Lidstone and Associates - A Wenck Company

October 2, 2017

Mr. 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-8F05
11545 Rockville Pike
Rockville, MD 20852-2738

RE: ANC Tailings Pond #1 Interim Stabilization Plan Design Memorandum

Dear Nick:

Enclosed for your review is the Design Memorandum for the ANC Tailing Pond #1 Interim Stabilization Plan. The Memorandum includes construction specification sections for Earthwork, Drainage Construction and Control, and Revegetation; Construction Drawings; and a Health and Safety Plan.

If you have any questions, please don't hesitate to contact me.

Sincerely,
Lidstone & Associates, a Wenck Company

Christopher D. Lidstone
Principal and Regional Manager

CDL:rce

Enclosures
Cc: Muthu Kuchanur
Sent via: Federal Express

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Technical Memo

Lidstone and Associates - A Wenck Company

To: Dominick Orlando, USNRC
Muthu Kuchanur, PE, PhD, Wyoming DEQ

From: Chris Lidstone, Marty Jones, Zack Billingsley, Paul Hildenbrand

Date: October 2, 2017

Subject: ANC Tailings Pond #1 Interim Stabilization Plan Design Memorandum

1.0 Introduction

The results of the Task Order# 002 (TO-2) report was submitted to the Nuclear Regulatory Commission (NRC) in August 2016. The NRC staff has reviewed the Task Order # 002 engineering evaluation/cost analysis reports. Based on the recommendations of the Task Order # 002 report and the Wyoming Department of Environmental Quality, Land Quality Division's (WDEQ) request to revise the Confirmatory Order, the Confirmatory Order was modified to state, "Using the funds remaining from the forfeited reclamation bond, the WDEQ shall perform engineering and reclamation activities to temporarily stabilize the tailings ponds and provide surface diversions.". In a letter dated November 4, 2016, the WDEQ/LQD has accepted this modified Confirmatory Order. With concurrence from the NRC, the WDEQ/LQD issued Task Order # 003 (TO-3) dated March 21, 2017.

The primary purpose of (TO-3) was to complete the engineering design work for covering TP-1 and for the construction of diversion channels around TP-1. The work included sampling of the overburden stockpile, sampling and suitability evaluation of the material within Willow Springs Draw (Wicking Barrier) and identification, surveying and review of various topsoil stockpiles to determine their radiological and chemical suitability for use as cover material. Based on site investigations, suitable material quality and quantity analysis, and estimated construction costs, the proposed design calls for an average cover thickness of 3.25 feet to be placed on TP-1. The engineering analysis shows that this cover will allow successful revegetation and as such will address geomorphic stability and provide an interim cover until additional funding is available for permanent closure of the site. The proposed design will address long term stabilization of TP-1 and minimize adverse impacts to the environment and public health and safety. The remainder of this memorandum provides a summary of TO-3 activities that resulted in the current proposed interim stabilization plan.

2.0 Material Suitability

2.1 Topsoil

The materials suitability investigation included identification and sampling of topsoil stockpiles, overburden spoils material and the sandy channel material in Willow Springs Draw. Additionally, the existing TP-1 cover and the surface of the overburden borrow area was surveyed for radioactivity using a handheld gamma scintillation instrument (MicroR meter).

A total of 11 topsoil stockpiles were identified during site investigations, of which 9 will be used for the TP-1 Cover (**Figure 1**). These stockpiles were surveyed to provide accurate volumes, with the total volume of the available topsoil for the TP-1 cover equaling approximately 50,700 cubic yards (CY). This should provide approximately 12 inches of topsoil over the entire TP-1 area (approximately 36 acres). An additional 12 inches of

growth medium of suitable material will underlie the topsoil. The results of the topsoil sample analyses are provided in **Table 1**. The topsoil was compared to WDEQ Guideline 1 Criteria for topsoil suitability and was determined to meet the suitability criteria.

Table 1: Topsoil Results

Property/Constituent	Result
Texture	Sandy Loam
Sand	64%
Silt	23%
Clay	13%
pH	7.2
Organic Matter	1.30%
Available Potassium	162 ppm
Electrical Conductivity	0.42 dS/m
Nitrogen-Nitrate	5.9 ppm
Radium 226	5.8 ± 0.3 pCi/g
Sodium Bicarbonate Phosphorus	17 ppm
Total 3050 Uranium	9 mg/Kg

An additional 34,000 CY of topsoil is available and can be used for future reclamation activities, as needed, including reclamation of the borrow area.

2.2 Overburden

During the material suitability investigations, test pits ranging in depth from 8 to 13 feet were excavated in the overburden material located to the south and west of TP-1. Each test pit was logged to address lithology, mineralogy, radiometrics, and texture. Logging and evaluation of material suitability was overseen by a licensed geologist. Overburden samples were composited across the following intervals: 0-5 feet and 5-14 feet to compare the differences in material suitability at variable depths. The samples were sent to an EPA approved analytical laboratory and were analyzed for Radium-226, ABP, As, Se, and SAR.

Based on the WDEQ/LQD Guideline 1 suitability criteria, the majority of all samples met Arsenic (<2.0 ppm), Selenium (<0.1 ppm), and Sodium Absorption Ratio (SAR) (0-10) suitability. The pH (5.5 – 8.5) and Acid-Base Potential (>-5 t/1000t) criteria were typically not met. The overburden material had an average acid-base potential (ABP) of -15.2 t/1000t and an average pH of 4.5, indicating highly acidic material and/or material which will become acidic over time. **Figure 2** and **Figure 3** provide the results of the analysis for pH and ABP at the variable depths. As shown in the figures, the deeper material proved to be more suitable in terms of ABP and pH. Radium-226 analyses averaged 9.2 pCi/g, well below the determined suitability limit of 20 pCi/g. Only three samples exceeded 20 pCi/g:TP2-1, TP3-2, and TP4-1. Field mixing and/or separation during excavation should be adequate to maintain soil concentrations at less than 20 pCi/g.

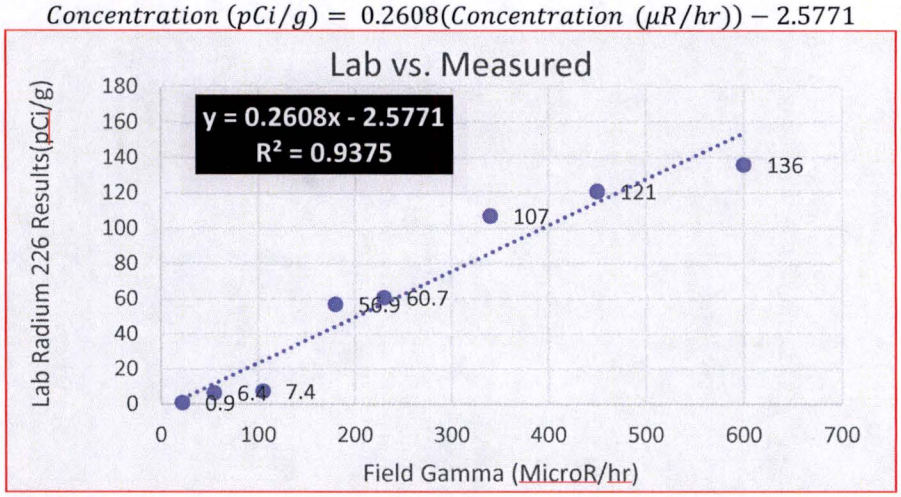
2.3 Radiological Survey

The surface of the existing TP-1 cover and the proposed overburden borrow area were surveyed during the site investigations using a handheld microR meter (**Figure 4**). The existing TP-1 cover consists of approximately 1 to 2.5 feet of cover material, placed on top of the tailings in 1988 by ANC. Since 1988, the existing cover has proven inadequate in reducing the radon emanation to less than the acceptable level of 20 pCi/m^{2}S, as discussed further in Section 3.0. The average background radiometric measurements recorded in native material at a distance of approximately 2000 feet from TP-1, for shielded and unshielded was 38 µR/hr and 50 µR/hr, respectively, which translates as a calculated range

from 7.3 to 10.4 pC/gm. Data provided by ANC in 1988 indicated an average background (unshielded) gamma exposure reading at one meter from the surface of 40 μR/hr and an average background Radium-226 concentration of 4.27 pCi/g. Similar studies performed in West and Central Gas Hills areas for Abandoned Mine Lands projects have resulted in similar average background gamma exposure rates ranging from 8 to 11 pC/gm. Therefore, the unshielded exposure rate determined above appears to be consistent with other historic studies performed at the site and within the Gas Hills area.

Surface gamma measurements were taken at each of the overburden borrow area soil sampling locations. These field measurements were compared to the Radium-226 concentrations measured by the laboratory to create the regression equation below:

$$Concentration\ (pCi/g) = 0.2608(Concentration\ (\mu R/hr)) - 2.5771$$



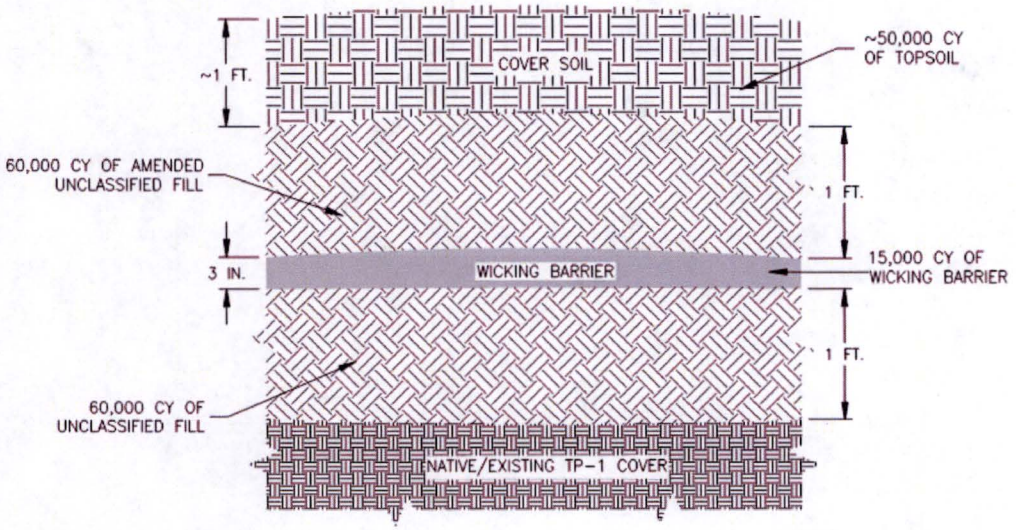
Using this regression equation, surface gamma readings measured in the overburden borrow area and at TP-1 were converted to Radium-226 concentrations in pCi/g. **Figure 4** shows the locations and results of the unshielded field gamma survey, while **Figure 5** shows the calculated Radium-226 concentrations at each location. The average calculated Radium-226 concentration for the overburden material using the regression equation are 7.3 pCi/g and 10.4 pCi/g for shielded and unshielded, respectively. It should be noted that the average Radium-226 content reported by the laboratory was 9.6 pCi/g, which agrees closely with the regression curve calculations. The calculated concentrations were used to establish the suitability of overburden from the proposed borrow area and to characterize the surficial radium content of existing cover material at TP-1. The NRC standards for establishing the suitability of cover material with respect to Radium-226 are based on the background concentration at the site + 5 pCi/g for the first 15 cm depth below surface and background plus 15 pCi/g for each subsequent 15 cm depth. Using the unshielded value above of 10.6 pCi /g, the near surface target for cover Radium-226 concentration is 15.6 pCi/g.

Based on the above, the surface gamma survey data supports the laboratory analytical data used to determine that most of the overburden material is of suitable quality in terms of Radium-226, particularly the material located in the northern half of the borrow area. The surface gamma measurements collected from TP-1 were used in the development of design plans for covering and revegetating TP-1.

3.0 Reclamation Conceptual Plan

Initially, the cover design goal for TP-1 included a 5-foot thick cover including layers of clean spoil material, wicking material, and topsoil. However, as earthwork unit prices and required quantities were developed, it was determined that the remaining funding would allow for only an additional 3.25 feet of cover. The current proposed cover plan, shown in **Detail 1**, includes a 1-foot thick layer of unclassified fill (overburden) over the existing 2.0+/- feet of existing cover, followed by a 3-inch thick layer of wicking material, followed by another 1-foot thick layer of unclassified material amended with lime to buffer the potential for soil acidity. Finally, an approximate 1-foot thick layer of suitable topsoil will be placed over the cover material, and the entire affected surface will be revegetated. The purpose of the wicking layer (coarse textured imported layer) is to ensure vertical drainage from the growth media layers (topsoil and amended overburden), while preventing capillary rise and potential acidification of the upper layers.

Detail 1: TP-1 Proposed Cover Plan



The bottom layer of unclassified material will provide additional protection to the cover material from radon emanation. A 2014 radon emanation study at TP-1, conducted by Oak Ridge Associated universities for the NRC, indicated that with the existing cover (~2-3 feet thick) the radon emanation from TP-1 averaged 32.3 pCi/m^{2}S, with a low of 2.1 pCi/m^{2}S and a high of 189.8 pCi/m^{2}S. It is anticipated that the additional 3.25 feet of cover thickness will reduce the average TP-1 radon emanation rate to less than 20 pCi/m^{2}S. The sand moisture layer (wicking barrier) will provide protection for the bottom fill layer from potential surface seepage that could cause mobilization of water through the tailings. The wicking barrier, in combination with the unclassified fill layer above it, will allow a capillary break to form due to the different hydraulic conductivities of the different materials. This will restrict the flow of water, thereby minimizing the potential of water seepage into the tailings. The top layer of unclassified fill has an average ABP of -7 t/1000 t, which will require an amendment of lime to meet WDEQ Guideline 1 suitability standards. The lime will be imported from Worland, Wyoming (waste product from the sugar beet processing industry) and will be disked into the soil to provide a long-term buffer to future acidification. The lime will be applied at the recommended ABP rate to ensure that there is sufficient $CaCO_3$ to address future acid-turning potential. This will not only provide immediate support (organic matter and porosity), but will ensure the long-term survival of the surface

revegetation cover. Although approximately 1 foot of topsoil will be placed over the unclassified fill layer, root depths for native vegetation in the Gas Hills can reach to 18-inches below surface, meaning the layer below the topsoil must also be suitable for vegetation growth.

4.0 Design Hydrology

The site hydrology was determined using the precipitation events from TO # 002 (**Table 2**) and delineating the watersheds for the project area. A drainage plan was developed to convey runoff around TP-1. This assumes not only existing topography but also the removal of all blockages to ensure through drainage. Each diversion channel will collect runoff from the surrounding areas, minimizing erosion of the proposed TP-1 Cover. The Rational Method was used to estimate the design discharge from each basin. A Curve Number (CN)= 76 was assumed for the landscape, the hydrologic soil group, and vegetative cover of the project area. Converting the CN to a runoff coefficient (C) allowed the runoff during each event for the western basin (72.6 acres) and the eastern basin (30.2 acres) to be determined. Geomorphic stability of each drainage was a design consideration-given their proximity and purpose to rout flows around the mill tailings (TP-1). Although direct erosion and overtopping flows needed to be addressed, it was important to consider sediment yield and channel aggradation as design considerations.

