matrix		# of Containers			
151510407-001		09:30		12:00		WP-288 0-15cm	
2		09:30		12:00		WP-288 15-30cm	
3		09:30		12:00		WP-288 @ 68cm	
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
LAB COMMENTS		Relinquished By (Signature/Printed)		DATE		TIME	
18.6		R.A. Garling		10/26/15		12:15	
		Kathy Boyd		10/27/15		12:10	
SHIPPING INFO		MATRIX CODES		TURNAROUND TIMES		COMPLIANCE INFORMATION	
<input type="checkbox"/> UPS <input type="checkbox"/> Fed Express <input type="checkbox"/> US Mail <input checked="" type="checkbox"/> Hand Carried <input type="checkbox"/> Other _____		Water WT Soil SL Solid SD Filter FT Other OT		Check desired service <input checked="" type="checkbox"/> Standard turnaround <input type="checkbox"/> RUSH - 5 Working Days <input type="checkbox"/> URGENT - < 2 Working Days Rush & Urgent Surcharges will be applied		Compliance Monitoring? Y/N Program (SDWA, NPDES,...) PWSID / Permit # Chlorinated? Y/N Sample Disposal: Lab Client	
ADDITIONAL REMARKS		RELATED TO ANC-GH-WAT-2015 IDENTIFICATION BY L&A FOR WDEQ / STATE OF WY.					



Date: 12/9/2015

**CLIENT:** R and D Enterprises, Inc  
**Project:** ANC -WBT 2015  
**Lab Order:** S1510407

**CASE NARRATIVE**

**Report ID:** S1510407001

Samples WP-288 @68cm, WP-288 0-15cm, and WP-288 15-30cm were received on October 27, 2015.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition

40 CFR Parts 136 and 141

40 CFR Part 50, Appendices B, J, L, and O

Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012

ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Inter-Mountain Labs

Your Environmental Monitoring Partner

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

**Sample Analysis Report**

**Company:** R and D Enterprises, Inc  
PO Box 3321  
Casper, WY 82602

**ProjectName:** ANC -WBT 2015  
**Lab ID:** S1510407-001  
**ClientSample ID:** WP-288 0-15cm  
**COC:** 154031

**Date Reported** 12/9/2015  
**Report ID** S1510407001

**WorkOrder:** S1510407  
**CollectionDate:** 9/20/2015 12:00:00 PM  
**DateReceived:** 10/27/2015 12:11:00 PM  
**FieldSampler:** RG  
**Matrix:** Soil

**Comments**

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
<b>Radionuclides - Total</b>							
Radium 226	374	pCi/g		0.2	E901.1 Mod.	11/28/2015 821	MB
Radium 226 Precision (±)	5.7	pCi/g			E901.1 Mod.	11/28/2015 821	MB

**These results apply only to the samples tested.****RL - Reporting Limit**

**Qualifiers:** A Check MSA specifications  
C Calculated Value  
H Holding times for preparation or analysis exceeded  
L Analyzed by another laboratory  
ND Not Detected at the Reporting Limit  
S Spike Recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank  
E Value above quantitation range  
J Analyte detected below quantitation limits  
M Value exceeds Monthly Ave or MCL or is less than LCL  
O Outside the Range of Dilutions  
X Matrix Effect

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

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**Sample Analysis Report**

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**Date Reported** 12/9/2015  
**Report ID** S1510407001

**ProjectName:** ANC -WBT 2015  
**Lab ID:** S1510407-002  
**ClientSample ID:** WP-288 15-30cm  
**COC:** 154031

**WorkOrder:** S1510407  
**CollectionDate:** 9/20/2015 12:00:00 PM  
**DateReceived:** 10/27/2015 12:11:00 PM  
**FieldSampler:** RG  
**Matrix:** Soil

**Comments**

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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**Radionuclides - Total**

Radium 226	368	pCi/g		0.2	E901.1 Mod.	11/28/2015 842 MB
Radium 226 Precision (±)	5.7	pCi/g			E901.1 Mod.	11/28/2015 842 MB

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S Spike Recovery outside accepted recovery limits

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E Value above quantitation range  
J Analyte detected below quantitation limits  
M Value exceeds Monthly Ave or MCL or is less than LCL  
O Outside the Range of Dilutions  
X Matrix Effect

Reviewed by: Wade Nieuwsma  
Wade Nieuwsma, Assistant Laboratory Manager



## Sample Analysis Report

**Company:** R and D Enterprises, Inc  
PO Box 3321  
Casper, WY 82602

**Date Reported** 12/9/2015  
**Report ID** S1510407001

**ProjectName:** ANC -WBT 2015  
**Lab ID:** S1510407-003  
**ClientSample ID:** WP-288 @68cm  
**COC:** 154031

**WorkOrder:** S1510407  
**CollectionDate:** 9/20/2015 12:00:00 PM  
**DateReceived:** 10/27/2015 12:11:00 PM  
**FieldSampler:** RG  
**Matrix:** Soil

## Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
<b>Radionuclides - Total</b>							
Radium 226	350	pCi/g		0.2	E901.1 Mod.	11/28/2015 903	MB
Radium 226 Precision (±)	5.3	pCi/g			E901.1 Mod.	11/28/2015 903	MB
Thorium 230	150	pCi/g		0.2	ACW10	11/19/2015 1042	MB
Thorium230 Precision (±)	14.1	pCi/g			ACW10	11/19/2015 1042	MB
<b>General Parameters - Soil</b>							
pH	3.4	s.u.		0.1	USDA 60-21a	11/17/2015 1605	BS
Electrical Conductivity	2.42	dS/m		0.01	ASA9 10-3.3	11/17/2015 1557	BS
Percent Solids	80.0	%		0.1	ASTM D2216	10/28/2015 000	KS
Percent Moisture	20.0	%		0.1	ASTM D2216	10/28/2015 000	KS
<b>Soil Anions</b>							
Chloride	9	ppm		1	EPA 300.0	11/20/2015 1034	AB
Sulfate	1780	ppm		1	EPA 300.0	11/20/2015 1034	AB
<b>Metals - Hot Water Soluble</b>							
Nitrogen-Ammonia	32	ppm		1	ASA9 33-3.2	12/07/2015 000	AMB
<b>Acid Potential</b>							
Total Sulfur	0.88	%		0.01	EPA600/2-78-054	11/09/2015 1104	JZ
Pyritic Sulfur Acid Generating Potential	ND	t/1000t		0.31	EPA600/2-78-054	12/03/2015 1335	KS
Net Neutralizing Potential	2.15	t/1000t			EPA600/2-78-054	12/03/2015 1335	KS
ANP/AGP Ratio	>6.94	t/1000t			EPA600/2-78-054	12/03/2015 1335	KS
<b>Metals - Total</b>							
Uranium	0.4	mg/Kg		0.3	EPA 200.8	11/05/2015 2226	MS
<b>Sulfur</b>							
Sulfur, Sulfate	0.87	%		0.01	EPA600/2-78-054	11/09/2015 1104	JZ
Sulfur, Pyritic	ND	%		0.01	EPA600/2-78-054	11/09/2015 1104	JZ
Sulfur, Organic	0.01	%		0.01	EPA600/2-78-054	11/09/2015 1104	JZ
Acid Neutralizing Potential	2.15	t/1000t			EPA600/2-78-054	11/05/2015 216	JZ
<b>Total Organic Carbon</b>							
Total Carbon	0.3	%		0.1	ASA9 29-2.2	11/09/2015 1104	JZ

## These results apply only to the samples tested.

## RL - Reporting Limit

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Wade Nieuwsma, Assistant Laboratory Manager