Table 2: Gas Hills Storm Events

Event	Precipitation (in)
PMP (1 hour)	9.2
100-year, 24-hour	3.3
50-year, 24-hour	2.6
25-year, 24-hour	2.3
10-year, 24-hour	1.9
2-year, 24-hour	1.1

Soil samples were collected in locations that would drain directly into the drainage channels and a Shield's Analysis was conducted to determine the threshold for sediment motion. The analysis concluded that the material was highly mobile and would be entrained during the rising limb of the hydrograph and would be deposited during the recessional limb of the hydrograph. To address this concern, a detention basin that would collect 80% of the western basin runoff was incorporated into the design. With this detention basin, the western basin can be reduced to 14.6 acres, significantly reducing the runoff into the diversion channel. Sized to contain the 100-year event (2.13 acre-feet (AF)) with extra contingency, the basin's capacity is approximately 3.48 AF of water, or 5620 CY of sediment. A Universal Soil Loss Equation (USLE) analysis was conducted on the western basin to determine the approximate amount of time it would take to fill the proposed basin with sediment. Using three different methods (Modified USLE, Julien, and McCool) and assuming a portion of each basin would remain unreclaimed, it was determined that it would take between 37 and 69 years to fill the basin completely, and 14-27 years to reduce the capacity of the basin to below the 100-year event. The capacity of each proposed diversion channel and the detention basin is presented in **Table 3**.

Table 3: Site Design Hydrology

	West Channel (No Detention)	West Channel (With Detention)	East Channel	Total Discharge-Both Drainages with Detention (cfs)	Maximum Total Discharge-Both Drainages (cfs)
Area (acres)	72.6	72.6	30.2	44.8	130.7
PMP (1 hour)	743	149	289	439	1337
100-year, 24-hour	150	30	57	88	269
50-year, 24-hour	91	18	35	53	163
25-year, 24-hour	68	14	26	39	122
10-year, 24-hour	40	8	15	23	72
2-year, 24-hour	2	0	1	1	3

While the diversion channels could be designed to convey the 100-year or greater event in an erosionally stable fashion, such a design approach would result in excessive aggradation under more frequently occurring and lesser return period events. Sediment deposition in the channels could create a backwater or damming effect, causing potential erosion of the TP-1 cover by redirecting flows into the covered tailings. Overall aggradation could result in the loss of channel capacity and allow meandering flow adjacent to the cover. With the approximate discharges for the channels determined, the channels were sized as shown in **Detail 2**. With the highly mobile material, the goal was to ensure that sediment would be conveyed through the channels in a hydraulically efficient fashion. The channel was sized to ensure the velocities remain non-erosive (less than 3.5 ft/s) for events less than the 10-year event. During the 10-year event, the expected velocities for the west and east channels are 2.8 ft/s and 3.2 ft/s, respectively, meeting the 3.5 ft/s criteria. The west channel velocities assume the detention basin is constructed. If there is no detention basin, the velocity increases to 4.2 ft/s in the west channel for the 10-year event. Channel hydraulics for the west and east diversion channels are shown in **Table 4**.

Detail 2: TP-1 Diversion Channel Typical Section

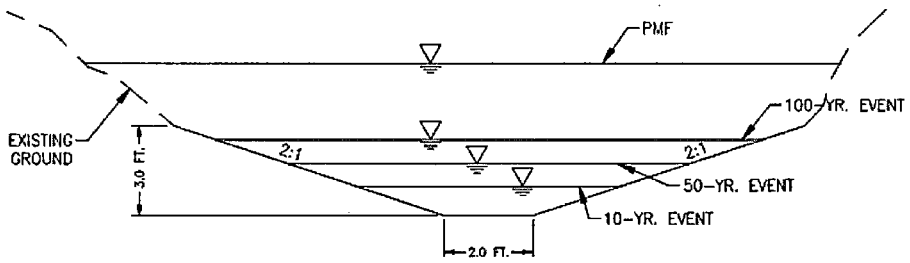


Table 4: TP-1 Diversion Channel Hydraulics

		Flow Event					
		PMF	100-Year	50-Year	25-Year	10-Year	2-Year
Western Channel w/o Detention	Flow (cfs)	743	150	91	68	40	2
	Depth (ft)	6.1	3.1	2.5	2.2	1.7	0.4
	Velocity (ft/s)	8.7	5.8	5.1	4.8	4.2	1.8
West Channel w/Detention	Flow (cfs)	149	30	18	14	8	1
	Depth (ft)	3.1	1.5	1.2	1.1	0.8	0.2
	Velocity (ft/s)	5.8	3.9	3.4	3.2	2.8	1.1
East Channel	Flow (cfs)	289	57	34	26	15	1
	Depth (ft)	4.1	2.1	1.6	1.4	1.1	0.2
	Velocity (ft/s)	6.9	4.6	4.0	3.7	3.2	1.3

1. Manning's n = 0.035

5.0 Grading Plan

5.1 Grading Plan

Prior to commencement of material borrow, high spots upon the existing TP-1 will be regraded to develop a relatively even surface and allow direct placement of the final cover. The overall grading plan will create a uniform and gently sloping surface that will provide support and stability for the additional approximately 3.25 feet of cover. Given the presence of the existing cover (estimated at 2.0 feet) and the addition of 3.25 feet of clean (low radium levels) cover, radon emanations are anticipated to be less than the 20 pCi/m^{2}S background. The final cover will consist of approximately 12 inches of topsoil and 12 inches of suitable subsoil, which will provide adequate growth medium for a revegetated surface. Below the growth medium layer of 24 inches, a 3-inch wicking barrier will protect the subsoil from capillary rise of salts and acidification due to the oxidation of sulfides in the lower layers flux.

Geomorphically the final cover **(Figure 7)** will be slightly domed with an overall grading of 40:1 (H:V) across the regraded and covered tailings and side slopes that tie into the existing topography at a gradient no steeper than 8:1 (H:V). With a well-established vegetated cover, this slightly mounded cover within a protected natural valley will be resistant to wind and water erosion. The adjacent diversion channels will be sized to convey the PMF and will be erosionally stable up to the 10-year event. Lateral erosion into the tailings is unlikely given the thickness of the barrier (ranging from 50 to 150 feet) between the newly constructed diversion and the actual buried tailings. The presence of a grade control (buried rock riprap-see Section 7.1) where each channel outlets to the native channel on the north side of the reclaimed TP-1, will prevent headcutting from the native channel into the diversion channel adjacent to the reclamation (closure) area.

5.2 Borrow Sources and Placement

Using the results of the material suitability investigation, the best quality overburden material was selected for placement on TP-1. **Figure 6** shows that the material is considered suitable for use with respect to ABP and pH. The majority of the samples were collected using a track excavator from the near surface to a maximum depth of 10-14 feet. Due to the unknown material quality below this depth and final borrow area regrading (reclamation) costs, the maximum excavation within the borrow area was established at approximately 13 feet. As shown in **Figures 2 and 3**, the overburden material within the proposed borrow area is more suitable at the lower depths (5-14 feet) and exhibit an

average ABP of -3.3 t/1000t. The upper zone (0-5 feet) exhibits an average ABP of -11.4 t/1000t. Therefore, the excavation will occur in two phases. The first 5 feet of material, or the depth of cut that will generate 60,000 CY will be used for the lower (unamended) layer and will be placed directly on the TP-1 existing surface. After the first 60,000 CY of material is excavated from the borrow area, the remaining approximate 60,000 CY of material will be placed above the wicking barrier and amended with imported lime as part of phase two. The borrow area will be regraded to a concave landform, with slopes from 4:1 (H:V) to 8:1 (H:V) draining into the proposed detention basin. This borrow area will be left unreclaimed under this project.

The topsoil stockpiles that will be used for the TP-1 cover will be loaded and hauled to TP-1. Upon excavation of the topsoil, a minimum of 1 foot of topsoil shall remain at each topsoil stockpile location. The disturbed location will be ripped, disked, and seeded.

6.0 Willow Springs Draw

6.1 Design Considerations

It was initially anticipated that 12 inches of wicking material would be placed on TP-1. After evaluating haul distances and unit price estimates, it was determined that the remaining funds and available field quantities would allow only for a wicking barrier 3 inches in thickness over the approximately 36 acres of TP-1 cover surface. The required material volume is 15,000 CY. During the site investigation in April 2017, a profile and cross sections of Willow Springs Draw were stationed and field textures were established at depths ranging from the surface to 2 feet. A review of pre-1987 mapping indicate that the Willow Springs Draw channel has been subjected to between 4-7 feet of aggradation since its construction circa 1982. The sedimentologic characterization of the upper 2 feet is anticipated to remain consistent to a depth of 3-5 feet. Based on the analysis, it was determined that the material is suitable and will provide an adequate wicking barrier in the TP-1 cover.

6.2 Channel Profile

The existing slope of Willow Springs Draw, on average, is approximately 1.20%. Without creating a large knickpoint, an average depth of 5 feet needs to be excavated out of the channel to generate the required volume of wicking material. **Figure 8** presents the proposed channel profile that will incorporate a new channel cross section to assist in the geomorphic stability of Willow Springs Draw. A narrow pilot channel (20-foot bottom width), with a high flow floodplain will transport the sediment through the reach more efficiently than current conditions allow.

While no modifications to the existing Willow Springs Draw culverts are proposed, adjustments to the channel gradient will provide better transport capacity. The gradient immediately upstream of the culverts will be flattened to approximately 0.80%, while approximately 500 feet upstream, the gradient will be approximately 1.62%. This steepening will increase channel velocities through this section and will convey the sediment through the channel much more efficiently than current conditions. It is anticipated that deposition will continue to occur within the flattened section, where the channel approaches the haul road culvert.

7.0 Miscellaneous Considerations

7.1 Grade Control

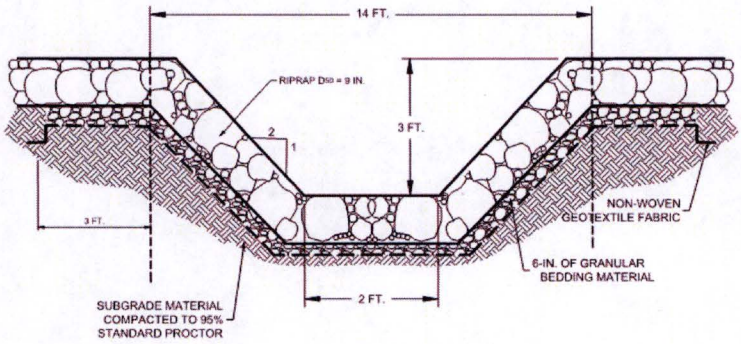
As discussed in Section 4.0, diversion channels on each side of TP-1 will be constructed to prevent erosion of the proposed cover. These channels will extend toward the northernmost

section of TP-1 where they will transition into existing, but steeper native channels. The existing drainages are well vegetated and the presence of this vegetation (grass and shrub) will yield a much more stable system immediately than if one were to construct a new channel. Given slope considerations (averaging 5-7%) a newly constructed channel would require riprap to ensure some degree of stability. For this reason, the design daylights the newly constructed diversion channel into a well vegetated existing channel north of the TP-1 Tailings Dam.

Once vegetation is developed in the constructed channels and throughout the entire site, the system will be much more stable and there will be retardance for both stream and overland flow. During large storm events, there will be potential for channel erosion originating from the steeper downstream native drainages and without correction this could result in a progressive headcut migrating upstream towards TP-1. To prevent any adverse impacts to the TP-1 cover or its adjacent diversion channels, grade control structures will be constructed at the transition from the constructed channels to the native drainages. These structures are designed to ensure that a headcut will not migrate upstream into the constructed channels and threaten the integrity of the TP-1 cover.

The riprap of the proposed grade controls (**Detail 3**) was sized to withstand the 100-year, 24-hour event. Using the Riprap Design Software, RDS3, various methods were used to analyze the hydraulic conditions during this type of event. Using the method by the Army Corps of Engineers (USACE), a D50=9 inches was determined to be of sufficient size to withstand events exceeding the 100-year event in both the east and west drainage channels.

Detail 3: Grade Control Structure Detail



PROFILE VIEW

Figure 1: Site Overview
Figure 2: Cover Material Suitability - pH
Figure 3: Cover Material Suitability (ABP)
Figure 4: Surface Radiological Measurements (microR)
Figure 5: Surface Radiological Measurements (pCi/g)
Figure 6: Material Borrow Plan
Figure 7: TP-1 Cover Plan
Figure 8: Willow Springs Draw Plan and Profile

Figures

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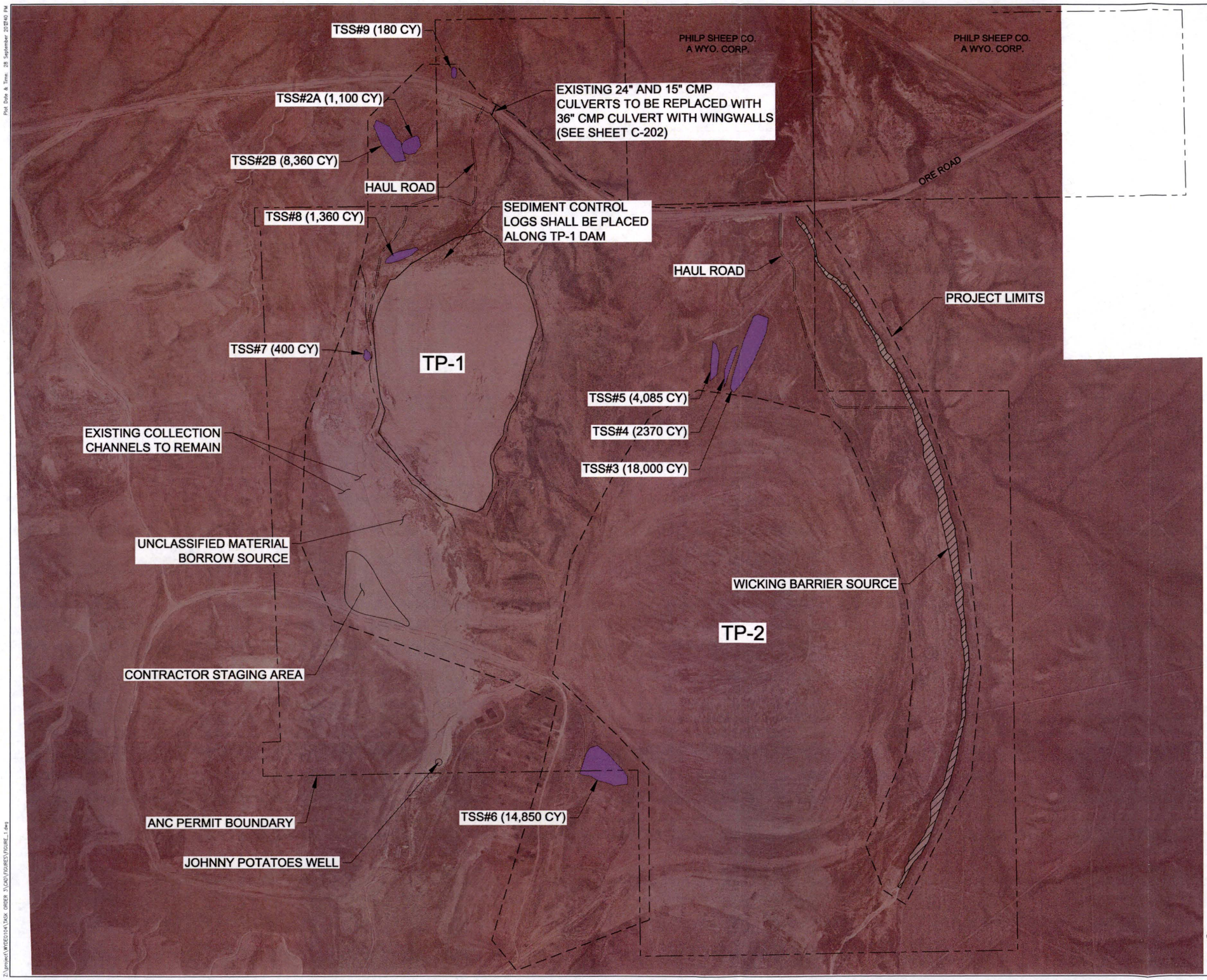

LEGEND

- HAUL ROAD
- PROPERTY BOUNDARY
- WICKING BARRIER SOURCE
- TOPSOIL SOURCE PILE

NOTES:

1. ALL TOPSOIL STOCKPILES USED FOR TP-1 SHALL BE RECLAIMED AND TIED INTO EXISTING GROUND AND REVEGETATED.
2. WATTLES TO BE PLACED IN THE COLLECTION CHANNELS, AND WITHIN THE DISTURBANCE AREA AT THE DIRECTION OF THE ENGINEER.
3. CONTRACTOR SHALL CONDUCT RECLAMATION OPERATIONS WITHIN THE PROJECT LIMITS.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

CLIENT

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY
LAND QUALITY DIVISION

PRIME CONSULTANT

Ligrone and Associates, Inc.
WENCK
Responsive partner, Exceptional outcomes

SUB CONSULTANT

PROJECT TITLE

AMERICAN NUCLEAR CORPORATION
TP-1 INTERIM STABILIZATION PLAN

SHEET TITLE

SITE OVERVIEW

DWN BY	CHK'D	APP'D	DWG DATE 9/28/17
DJW	CMJ	CDL	SCALE

PROJECT NO.	SHEET NO.	REV NO.
WYDEQ104	FIGURE 1	

Plot Date & Time: 28 September 2017 40 PM

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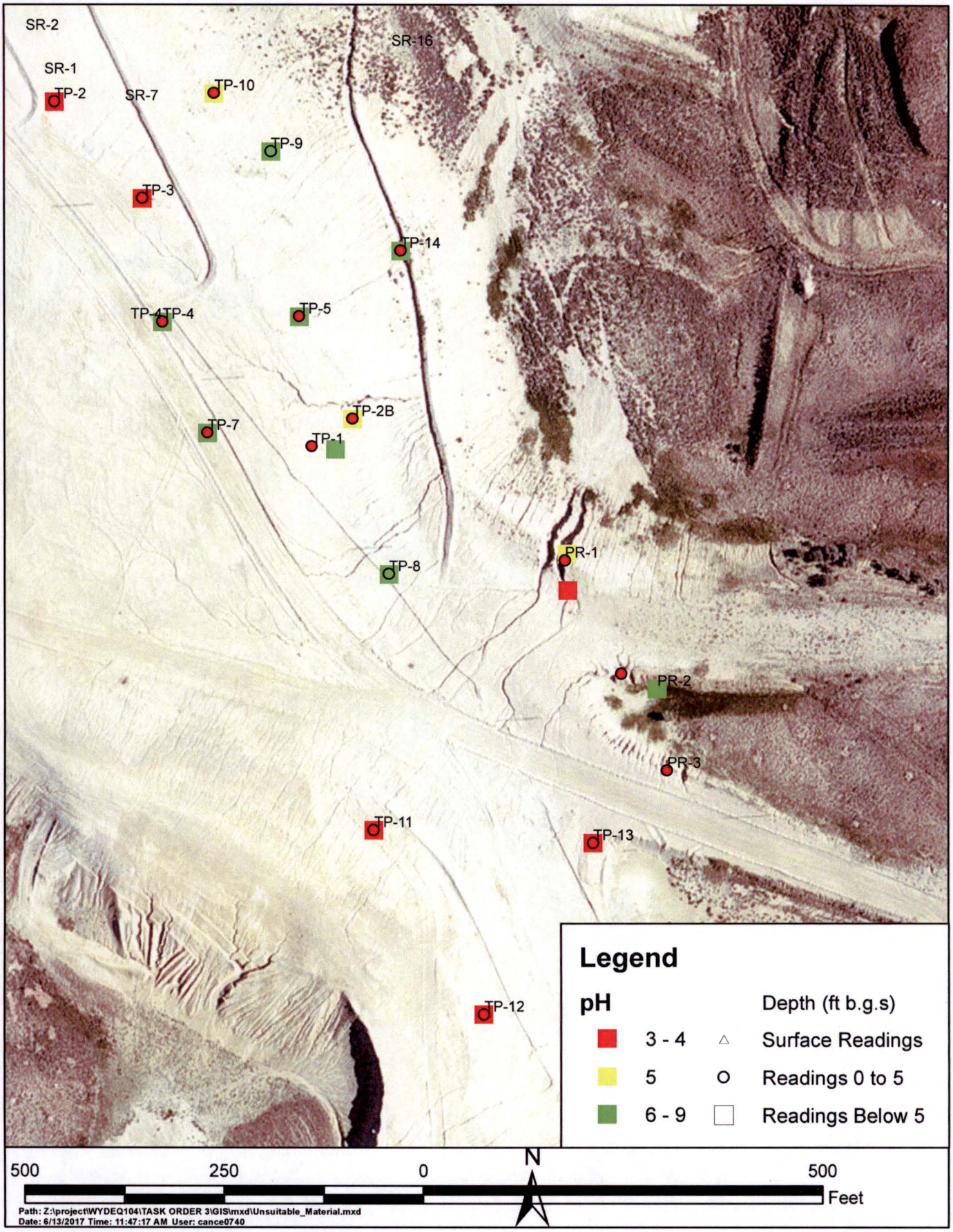
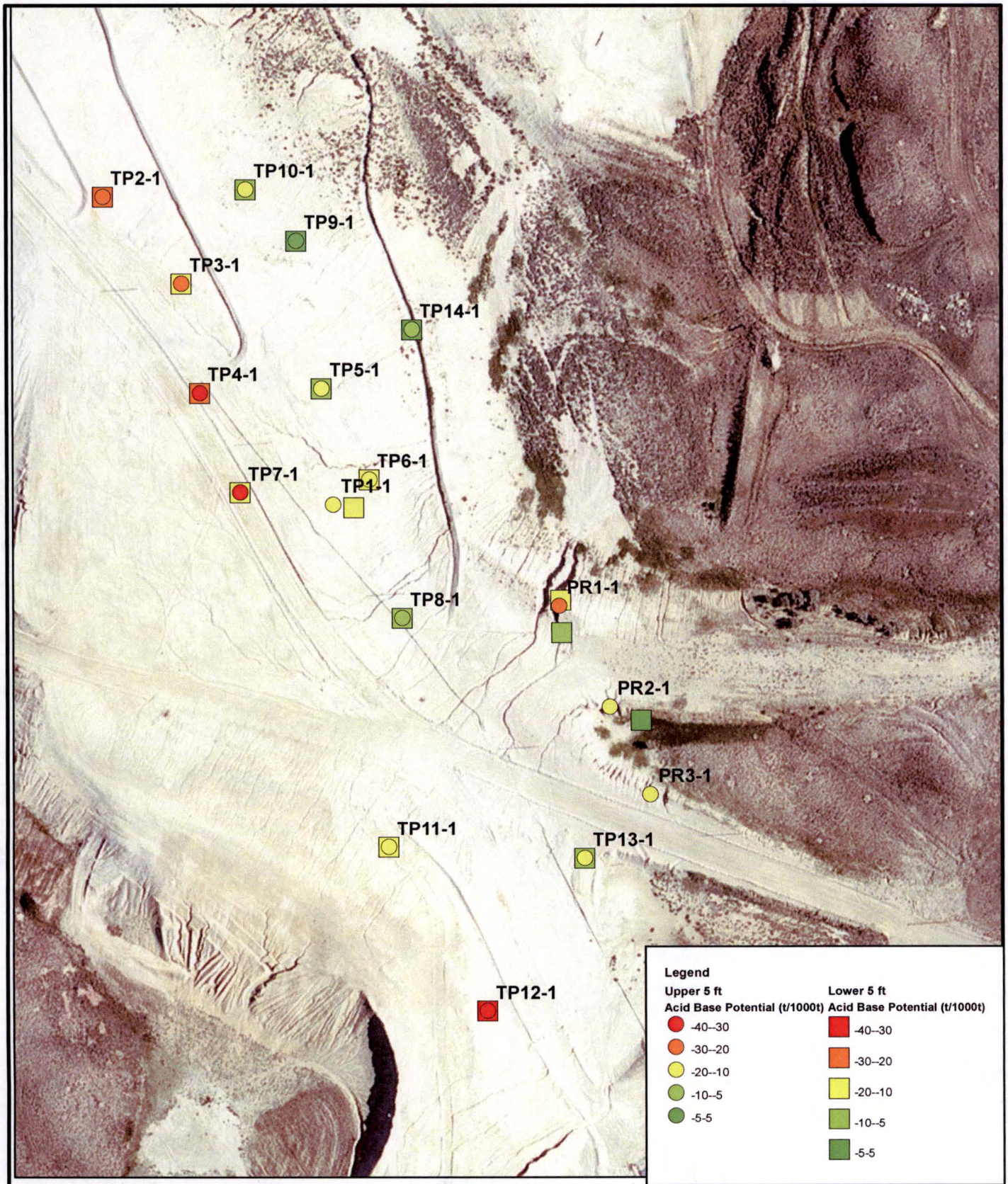


ANC TASK ORDER 3- DATA COLLECTION	Lidstone and Associates, Inc. / WENCK / Lidstone and Associates - A Wenck Company	JUNE 2017
Cover Material Suitability - pH		Figure 2



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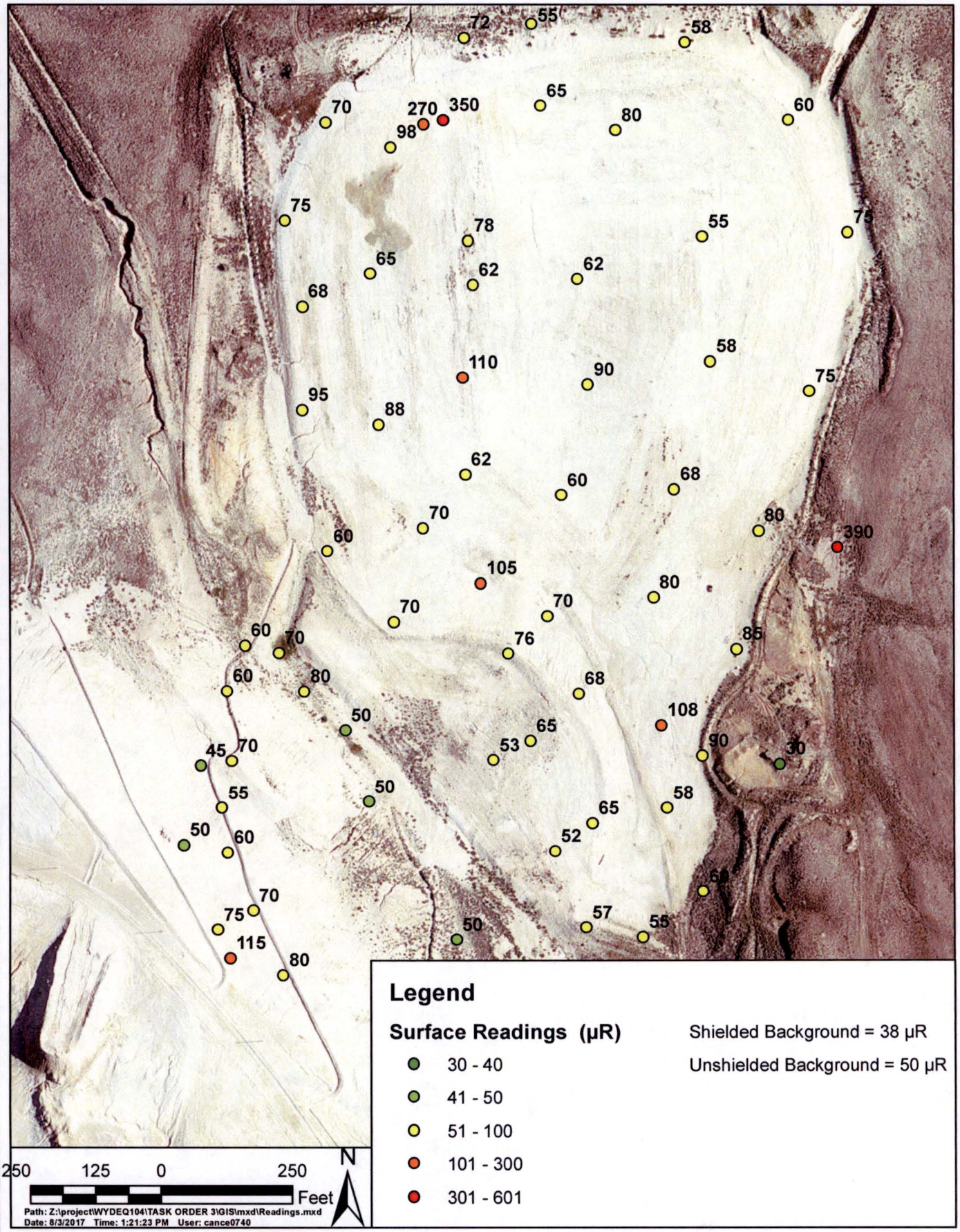
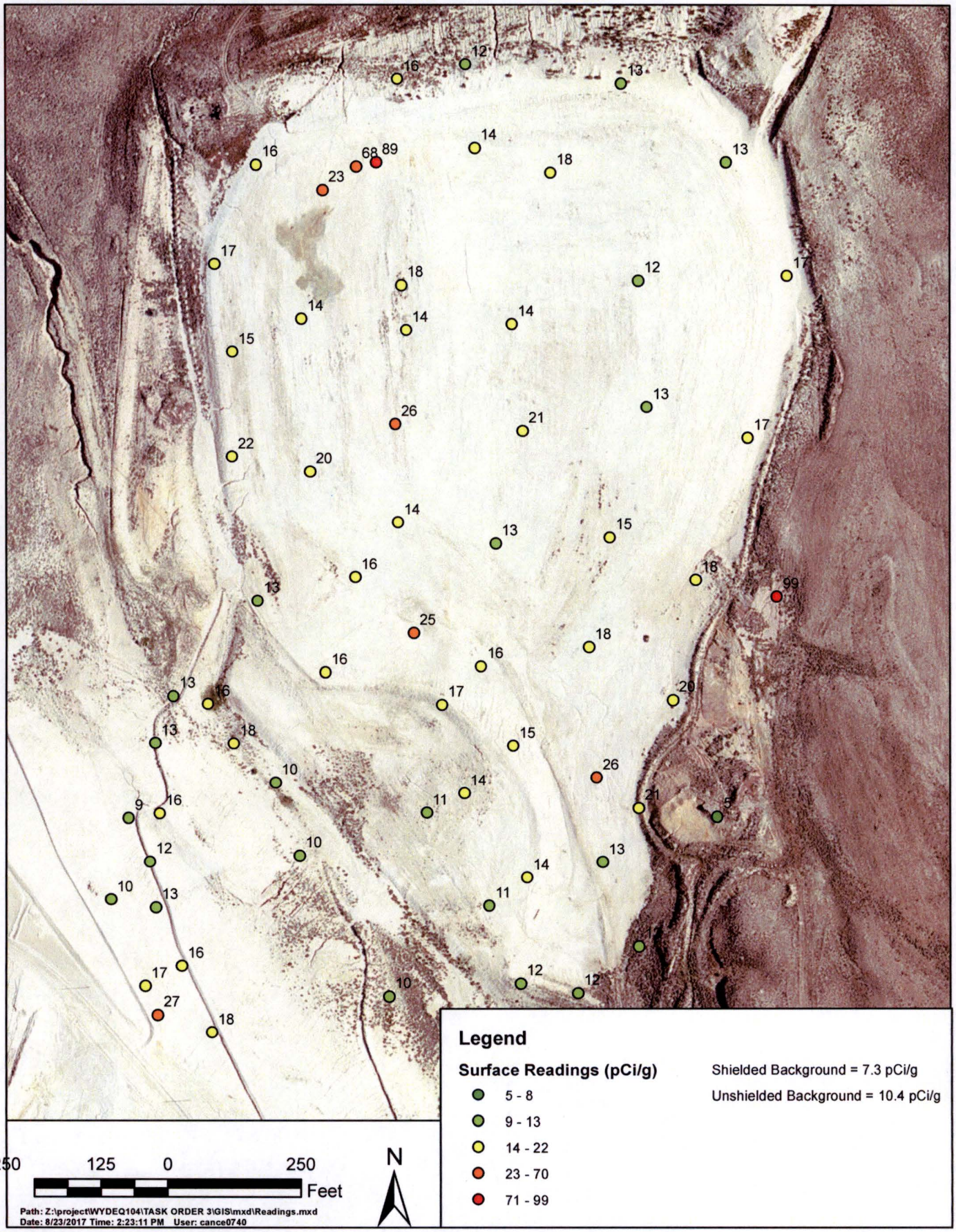
ANC TASK ORDER 3- DATA COLLECTION	Lidstone and Associates, Inc. WENCK	JUNE 2017
Cover Material Suitability	Lidstone and Associates - A Wenck Company	Figure 3



ANC TASK ORDER 3- DATA COLLECTION	Lidstone and Associates, Inc. / WENCK — Lidstone and Associates - A Wenck Company	AUG 2017
SURFACE RADIOLOGIC MEASUREMENTS		Figure 4



ANC TASK ORDER 3- DATA COLLECTION

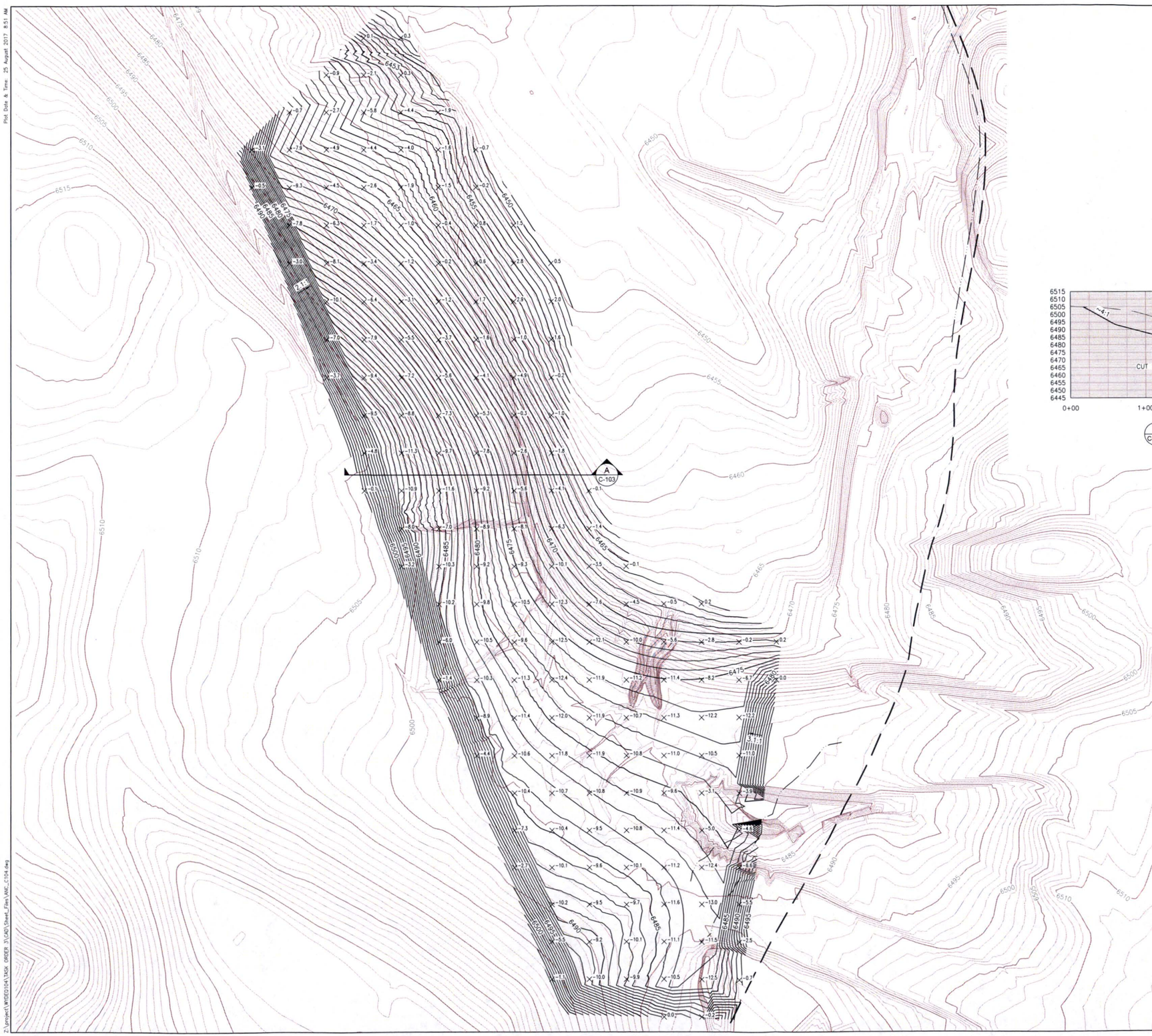
Surface Radiological Measurements

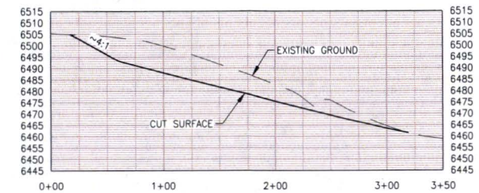
Lidstone and Associates - A Wenck Company

AUG 2017

Figure 5

Plot Date & Time: 25 August 2017 8:51 AM





A C-104 SECTION
SCALE: 1" = 60' H, 1" = 30' V

LEGEND

- 6700 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING DRAINAGE
- 6700 — PROPOSED MAJOR CONTOUR
- 6702 — PROPOSED MINOR CONTOUR
- ×-11.86 — CUT/FILL TICK
- A — SECTION DESIGNATOR
- C-103 — SHEET NUMBER / LOCATION OF SECTION VIEW
- CROSS SECTION CALLOUT

NOTES:

1. VOLUME OF BORROW MATERIAL: 100,000 Cu. Yds. (CUT).
2. BORROW MATERIAL TO BE EXCAVATED AND HAULED TO TP-1.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

CLIENT

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY LAND QUALITY DIVISION

PRIME CONSULTANT

Lidstone and Associates, Inc.
WENCK
Responsive partner, Exceptional outcomes

SUB CONSULTANT

PROJECT TITLE

AMERICAN NUCLEAR CORPORATION
TP-1 INTERIM STABILIZATION PLAN

SHEET TITLE

MATERIAL BORROW PLAN

DWN BY	CHK'D	APP'D	DWG DATE 9/18/17
DJW	CMJ	CDL	SCALE

PROJECT NO. WYDEQ104

Figure 6

REV NO.

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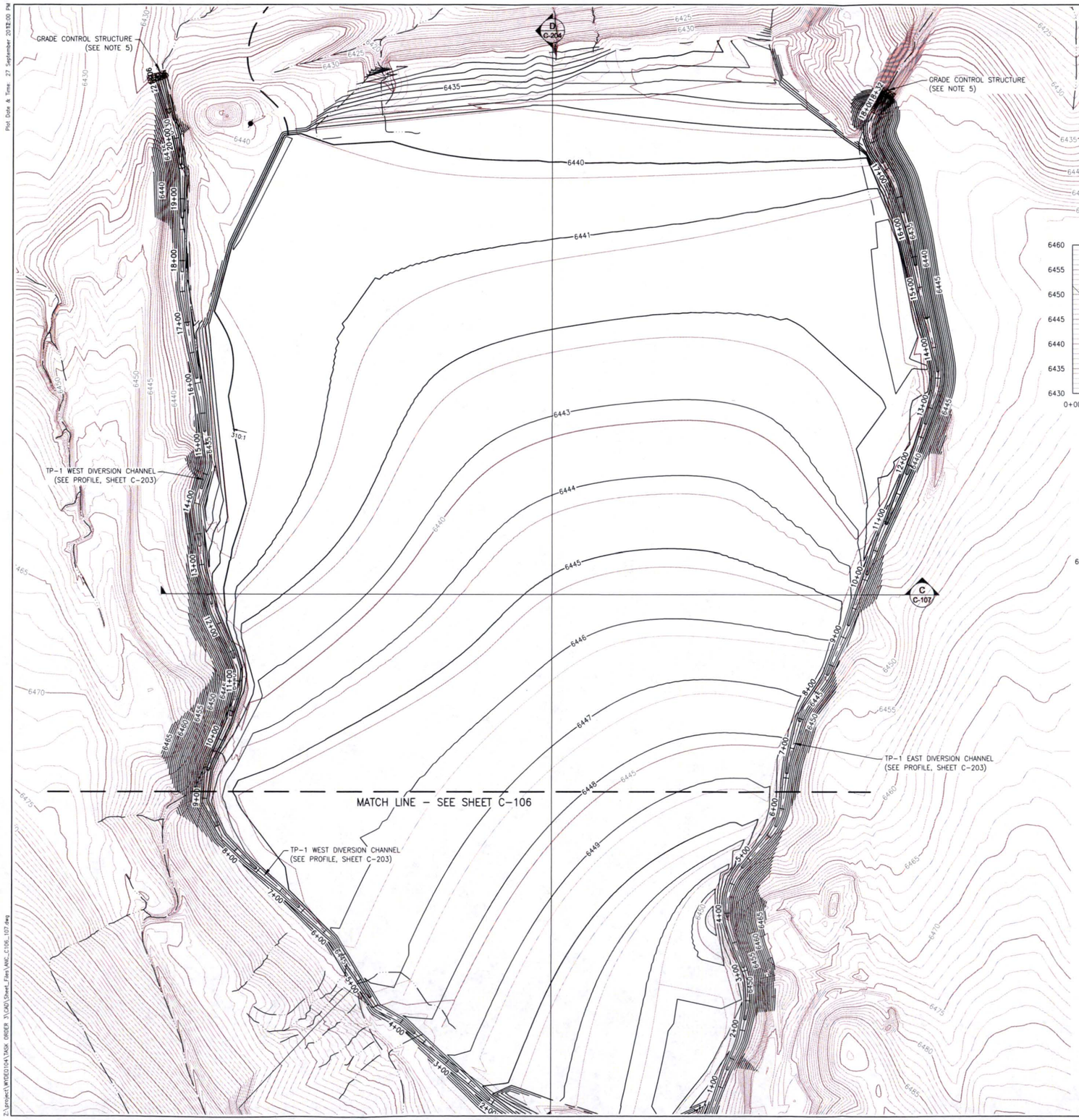
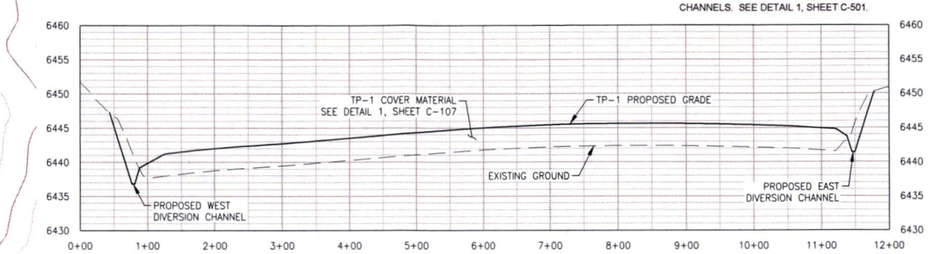


LEGEND

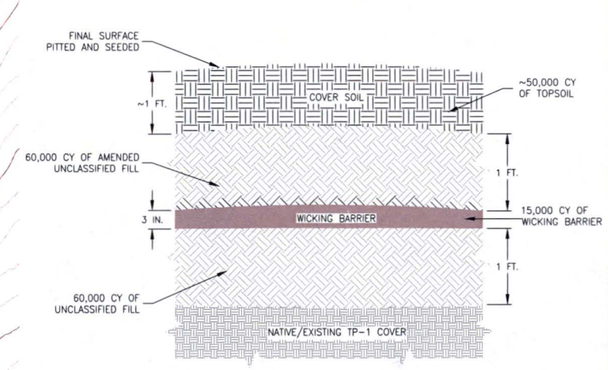
- 6700 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING DRAINAGE
- 6700 — PROPOSED MAJOR CONTOUR
- 6702 — PROPOSED MINOR CONTOUR
- A / C-107 — SECTION DESIGNATOR; SHEET NUMBER / LOCATION OF SECTION VIEW
- CROSS SECTION CALLOUT

NOTES:

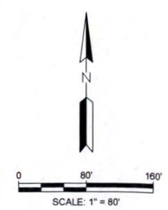
1. TOTAL VOLUME PLACED ON TP-1: 191,700 Cu.Yds.
2. UNCLASSIFIED EXCAVATION VOLUME: 126,000 Cu. Yds.
3. WICKING BARRIER VOLUME: 15,000 Cu. Yds.
4. TOPSOIL VOLUME: 50,700 Cu. Yds.
5. CONSTRUCT GRADE CONTROL STRUCTURES AT TRANSITIONS FROM GRADED CHANNELS TO NATIVE CHANNELS. SEE DETAIL 1, SHEET C-501.



C / C-107 **SECTION**
SCALE: 1" = 100' H, 1" = 10' V



1 / C-107 **TP-1 COVER MATERIAL**
NOT TO SCALE



REV	REVISION DESCRIPTION	DWN	APP	REV DATE

CLIENT
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LAND QUALITY DIVISION

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SUB CONSULTANT

PROJECT TITLE
AMERICAN NUCLEAR CORPORATION
TP-1 INTERIM STABILIZATION PLAN

SHEET TITLE
TP-1 COVER PLAN

DWN BY	CHK'D	APP'D	DWG DATE	REV NO.
DJW	CMJ	CDL	9/27/17	
PROJECT NO. WYDEQ104			SCALE	

Figure 7

Plot Date & Time: 27 September 2018 2:00 PM
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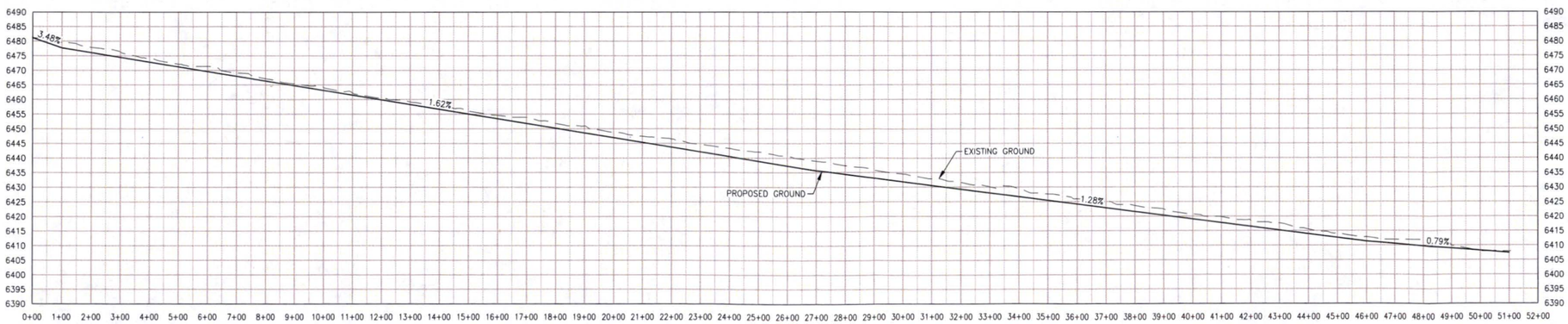
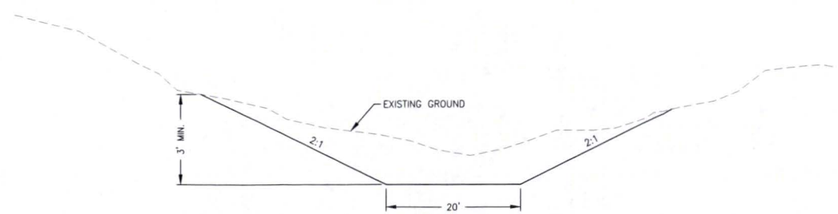


WILLOW SPRINGS DRAW PROFILE
SCALE: 1" = 200' H, 1" = 20' V



WILLOW SPRINGS DRAW TYPICAL SECTION
SCALE: 1" = 10' H, 1" = 10' V

SCALE:
HORIZONTAL: 1" = 30'
VERTICAL: 1" = 6'

REV	REVISION DESCRIPTION	DWN	APP	REV DATE

CLIENT
WYOMING DEPARTMENT OF
ENVIRONMENTAL QUALITY
LAND QUALITY DIVISION

PRIME CONSULTANT
Livestone and Associates, Inc.
WENCK
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SUB CONSULTANT

PROJECT TITLE
AMERICAN NUCLEAR CORPORATION
TP-1 INTERIM STABILIZATION PLAN

SHEET TITLE
WILLOW SPRINGS DRAW PLAN AND PROFILE

DWN BY	CHK'D	APP'D	DWG DATE 8/30/17
DJW	CMJ	CDL	SCALE

PROJECT NO. WYDEQ104 | **Figure 8** | REV NO.

Plot Date & Time: 27 September 2018@13 PM

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Specifications

Section J – Earthwork
Section L – Drainage Construction and Control
Section N – Revegetation

SECTION K

EARTHWORK

ANC TP-1 INTERIM STABLIZATION PROJECT

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SECTION K
EARTHWORK

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- 1.3 Clearing and Grubbing K-5
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SECTION K
EARTHWORK

1.0 GENERAL

a. This section applies to all earthwork activities associated with this project including excavation and backfill with on-site unclassified and/or unsuitable soil materials, excavation and placement of the wicking material, and salvaging and handling topsoil, as well as clay for a pond liner.

b. Construction activities at the site may include the following.

(1) The regrading and/or partial backfill of mining areas, and regrading of borrow material, which include:

- Interim grading of the existing TP-1 surface;
- Selective handling and disposal of Unsuitable materials and placement of the materials at designated locations;
- Excavation and placement of Unclassified materials; and,
- Placement of a cover and preparation of the final regraded slope.

(2) Excavation and placement of wicking material, which includes:

- Excavation of the wicking material from Willow Springs Draw and haul to TP-1 site;
- Direct placement of the wicking material on the TP-1 Cover as designated on the Drawings.

(3) Salvage of Topsoil from existing stockpiles, which includes:

- Excavation, haul, and direct placement of topsoil on finished slopes as designated on the Drawings.

(4) Salvage of Topsoil from excavation areas and drainages, which includes:

- Excavation, stockpiling and/or direct placement of salvaged topsoil and/or cover soil material on finished slopes or at stockpile locations as designated on the Drawings. The intent of this specification is to utilize direct placement methodologies to the maximum extent possible.

(5) Establishment of diversion channels and/or drainages and installation of drainage control structures, which include:

- Construction of drainage channels, rock structures, erosion control ditches and storm water control facilities.

(6) Construction of a Detention Pond and placement of compacted low permeability material within the floor of the Detention Pond, which includes:

- Excavation of overburden material and placement onto the surface of TP-1;
- Compaction of imported low permeability overburden and/or clay, placement, and liner compaction.

(7) Revegetation of the site (see Section N):

c. All construction equipment that is mobilized to the construction area during this project shall be pressure washed prior to transporting the equipment to the project site. The equipment will be inspected by the Engineer to ensure that the equipment has been properly cleaned.

d. Contractor shall be responsible for grade staking and compliance testing where compaction is required.

e. The Contractor shall ensure that no activity or disturbance occurs outside of the Project Limits.

f. Contractor shall be on notice that Unsuitable material excavation will be closely controlled by the Engineer. The Drawings define select locations where excavation is anticipated and material is unclassified. If Unsuitable material is encountered, such material will be set aside and regraded onto an adjacent spoils surface. Additional sites may be identified by the Engineer during field construction observation and the Contractor will be required to avoid those additional sites and areas.

g. The Contractor shall prepare his bid and work schedule such that he will complete the project during the scheduled time period. Discontinuance of Work due to adverse weather conditions is described in Section G, 2.I of the Specifications.

1.1 Scope of Work

a. The Contractor shall furnish all labor, tools, supplies and equipment necessary to perform the site preparation, excavation, backfilling, compaction, and grading as described herein and as requested by the Engineer.

b. All excavation, backfilling, disposal of Unclassified materials and material hauls shall be conducted at the locations shown on the Drawings and to the lines and grades shown on the Drawings. The Contractor shall be solely responsible to determine the method(s) necessary to excavate and backfill all designated grading and disturbed areas according to the Drawings and/or as established in the field by the Engineer.

c. The Engineer will identify the various material types and boundaries. The Contractor is responsible for the segregation and handling of the materials according to the material classification. The presence or absence of the Engineer shall not relieve the Contractor of this responsibility.

d. Selective handling of Unsuitable material and Topsoil during excavation and backfill activities may be required.

e. Construction of a soil liner system for a Detention Pond may be required. The placement of the soil liner shall consist of placement of two lifts of selectively handled site materials conditioned and compacted to specified requirements.

f. Construction of two channels, including riprap grade control structures.

g. The Contractor should be aware that old mining debris such as tires, old pieces of equipment, pipe, concrete, wood, domestic solid waste, etc., may be encountered. If encountered, they will be disposed of as requested by the Engineer.

1.2 Site Conditions

a. It is the responsibility of the Contractor to examine the site personally and to conduct such additional investigations as he/she may deem necessary for the planning and execution of the work.

b. The Contractor shall be aware that uranium and uranium dust are hazardous materials. The Contractor shall be responsible for using extreme caution when performing the work and take appropriate measures that will reduce the possibilities of inhalation of uranium dust. The Contractor shall provide water for dust control as specified herein, described in the Storm Water Pollution Prevention Plan, and as requested by the Engineer.

c. The Contractor is responsible for the health and safety of personnel, subcontractors, and suppliers. Special precautions shall be taken to protect operators and equipment from hazards. The Contractor, personnel, subcontractors, and suppliers may be exposed to uranium dust, fumes, and carbon monoxide during performance of the work.

1.3 Clearing and Grubbing

The Contractor shall clear, grub, remove, and dispose of all encountered debris within the excavation and fill areas shown on the Drawings, or as requested by the Engineer prior to commencing excavation activities.

1.4 Construction Sequence

The general earthwork construction sequence described herein is recommended to achieve the overall reclamation goals for the project. Mobilization, storm water controls, project limit controls, and other pre-construction efforts shall be completed prior to the initiation of earthwork activities. This subsection is not intended to release the Contractor of any obligation to provide a comprehensive sequence of construction, definition of ways and means, and/or a schedule of work. The following section is provided to increase the Contractor's understanding of the project. The Contractor shall schedule his activities in one or more areas considering potential delays and encumbrances including, but not limited to, potential weather conditions, delays for testing and sampling and interim surveys.

a. Prior to mobilizing equipment, the Contractor shall salvage Topsoil from the staging and borrow areas and place into a stockpile.

b. The Contractor shall sequence construction activities to minimize double handling of Topsoil or Coversoil. Topsoil shall be stripped from areas noted on the Drawings or identified in the field by the Engineer. The approximate depth of Topsoil to be removed at all locations shall be 12 inches. Stripping depth will be field verified by the Engineer. Where necessary Topsoil shall be stockpiled in a neat, well-dressed pile for future handle and placement. The Contractor shall work around these Topsoil stockpiles until the project is complete.

c. The Contractor shall complete all temporary erosion control features and hydrologic control structures for storm water control.

d. Following development of the staging area, the interim grading plan of TP-1 shall be completed as noted in the Project Drawings. Existing high spots shall be moved to fill low spots to create a more uniform surface.

e. Following removal of Topsoil, the Contractor shall excavate the Unclassified material consistent with the Project Drawings. Placement of the Unclassified material shall occur as noted on the Drawings. It is anticipated that the upper lift (5-6 feet) of Unclassified material as noted on the Drawings shall be directly placed on the regraded TP-1 cover as the first 1-foot overburden lift.

f. The wicking material from Willow Springs Draw will be excavated as shown on the Drawings and directly placed on TP-1 above the first layer of Unclassified material.

g. The second lift of unclassified material, ranging from depths of 6-12 feet more or less will be placed on TP-1 after the placement of the wicking material, as identified in the Drawings. Final slopes of the borrow area shall be reduced to a 4H:1V minimum slope, as detailed in the Drawings. This lift of Unclassified material will be amended using imported lime.

h. The proposed channels and detention pond shall be constructed according to the grading plan, along with riprap grade control structures and side slopes as noted on the Drawings.

i. A liner of salvaged low permeability materials will be constructed in the pond footprint, as shown in the Drawings and as outlined in these Specifications.

j. Following completion of rough grading on TP-1, the Contractor shall excavate the topsoil stockpiles and place directly on TP-1 and other designated Topsoil placement locations. All disturbed areas identified for seeding on the Drawings shall be revegetated according to these Specifications, see Section N.

k. The Contractor shall install final Storm Water Control features to ensure compliance with the Storm Water Control Plan.

2.0 MATERIAL CATEGORIZATION

a. The Contractor shall be responsible for the selective excavation of Classified materials as defined in Section I, identification in the field, and placement of those materials in the proper sequence. The presence or absence of the Engineer does not relieve the Contractor of the responsibility to excavate, haul, and place the various categories of materials to the lines and grades shown on the Drawings or as established in the field by the Engineer. Materials to be excavated, hauled, and placed are as follows:

   (1) Unclassified Material

   (2) Wicking Material

   (3) Topsoil

   (4) Channel Excavation

b. Unclassified material includes subsoil, underburden, spoils and weathered rock. Such material shall be suitable for near surface placement as defined by the Engineer or as presented on the Drawings. Suitable material includes low radioactivity, non-acidic and non-deleterious material. Weathered rock (sandstone, siltstone) includes all rippable substrate assuming a ripping tooth for a D6H Caterpillar (flywheel HP of 165) or an equivalent. Unclassified excavation and placement includes excavation, ripping, loading, and hauling to a designated fill area, placement, and final grading.

c. Wicking material includes sandy material taken from Willow Springs Draw. Wicking material excavation and placement includes excavation, ripping, loading, and hauling to a designated fill area, placement, and final grading.

d. Topsoil and Coversoil material includes all suitable surface soil material, generally comprised of the A, B and C-horizons or overburden material that has an existing stand of desirable vegetation that are suitable for plant growth. It includes soil, roots, organic materials, and vegetation. Topsoil excavation includes excavation, loading, and hauling to a designated fill area or stockpile. Topsoil excavation also includes excavation and hauling from a stockpile location to the final placement area.

e. Unsuitable material includes uranium mining spoils, uranium waste, highly acidic and/or radioactive or other deleterious materials and shall be placed at an approved fill location. It does not include metal objects, concrete, wood materials, or other man-made materials or domestic debris. Such materials shall be removed from the site and disposed of properly.

f. Classification of materials will be at the discretion of the Engineer.

3.0 EXECUTION

3.1 Clearing and Grubbing

a. Existing vegetation, including brush, grass, and other suitable material, that can be used as mulch shall be cleared from the excavation areas and stockpiled in a location

designated by the Engineer. The Contractor shall selectively place woody vegetation and mulch on final surface as requested by the Engineer. This work shall be incidental.

b. The Contractor may dispose of the remaining refuse generated from clearing and grubbing at an available waste site, reviewed by the Engineer. The Contractor shall dispose of these materials in such a manner to meet all requirements of state, county, and municipal regulations regarding health, safety, and public welfare. The Contractor shall obtain necessary permits and/or pay the necessary fees to DEQ or the County for material disposal.

3.2 Salvage and Stockpiling of Topsoil and/or Coversoil

a. Prior to Topsoil salvage, all old mining debris, tires, equipment, wood, domestic solid waste, etc., that may interfere with grading activities shall be removed from the site and disposed of as requested by the Engineer.

b. Potential Topsoil locations include all areas where plant growth currently exists. The actual locations of Topsoil or Topsoil Stockpiles will be defined in the field by the Engineer or are identified on the Drawings.

c. Stripping of Topsoil material shall be conducted in all excavation and embankment areas where the Topsoil material has been determined as suitable. Topsoil shall only be stripped when the ground is free of frost to allow proper excavation, removal, and stockpiling. Topsoil shall be stripped to a minimum depth of 12 inches, or as requested by the Engineer and stockpiled at locations designated by the Engineer. Topsoil stockpiles shall be constructed in a manner to minimize wind and water erosion. Temporary measures to protect topsoil stockpile may be required.

d. Removal, excavation, haul, and placement of topsoil from Topsoil Stockpiles will occur following placement of TP-1 cover. To the extent possible, the Contractor shall limit road construction and utilize existing roads. The Contractor shall strip topsoil from existing land surface prior to construction of roads and/or staging. At the end of topsoil excavation and haul operations, stripped topsoil shall be replaced or a minimum of 12 inches shall remain along the stockpile footprint and all disturbance shall be revegetated.

3.3 Interim Grading Plan

a. The existing TP-1 cover shall be leveled to create a more uniform surface by dozing existing high spots. The material shall be pushed to low spots to the satisfaction of the Engineer or as shown on the Drawings.

b. The leveling of the existing cover land surface shall be within 0.1 feet to the lines and grades shown on the Drawings or to the satisfaction of the Engineer.

3.4 Finish Grade Control

a. The Contractor shall provide a qualified grade control person whose duties will include off setting construction staking and coordination with the Engineer as

required to ensure the desired cuts and fills are achieved. All areas will be graded at the completion of earthwork activities to achieve the design elevations and contours to provide continuity of slopes and to provide smooth transitions between different slopes.

b. Accurate trimming of the slopes will not be required except where specifically stated or in drainage ways, channels, ditches, safety berms and roads. All slopes will be blended evenly to provide continuity of slopes and to provide smooth transitions between different slopes.

c. Excavation of the pre-mining land surface, Unsuitable materials, Topsoil, and Unclassified materials shall be within + 0.5 feet and backfill shall be constructed to within 0.1 feet the established lines and grades as shown on the Drawings or staked by the Engineer. Ditches and channels shall be constructed to within + 0.1 feet of design grade.

3.5 Excavation and Placement

a. Unclassified material shall be excavated, hauled, and placed from areas within the designated Project Limits to the locations shown on the Drawings and to the lines and grades shown on the Drawings.

c. Each lift of excavated material shall be placed in approximately horizontal layers. With the exception of lifts underlying the channels or within the Detention Pond floor, no density requirements will be applied. However, the Contractor shall conduct the placement in such a manner to obtain the maximum compaction by equipment traffic.

d. Accurate trimming of fill slopes will not be required but the slopes shall be constructed reasonably close to the established lines and grades as shown on the Drawings or staked by the Engineer.

e. The Contractor shall apply dust control water when needed or as requested by the Engineer.

f. All drainage way transitions from existing channels to constructed channels in the Project Limits, or vice-a-versa, shall be uniform and gradual as requested and reviewed by the Engineer.

g. After fill placement has been completed, all excavation and embankment areas shall be final graded to the satisfaction of the Engineer. All mining debris, from past or current operations, shall be removed from the final graded surface and disposed at suitable locations identified by the Engineer. Cut slopes shall be blended with adjacent terrain by rounding the top of slopes, and inslopes and backslopes shall be trimmed to eliminate any windrows or abrupt grade changes. The final graded surface shall be free from all deleterious materials that may be detrimental to revegetation activities, as determined by the Engineer.

h. Excavation of Unsuitable material shall be completed in a selective manner and at the Direction of the Engineer. Unsuitable material will be excavated with minimal

disruption to surrounding or underlying Unclassified material and set aside for ultimate placement in a nearby fill. Excavation equipment that is utilized to haul Unsuitable material, if such haul is necessary shall be loaded to an appropriate capacity to ensure that there will be no spillage of Unsuitable material from the haulage equipment.

i. Unsuitable material can be encountered during excavation operations at any area within the project. The presence of Unsuitable material shall be determined and its location defined in the field by the Engineer. The Contractor shall not at any time make claim for additional payments or consideration because of any misunderstanding regarding (1) the nature of the materials, (2) variation in quantities encountered in the excavations.

j. Unsuitable material shall be placed at the disposal locations identified by the Engineer in such a manner as to isolate these materials from natural dispersive forces (wind and water erosion).

k. The location of Topsoil and/or Coversoil materials has been tentatively identified and shown on the Drawings. However, Topsoil material can be encountered during excavation operations at any area within the project. Past mining operations tended to place material of variable quality in the same area. The presence and concentrations of Topsoil materials shall be determined and its location defined in the field by the Engineer.

l. During excavation, Topsoil material may be encountered within areas of Unclassified material. The Engineer may survey and sample Topsoil material within the Unclassified material excavation. Topsoil or subsoil that is deemed adequate for a growth medium by the Engineer will be placed into a stockpile or directly placed onto slopes that are at final design grade. Contractor shall make every effort to minimize the amount of material placed in stockpile and maximize direct placement.

m. After final grading and the suitable overburden lift has been completed, lime shall be incorporated into the upper lift of overburden. This lime shall be ripped or scarified into the upper lift of suitable overburden. Topsoil shall be removed from existing stockpiles, hauled, and placed in approximately horizontal layers over the final grade. Topsoil shall typically be placed to a 12-inch consolidated depth or as defined by the Engineer. Following placement of Topsoil, it will be bladed to a uniform grade as defined by the Engineer.

    (1) All Topsoil which is placed in stockpiles, shall be approved in advance by the Engineer.

3.6 Detention Pond Construction and Placement of Liner

a. The Contractor shall excavate the Detention Pond to the lines and grades presented on the Drawings.

b. Excavated materials shall be placed in compacted 6-inch lifts into the Detention Pond dam and/or placed within the upper overburden lift (not compacted) of TP-1. Each lift shall be compacted to 95% Standard Proctor Compaction Density and within 3% of

Optimum Moisture. The Contractor shall anticipate that water may need to be added to the material to achieve optimum moisture content.

c. Low permeability overburden or stockpiled clay material will be placed within the pond bottom. Placement shall occur in 6-inch lifts for a total depth of 12 inches. Each lift shall be compacted to 95% Standard Proctor Compaction Density and within 3% of Optimum Moisture. The Contractor shall anticipate that water may need to be added to the material to achieve optimum moisture content.

d. Low permeability overburden can be obtained on site at locations identified by the Engineer. If clay material is required, such material shall also be obtained on site and shall be selectively handled from existing excavations and stockpiled until placement within the floor of the Detention Pond.

4.0 BRACING, SHORING, AND BENCHING

a. Excavated surfaces too steep to be safe and stable if unsupported shall be supported as necessary to safeguard personnel, equipment, and work and to prevent adjacent ground from sliding.

b. It is the Contractor's responsibility and liability to determine if bracing, shoring, or benching is necessary in order to ensure safety and to comply with all applicable Wyoming Occupational Health and Safety and Federal Occupational Safety and Health Administration Regulations. All shoring, bracing, or benching required shall be constructed in accordance with the regulations for construction as set forth by each of these entities.

5.0 DUST CONTROL

The Contractor shall provide dust control measures for health, safety, and the reduction of a dust nuisance at the construction site. These measures shall consist of the application of water to the disturbed surfaces, access roads, stockpiles, and haul roads. Water shall be uniformly applied in a fine spray by means of controllable pressure and spray bars or nozzles and in such a manner that will avoid ponding or over wetting. The water truck described in this section shall be properly fitted with such equipment.

6.0 CONSTRUCTION WATER

The Engineer has received permission from Wyoming AML to obtain water for dust control purposes from the Johnny Potatoes well, located approximately 0.25 mile south of TP-1, as discussed in Section J of these Specifications.

7.0 MEASUREMENT AND PAYMENT

7.1 Method of Measurement

a. Prior to commencement of work, the Contractor shall verify to the extent necessary and approve in writing the Engineer's existing ground and stockpile surveys. These existing ground and stockpile surveys shall be the determination of Initial Ground. Final ground will be surveyed at the end of the Work.

b. The Contractor and Engineer shall agree prior to any earthwork being performed on the methodology that will be utilized to determine the volumetric quantities of Earthwork including unclassified excavation, wicking material excavation, and topsoil excavation. Methods that may be utilized include survey quantity determination based on the difference in the Existing Grade and the Final Grade (determined by survey) for excavated and stockpiled areas or Load Count with swell and consolidation factors. Interim surveys may be required to address stockpiled quantities or overexcavation.

c. The interim grading of the existing TP-1 cover shall be paid using the loaded equipment hour rates agreed upon before initiation of construction and as identified under Section O Force Account.

d. Interim surveys may be required to determine excavation quantities for materials excavated from the Borrow material sites. Contractor shall take the need to complete the quantity surveys into account for planning of Work sequencing.

e. Volume of Topsoil that has been placed in stockpiles has been surveyed and such data shall be presented to the Contractor. Stockpiled volume for payment for Topsoil shall be by bank cubic yard (BCY), accounting for swell factor when placed into stockpile. Sub-excavation shall be measured by interim survey.

f. The Contractor shall review and approve the topsoil stockpile surveys prior to re-disturbance of stockpiles. Topsoil stockpiles, where double handle of material is required will be approved by the Engineer and measured. Topsoil stockpiles, for the Contractor's convenience, shall not be measured for payment.

g. The sum of quantities for individual materials within a given excavation area will not exceed the total volume of material excavated as determined from initial and final surveys. Interim and final surveying to establish interim and final grades for measurement of excavation and stockpiled material for payment will be performed by the Engineer.

h. Overexcavation, as requested by the Engineer, to remove Unclassified material, Topsoil material, and/or Unsuitable material will be included in the measurements for payment. In some cases, overexcavation will be paid on an hourly basis. Overexcavation not requested by the Engineer will not be measured for payment.

i. The Engineer and Contractor shall compare records daily for the number of loads of each type of material that were hauled and placed. Equipment capacities used to estimate the monthly quantities will be determined and mutually agreed upon prior to any material hauling. These load count measurements will be adjusted to reflect BCY. The Engineer and Contractor shall determine and agree on swell and consolidation factors used on load quantities to determine the BCY hauled by each size and piece of equipment and for all classification of materials prior to construction activities. <u>While load counts may be used for progress payments, the final quantities for final payment shall be calculated from closeout surveys</u>.

j. Measurement for payment for Dust Control will be incidental to Mobilization (Section J). Payment shall be incidental to the Work.

k. Measurement for payment for Clay Pond Material (Item A-3) shall be based on the cubic yard of the clay material excavated, hauled and placed in the pond area identified on the Drawings. Measurement shall be made in place and shall include a measurement in area (square feet) and depth (feet).

7.2 Special Considerations

a. The final quantities for the major categorizations of excavation materials may vary from the quantities shown on the Drawings. The 30 percent quantity variance shall not apply to material quantities. Such quantities as shown on the Bid Schedule may vary and unit prices will not be renegotiated.

b. Quantities for the monthly progress payment estimate shall utilize the reports that the Contractor is required to submit to the Engineer on a daily basis. The reviewed quantities of excavation will be paid at the contract unit price. Payment at the unit price shall be full compensation for excavating, hauling, placing, grading, shaping, trimming, scarifying, compacting materials as specified, including all labor, equipment, tools, and incidentals necessary to complete the work.

c. All stockpiles shall be authorized by the Engineer. Stockpiles for the Contractor's convenience shall not be measured or paid. Materials placed in Engineer-authorized temporary stockpiles shall be paid by the BCY as determined by stockpile volume corrected with an agreed upon swell factor or based on stockpile interim surveys.

d. Unit quantities for payment of Unclassified and Topsoil materials are intended to reflect BCY.

e. Estimated quantities for excavated materials reflect single handling and direct placement to backfill locations. Where unsuitable materials are encountered, removed and added to a fill location, the Engineer and Contractor shall determine a mutually acceptable means of measurement and payment. It is anticipated that Unsuitable Material handling shall be paid as Hourly Work under Section O. The Contractor will make every effort to sequence operations to minimize stockpiling and double handling of Topsoil or Unsuitable material. Topsoil payment will be made per handle.

f. The sum of quantities for individual materials within a given excavation area will not exceed the total volume of material excavated as determined from initial and final surveys.

7.3 Pay Items

a. The pay item Wicking Material Excavation and Placement (K-1) shall be paid by the BCY. Wicking Material shall be paid when it is moved from the place of excavation to final placement and graded to create the 3-inch Wicking Barrier. The pay item Wicking Material shall include all work performed during excavating, hauling, and placement of Wicking Material as required by these Specifications. Final grading and

smoothing of Willow Springs Draw shall be incidental to payment. Monthly progress payments will be estimated.

b. The pay item Unclassified Excavation (K-2) shall be paid by the BCY. Payment for handling rocks, boulders, and mine debris is included. Loading, hauling, handling, and controlled backfill of Unclassified material as part of the fill shall be incidental to payment. Identifying and use of select fine-grained Unclassified material for use in pond construction and lining lifts shall be paid. Monthly progress payments will be estimated.

c. The pay item Topsoil (K-3) shall be paid by the BCY and includes generated Topsoil and/or Coversoil excavated from identified stockpiles or identified by the Engineer from borrow areas. Topsoil shall be paid when it is moved from (1) place of excavation to a final cover, (2) or from place of excavation to a stockpile and/or, (3) a place of excavation and direct hauled to a final placement area to create a final fill. Topsoil placement depth at TP-1 is estimated at 12 inches. The pay item Topsoil shall include all work performed during site preparation, road improvements, excavation, hauling, stockpiling, pre-ripping of the regraded surface and placement of topsoil material as required by these Specifications. Monthly progress payments will be estimated.

d. The Pay Item Unsuitable Material will be paid on an hourly basis out of Force Account or as mutually determined by the Engineer and Contractor. The pay item shall include the identification, loading, hauling, handling, and controlled placement of Unsuitable material. Monthly progress payments will be estimated.

e. The pay item Dust Control shall be paid under Mobilization and is incidental to payment. Dust Control shall include equipment (water truck), fuel, operator, equipment maintenance, haulage from the water source to the project area, and incidentals necessary for the Contractor to provide a water supply and apply the water to the project site.

f. Payment for the Clay Pond Liner shall include placement, compaction and cost of all materials including labor, equipment and incidentals necessary to complete the work to design specification and plan. The pay item (A-3) clay material placement shall be paid by the cubic yard.

g. The following pay items apply to Earthwork and Dust Control as defined in this Section K of the Contract Documents:

Pay Item		Pay Unit
K-1	Wicking Material Excavation and Placement	CY
K-2	Unclassified Excavation and Placement	CY
K-3	Topsoil Excavation and Placement	CY
K-4	Channel Excavation and Construction	CY
A-3	Clay Pond Liner	CY

END OF SECTION K

SECTION L

DRAINAGE CONSTRUCTION AND CONTROL

ANC TP-1 INTERIM STABLIZATION PROJECT

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SECTION L
DRAINAGE CONSTRUCTION AND CONTROL

1.0 GENERAL

a. This section of these Specifications covers all work and materials required to complete the temporary and permanent drainage control structures in the configurations shown and in the locations specified in the Drawings, and incidental work associated with the Storm Water Pollution Prevention Plan (SWPPP). These include, but are not limited to erosion control ditches, drainage channels, riprap structures, earthen berms, road stability, run-on controls, surficial controls, and other temporary erosion control structures. All drainage controls required under the SWPPP shall be installed prior to the start of excavation.

b. The work consists of supplying and placing all materials in the areas and to the dimensions shown on the Drawings and described in these Specifications.

c. Shop Drawings

(1) The Contractor shall prepare and submit Shop Drawings, list of materials, manufacturer's specifications and testing data, installation plans and procedures for erosion control geotextile materials as required by these Specifications.

(2) All Shop Drawings shall be submitted by or no later than the Pre-commencement Meeting. The Engineer may require delivery of samples of each of the various materials in advance of project commencement and no later than two weeks prior to installation.

2.0 PRODUCTS

2.1 Riprap Material

a. The riprap material to be used for all rock riprap structures shall consist of a well-graded, durable, angular rock material. Angular rock is defined as having a minimum of three major flat surfaces with sharp angles between the surfaces. Riprap shall be free from organic material, clay or shale seams, cracks, or other structural defects.

b. The rocks should be roughly cubical with the maximum dimension not more than three times the least dimension.

c. Rounded stone, cobbles, boulders, or broken concrete shall not be acceptable for rock riprap or hydrologic control structures. Suitable rock types generally include, but are not limited to granite and similar crystalline rock types, limestone and dolomite. Unsuitable rock types are generally shale, slates, certain vesicular or porphyritic volcanic rocks, schists, and most sandstones.

d. Rock brought from an off-site source must be obtained from a source which is legally procured with a DEQ/LQD Mine Permit, if the source is from within the State of Wyoming. The Contractor shall identify the rock source, the subcontractor providing

the rock, and furnish the Engineer with a copy of this permit prior to delivery and riprap placement. Riprap shall be obtained from a location free of noxious weeds.

e. Rock suitability shall be based upon previously stated general criteria and the results of testing for the following criteria:

Test	Test Method	Requirements
Specific Gravity (Bulk SSD)	ASTM C127	2.50 (minimum)
Absorption	ASTM C127	2.0% (maximum)
Sulfate Soundness	ASTM C88	10% Loss (maximum)
Abrasion	ASTM C535	30% Loss (maximum)

The cost of the required testing shall be borne solely by the Contractor. Certified laboratory results of rock testing must be submitted to the Engineer. At any time, the Engineer may require additional testing of delivered riprap material. Alternative riprap sources that do not meet these criteria may only be accepted following a review of the testing results by the Engineer.

f. The median diameter of the riprap material shall approximate the median diameter or D50 of the riprap class and generally conform to the following gradation envelope: percent of material measured by weight, based on material with a specific gravity of 2.5. Material with a different specific gravity may have a slightly different size distribution.

RIPRAP GRADATIONS – RIPRAP CLASS

CLASS 6	
Corres. Min. Weight	**Intermediate Orthogonal Dimension**
20% finer than 2 pounds	less than 2 inches
50% finer than 10 pounds	less than 6 inches
100% finer than 82 pounds	less than 12 inche
CLASS 9	
Corres. Min. Weight	**Intermediate Orthogonal Dimension**
10%	less than 2 inches
20% finer than 4.5 pounds	less than 4.5 inches
50% finer than 36 pounds	less than 9 inches
100% finer than 291 pounds	less than 18 inches
CLASS 12	
10%	less than 2 inches
20% finer than 4.5 pounds	less than 6 inches
50% finer than 36 pounds	less than 12 inches
100% finer than 291 pounds	less than 24 inches

g. The Intermediate Orthogonal Dimension is defined as the average of the measurement of the three mutually perpendicular axes of any specimen. For example, if the three measured axes are 4, 8, and 12 inches in length, the intermediate orthogonal (average) dimension of the specimen is 4 + 8 + 12 = 24 ÷ 3 or 8 inches.

h. Dirt and fines of less than 1-inch maximum cross section accumulated from interledge layers or from blasting, salvage or handling operations or breaking shall not exceed 5% by weight.

i. Control of gradation will be by visual review. The Contractor shall provide a sample of each size of riprap at the construction site of at least 5 cubic yards, which meets the specific gradation and is typical of that material. The sample shall be used as a reference for judging the gradation of all riprap supplied. Any difference of opinion between the Engineer and the Contractor shall be resolved by dumping and checking the gradation of random truckloads of riprap material. If a gradation examination is required, any mechanical equipment necessary, a sorting site, and a Contractor's representative shall be provided by the Contractor at no cost to the Agency or the Engineer.

j. The equivalent spherical diameter of rock may be used to grade an alternate rock source once the specific gravity has been determined. The equivalent spherical diameter of the alternate rock source may be determined from the design weight and specific gravity by the following formula:

Diameter = $[\text{weight}/(\text{specific gravity} \times 261.4)]^{33} \times (2.0)$
Where diameter is in feet and weight is in pounds.

For example, the riprap needs to be 1.25 feet in diameter for a 160-pound rock with a specific gravity of 2.50.

k. The specific gravity of riprap shall not be less than 2.5.

l. Alternative gradations or suitability criteria may be allowed with the Engineer's review and recommendation.

2.2 Filter Fabric

a. The filter fabric in riprap structures shall be a pervious sheet composed of plastic yarn fabricated into a pattern with distinct pores or openings. Geotextile fabric, sediment fence and filter cloth as used in these Specifications are equivalent terms.

b. The plastic yarn shall consist of a long-chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, or vinylidene-chloride and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet radiation and heat exposure.

c. The filter cloth should be calendared or otherwise finished so that the yarns will retain their relative position with respect to each other. The edges of the cloth shall be selvaged or otherwise finished to prevent the outer yarn from pulling away from the cloth.

d. The filter cloth shall be non-woven and shall conform to the physical requirements listed in Table 1.

e. Prior to installation, the Contractor shall provide the Engineer with certification/documentation that the filter cloth furnished meets the chemical, physical

and manufacturing requirements of this section. Each roll installed must correspond to the lot or lots specified in the manufacturer's certification.

Table 1 Physical Requirements – Filter Cloth/Erosion Control Geotextiles[1, 2]

Erosion Control[3]			
Property	**Unprotected[4]**	**Protected[5]**	**Test Method**
Tensile Strength, lbs	200	100	ASTM D 4632
Elongation, %	15	15	ASTM D 4632
Seam Strength, lbs	180	100	ASTM D 4632
Puncture Strength, lbs	80	50	ASTM D 4833
Burst Strength, psi	320	170	ASTM D 3786
Trapezoid Tear, lbs	50	40	ASTM D 4533
Permittivity, sec^{-1}	0.5	0.5	ASTM D 4491
UV Degradation, %[6]	70	70	ASTM D 4355
Apparent Opening Size: a. Soil with 50% or less particles by weight passing US No. 200 Sieve, AOS less than 0.6 mm (greater than #30 US Std. Sieve). b. Soil with more than 50% particles by weight passing US No. 200 Sieve, AOS less than 0.210 mm (greater than #70 US Std. Sieve).			

Notes:

1. Acceptance of geotextile material is to be determined according to ASTM D 4759.
2. Agency will require a letter from the manufacturer certifying that its geotextile meets specification requirements.
3. Minimum – Use value in weaker principal direction. All numerical values represent minimum average roll values (i.e., test results from any sampled roll in a lot shall meet or exceed the minimum values in the table). Stated values are for non-critical, non-severe conditions. Lot sampled according to ASTM D 4354.
4. Unprotected erosion control applications are those where fabrics are used under conditions where installation stresses are strictly controlled (i.e., stone placement height should be less than 3 feet and stone weights should not exceed 250 pounds). Unprotected applications must be reviewed in advance by the Engineer.
5. Protected erosion control applications are those where fabrics are used in structures or under conditions where the fabric is protected by a sand cushion or by "zero-drop height" placement of stone.
6. Percent of minimum tensile strength (ASTM D 4632) retained after weathering per ASTM D 4355 for 500 hours.

2.3 Granular Bedding

a. The granular bedding for all rock riprap structures shall consist of a well-graded, durable aggregate.

b. The granular bedding shall consist of free draining sand, gravel, or crushed stone meeting the following gradations requirements.

Sieve Designation	Percent Passing Sieve
3 inch (75 mm)	100
1.5 inch (37.5 mm)	75-100
No. 4 (5.0 mm)	40-70
No. 50 (0.30 mm)	0-30
No. 200 (0.07 mm)	0-20

c. Granular bedding shall be non-plastic granular material consisting of excavated and screened native materials or imported materials which are classified (ASTM method D 2487) as GW-GC or SP-SM. Granular bedding shall not contain more than 20% minus 200 sieve material.

2.4 Culverts

a. Pipe shall be of the size indicated on the Drawings and meet AASHTO Standard Highway Live Load requirements for the diameter of pipe specified.

b. Culvert pipe sections shall be polymeric-precoated, galvanized steel pipe. The polymeric-precoated, galvanized steel pipe shall meet the requirements of AASHTO M36, M218, M245 and M246. The corrugated pipe shall have a minimum uncoated wall thickness of 0.064 inches.

c. The inside and outside of all precoated pipe shall have a polymeric coating with a minimum thickness of 10 mils (0.27 mm) per side. The pipe shall be fabricated with helical lock seams. No riveted or welded seams will be permitted. Units on which the spelter coating or polymeric coating has been damaged in fabrication or in handling and placement shall be repaired as follows:

(1) Damaged areas of spelter coating including all saw cut ends, shall be painted after all burrs are removed with a zinc dust-zinc oxide paint conforming to Federal Specification TT-P-641 and coated with a polymeric coating similar and compatible with the polymeric coating on the pipe.

(2) Areas of damaged polymeric coating only shall be repaired by the application of a polymeric coating similar and compatible with the polymeric coating on the pipe.

(3) All damage incurred in fabrication will be repaired at that location. Damage incurred during handling and placement will be repaired, inspected, and approved prior to backfilling the pipe.

d. Where flared end sections are used they shall be bituminous coated galvanized steel. The bituminous material shall meet the requirements of AASHTO M-190, Type A coating, except that the minimum coating thickness shall be 0.03 inch. Coupling bands shall be fully coated.

e. Joints shall be made with outside bands; each band consisting of one or two pieces and shall be as specified in the applicable manufacturer's standards. Space between the pipe and connecting bands shall be kept free from dirt and debris so that the

corrugations fit snugly. The connecting band, while being tightened shall be tapped with a soft-headed mallet of wood, rubber or plastic to take up slack and insure a tight joint.

2.5 Berms and Erosion Control Ditches

a. Earthen berms and erosion control ditches shall be constructed of native suitable material as shown on the Drawings or defined by the Engineer. In this case, earthen berms and erosion control ditches are complementary parts of the same structure constructed by an up gradient cut creating a ditch and a down gradient fill deepening the erosion control ditch.

b. Erosion control ditches will be temporary features, which are constructed as part of the storm water control requirements for the purposes of interim stabilization of the site. Erosion control berms and ditches shall be incidental to the Contractors' responsibility for construction, maintenance, replacement, and removal of temporary erosion control devices as discussed in Section J, 1.7. Where slopes are excessive, erosion control cloth may be required.

c. Erosion control ditches can be permanent features, which are constructed as part of the overall grading plan. In this case, erosion control ditches will capture surface water runoff from a long, undrained slope. The purpose of these features is to provide drainage density and prevent rill and gully erosion.

d. Erosion control ditches are typically v-shaped or trapezoidal channels cut into (1) the hillslope; (2) the top of a hillslope; (3) the constructed "terrace landform," and/or (4) the toe of the slope.

e. Berms and erosion control ditches constructed such that drainage is routed to a collection area shall include a sediment control BMP at the collection point such as sediment control logs, sediment basin or trap, and/or silt fencing.

f. If construction traffic must cross an erosion control berm/ditch, a temporary culvert shall be placed for drainage continuity.

2.6 Sediment Control Logs/Wattles

a. Sediment control logs or wattles are used as a sediment barrier to intercept sheet flow runoff from disturbed areas. Sediment control logs shall consist of natural materials as described in the storm water control details.

b. Sediment control logs shall be installed per the manufacturer's installation instructions in the locations shown on the Drawings.

2.7 Sediment Control Fence

a. Sediment Control Fence shall consist of the filter fabric as described in Section 2.2.

b. Fence posts shall either be 1 inch by 1-inch wooden posts 4 feet in length or steel posts of equivalent height and strength. Appropriate staples and/or clips shall be used to fasten the fabric to the fence post.

c. The wire mesh fabric backing shall be 32 inches tall and meet DOT 12.5 field wire.

2.8 Riprap Grade Control

a. Riprap grade control shall be constructed of rock as specified in Section 2.1, filter fabric (Section 2.2) and granular bedding (Section 2.3).

b. Each structure shall be keyed in and shall be built to the dimensions staked in the field and as defined on the Drawings.

c. Rock shall be placed in well-graded lifts. The Contractor shall maintain the gradation as specified in the riprap gradation table in accordance with the Class of Rock. All care shall be taken to ensure no segregation of rock.

2.9 Rock Check Dam

a. Rock check dams shall be constructed of rock as specified in Section 2.1, filter fabric (Section 2.2) and granular bedding (Section 2.3).

b. Each structure shall be keyed in and shall be built to the dimensions staked in the field and as defined in the Drawings.

c. Rock shall be placed in well-graded lifts. The Contractor shall maintain the gradation as specified in the riprap gradation table in accordance with the Class of Rock. All care shall be taken to ensure no segregation of rock.

3.0 EXECUTION

3.1 General

All trenching and excavation required, as part of this project, shall be executed in strict compliance with all applicable local, state, and federal requirements and regulations.

3.2 Drainage Channels

a. The Contractor shall install drainage channels as detailed on the Drawings and in the locations shown on the Drawings.

b. Channel transitions shall be constructed at locations identified on the Drawings or as staked by the Engineer. Channel transitions shall occur where two channels of variable cross-sectional areas meet. Channel depth, sideslope angle and width shall smoothly transition into the downstream section over the course of 100 feet, or as directed by the Engineer. Channel transitions shall be incidental to drainage channel construction and shall not be measured or paid.

c. Drainage channels shall be compacted in accordance with the Specifications.

(1) Where fill materials are needed to provide a trapezoidal shaped channel section for channel construction, these materials shall be constructed in 12-inch maximum lifts at 95% Modified Proctor Compaction and within 3% of Optimum Moisture Content or as approved in the field by the Engineer. The cover material will then be placed (as specified or as shown

on the Drawings) over the suitable surface material to obtain this final channel geometry.

(2) Where channels will be excavated to obtain the desired channel cross section, all available topsoil shall be stripped and the site shall be over excavated to accommodate the specified replacement depth of topsoil and subsoil.

d. Drainage channels shall neither be pitted nor the surface roughened in a manner which would obscure the definition of the channel cross section.

e. The channel and floodplain surface shall be constructed ± 0.1 feet to that shown on the Drawings, or as staked by the Engineer. Final grade elevations shall include replacement depth of topsoil or suitable coversoil material.

f. Drainage channels shall be broadcast seeded in accordance with the Revegetation Specifications, Section N. Drainage channels shall not be pitted.

3.3 Storage of Materials

a. Delivery of geotextile fabrics must be made in original wrapping showing name of manufacturer and product weight.

b. Storage of geotextile fabric must be in accordance with manufacturer's recommendations and in a location that will keep them from damage.

c. On-site stockpiles of riprap conforming to Section L, 2.1 shall be constructed in lifts no higher than 8 feet to minimize segregation.

3.4 Installation of Culverts

a. Width of trenches at any point below the top of the pipe shall not be greater than the outside diameter of the pipe plus 36 inches. Where wet or otherwise unstable soil incapable of properly supporting the pipe as determined by the Engineer is encountered in the bottom of the trench, such material shall be removed to a depth of at least one and one-half times the diameter of the pipe and replaced with selected on-site material as approved by the Engineer. The replacement material shall be placed in 6-inch lifts and compacted to 95% maximum dry unit weight of the Standard Proctor Curve, ASTM D-698 and within 3% of Optimum Moisture Content or as approved by the Engineer. The methods of obtaining compaction for any portion of culvert installation shall be approved by the Engineer prior to use. Unstable material removal and replacement will be paid for under the Unclassified Excavation Section of these Specifications.

b. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Prior to laying the pipe, the subgrade below the pipe to a depth of 6 inches shall be inspected and all rocks greater than 2 inches shall be removed. Pipe shall be laid to the grade and alignment as directed by the Engineer in the field. Pipe shall not be laid in water nor when trench conditions or weather are unsuitable for such work as determined by the Engineer. Diversion

of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected by the Engineer prior to backfilling. Any pipe damaged during replacement shall be removed and replaced at no additional cost to the Owner.

c. Selected bedding material as approved by the Engineer at a moisture content that will facilitate compaction shall be placed along both sides of the pipe in layers not exceeding 6 inches in compacted depth. The layers shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to insure thorough compaction of the fill on the bottom sides or haunches of the pipe. All compactions shall be to 95% of Standard Proctor density as above. Backfilling and compaction shall continue to 18 inches above the pipe, thereby achieving finished grade.

d. Field density tests of the compacted fill may be run at all levels. When test results indicate that compaction is not as specified, the material shall be removed and replaced or recompacted to meet Specification requirements at no expense to the Owner. Recompacted areas shall be tested by the Engineer, at the Contractor's expense to insure that the specified density is being obtained.

e. The maximum dry density and optimum moisture shall be as determined by the Engineer and shall be representative of the materials to be placed.

f. The Contractor shall be responsible for enforcing safety and maintaining safe working conditions in all trenches according to OSHA regulations.

3.5 Berms and Erosion Control Ditches

a. The Contractor shall install erosion control ditches as detailed on the Drawings and in accordance with these Specifications and at the Contractors discretion as necessitated by adherence to the SWPPP or as requested by the Engineer.

b. Ditch transitions shall occur at the upstream and downstream ends. Channel depth, sideslope angle and width shall smoothly transition into the downstream section in accordance with the actual pitch of the reclaimed slope, or as defined by the Engineer.

c. Berms shall be constructed so that they conduct water safely to areas of low slope.

3.6 Riprap Structures

a. Riprap structures shall be built to the lines and grades as defined on the Drawings. The riprap structures shall be constructed as shown on the Drawings or as modified by the Engineer.

b. The subgrade under any drop, rock apron, or grade control shall be well compacted prior to placement. The subgrade material shall be void of vegetation, large stones or boulders, clods, topsoil, frozen soil, standing water and debris. When constructed on fill, the subgrade shall be placed in no greater than 6-inch lifts.

c. Compaction for drop structure, bank protection or grade control subgrades shall be to 95% Modified Proctor Compaction and within 3% of Optimum Moisture Content or as requested in the field by the Engineer.

d. A key trench for installation of the filter cloth shall be constructed in accordance with the Drawings.

e. The Contractor shall obtain from the Engineer, review documentation of the grading compaction of subgrade or bank prior to placement of the granular bedding and/or filter cloth material and riprap. The Contractor shall schedule time to allow the Engineer to survey the prepared subgrade for the determination of riprap quantities.

f. The granular bedding and filter cloth shall be placed in all riprap structures in the manner and at the locations shown on the Drawings or as acceptable to the Engineer. The Contractor shall notify the Engineer of the schedule for placement of the filter cloth and granular bedding.

g. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. Fabric damaged before or during the installation of aggregate and/or riprap shall be replaced at the Contractor's expense.

h. The area upon which the fabric is to be placed shall be smooth and free of projections or depressions that may cause the fabric to be punctured and care shall be taken to remove all sharp rocks, stones, roots, and other sharp objects.

i. The fabric shall be placed without stretching and shall lie smoothly in contact with the soil or wall surface. Each strip shall be continuous in width with no joints. The fabric shall be placed with overlapping seams transverse to the centerline of the channel. When end overlapping of strips is necessary, the joints shall be overlapped a minimum of 2 feet. End overlaps shall be made in the direction of flow with the upstream section of fabric lapped over the downstream section. Sand shall be spread lightly between end overlaps to promote frictional contact. The work shall be scheduled so that not more than three days elapse between the placement of the fabric and the time it is covered with the specified material.

j. Insure that all edges of the fabric are well anchored either mechanically with staples and/or pins at a minimum of 1-foot intervals or covered with native or filter material. The fabric must be keyed at the locations and to the specifications shown on the Drawings. The anchor system should not be affected by contact with water.

k. Placement of the riprap and granular bedding shall begin at the downstream end of the riprap structure and proceed in an upstream direction.

l. The Contractor shall install riprap with a minimum of re-handling, and using a method to ensure the specified gradation is met. Size segregation of the riprap will not be permitted.

    (1) Riprap shall be spread in one or two lifts in a manner to avoid displacing the underlying material. After placement, the surface of the drop structure

shall be worked to ensure that it is well graded, with any void choked with smaller cobbles and stones. Hand placement of riprap may be necessary to achieve the designed flow line surface of the structure. Placing of riprap materials by end dumping on the slope or by other methods likely to cause segregation of the rock or damage to the slope will not be permitted.

3.7 Riprap Grade Controls and Check Dams

a. Riprap grade controls and check dams shall be constructed by the Contractor at the location shown on the Drawings or at the location identified in the field by the Engineer prior to achievement of final channel grades and prior to placement of the final topsoil.

b. The grade control or check dam shall be "field fitted" into the drainage. The dimensions and locations may be adjusted at the request of the Engineer.

c. The grade controls or check dam shall conform to the final channel surface as shown on the Drawings.

3.8 Channel Reconstruction Grading

a. Channel reconstruction grading shall be completed per the Drawings and as requested by the Engineer. Channels damaged due to reclamation activities shall be reconstructed with 3H:1V side slopes extending from a channel bottom of width similar to pre-reclamation conditions. Side slope shall extend to intersect with native ground. Revegetation of the reconstructed channel shall be in accordance with these Specifications.

3.9 Sediment Control Logs/Wattles

a. Sediment Control Logs shall be constructed as described and in the locations identified on the Drawings. Logs shall be placed atop the surface of the disposal area following coversoil replacement.

b. Each log or wattle shall be keyed into the ground surface and staked into place. Hand placed rock can be used to ensure that the sediment control log is not undermined.

3.10 Sediment Control Fence

a. Sediment Control Fence shall be constructed as described and in the locations identified on the Drawings. Fence posts shall be required with no more than 8 feet maximum spacing.

4.0 MEASUREMENT AND PAYMENT

a. Riprap will be measured for payment by the cubic yard (CY) as a completed in place structure. All class rock (riprap) shall be measured in the same manner. The pay item will include all material and work necessary to construct the completed and reviewed structure. Granular bedding material, filter cloth, excavation, grading, and grade control construction incidentals will be considered subsidiary to riprap and will not be measured for payment.

b. Measurement for payment of erosion control ditches and berms will paid on an hourly basis at rates established under Force Account Section O of these Specifications.

c. Measurement for payment for the Storm Water Control plan including the placement of Sediment Control Logs and Erosion Control Techniques will not be measured for payment and are incidental to Mobilization detailed in Section J of these Specifications. The item shall include all material, trenching, staking, equipment, and installation for the completed and reviewed erosion control feature. Maintenance, replacement, and removal necessitated under requirements of the Storm Water Permit shall be incidental to payment for Sediment Control Logs.

d. Payment for culverts shall include the cost of all materials, transport, excavation, trenching, bedding, installation of the culvert, backfilling, compaction, and road repair. Additional V-ditch or other ditch work and riprap as required to drain the culvert to a receiving stream or prevent erosion will be incidental and will not be measured for payment.

4.1 Pay Items

a. Payment for the riprap material shall be at the unit price bid per CY of the installed and reviewed riprap structure. All riprap classes shall be paid at the same rate.

b. Payment for erosion control ditches and berms shall be paid on an hourly basis and shall include fully loaded equipment time and labor as defined under Force Account.

c. Payment for the completed and reviewed work or materials will be made at the contract unit price installed. Payment at the unit price shall be full compensation for furnishing and placing all materials, including all labor, equipment, tools and incidentals necessary to complete the work to design specification including excavation, backfilling, compaction, trenching, hand tamping, slope shaping, and cleanup. Any materials damaged, wasted or deemed unsuitable for installation by the engineer will not be paid.

d. The following pay items apply to Drainage Construction and Control as defined in this Section L of the Contract Documents.

Pay Item		Pay Unit
L-1	Riprap	CY
O-1	Erosion Control Ditches	HR
A-2	36-IN. CMP Culvert	LS

END OF SECTION L

SECTION N

REVEGETATION

ANC TP-1 INTERIM STABLIZATION PROJECT

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SECTION N
REVEGETATION

1.0 GENERAL

1.1 Description of Work

a. This work shall consist of furnishing all labor, equipment, and materials necessary to complete the agricultural ripping, disking, fertilizing, application and incorporation of lime, seeding, and all other associated agronomic activities as required by these Specifications. It shall be the responsibility of the Contractor to comply with all applicable requirements and regulations of the General Safety and Health Regulation of the Wyoming Occupational Health and Safety Administration and all applicable state and local Boards of Health during application of these materials.

b. Areas which are disturbed during construction, including cut and fill areas, will be revegetated in accordance with the Drawings and Specifications.

c. Lime, which is a by-product of sugar beet processing, shall be imported for use on this Project. Alternative sources and materials other than sugar beet lime can be considered but application rates must be adjusted to account for Lime Purity. The Contractor shall use this material to neutralize the acid producing soils. Lime application rates may range from none to several tons. If required by the Engineer, collection of additional soil samples for lab analysis, and calculation of pure amendment rates may require 14 days or more to complete.

d. The agricultural lime shall be applied after the area has been rough graded in conformity with the lines and grades as shown on the Drawings and after the surface has been tested and approved by the Engineer. Not all project areas will require lime. Agricultural lime shall be incorporated into the upper overburden lift and above the wicking barrier and prior to placement of topsoil by disking. Disking for lime incorporation is subsidiary to lime application.

e. The agricultural lime shall not be applied to the surface more than 12 hours before disking. The purpose of this time limitation between the application of the agricultural lime and completion of site preparation for topsoil is to protect the lime from wind and water erosion.

f. Disking shall be done in conformance with these Specifications after agricultural ripping has been completed on the topsoil surface and accepted by the Engineer.

g. Seeding and fertilizing shall be done in conformance with these Specifications after the disking has been accepted by the Engineer.

h. The Owner and Engineer reserve the right to sample any and all materials delivered to the project for any applicable tests of purity, particle size, germination as well as any other test deemed necessary by either the Owner or Engineer. Samples shall be collected by the Engineer in the presence of the Contractor and submitted for analysis at a laboratory selected by the Engineer.

i. The Contractor shall be responsible for protecting the ripped and disked areas from damage prior to seeding. Construction equipment shall not be allowed on ripped and disked areas except for the purpose of completing other agronomic activities. Damage of any ripped or disked areas shall be repaired at the Contractor's expense.

j. No payment will be made for purchased seed prior to completion of seeding and acceptance by the Engineer.

k. Shop drawings:

(1) The Contractor shall submit a plan for the revegetation work at the pre-construction meeting detailing how the items in this section are to be completed. This plan should include a list of equipment, vendors supply materials (seed), and estimated schedule of work for completing the revegetation operations. This plan of work should also contain signed letters of commitment from each vendor that they will be able to supply the bid quantities of material when each is needed and to mobilize equipment to the site and in sufficient time to complete all agricultural activities within the allotted contract time.

(2) The Contractor shall submit a written statement from the individual, company, and/or agricultural subcontractor that they fully understand the scope of work and the specifications. The Contractor and his subcontractor if applicable, shall commit that unless excepted by the Engineer for reasons discussed below, they shall incur a $200/day penalty for failure to mobilize equipment to the site in accordance with the plan of work, Section N, 1.1(k)(1) or within 10 days of notification by the Engineer that lands have been completed and determined ready for agronomic work.

The Engineer shall postpone the start date only if adverse weather or soil conditions so dictate. Such conditions could include overly dry, frozen, or wet soils, where the water content exceeds field capacity by greater than 5%. The Engineer, in consultation with the Contractor, shall determine if agricultural operations are not possible and shall determine when the next allowable seeding period should occur. On that basis, the penalty clause will be waived or contractually tied to the next available seeding period. The Spring seeding window is anticipated to begin on March 15 and will likely expire on May 15. The Fall seeding window will begin after September 15 and will likely continue until frozen conditions terminate the window.

(3) The Contractor shall present Shop Drawings to the Engineer at the Pre-Construction conference prior to hauling lime material to the site. Such Shops shall identify the source, texture, moisture content and purity of the lime. The Contractor shall submit a plan for monitoring and controlling the application rate for lime that is applied to this Work.

1.2 References

a. Wyoming Seed Law.

b. Federal Seed Law.

2.0 PRODUCTS

2.1 Agricultural Lime

a. Agricultural lime shall be spread evenly on the soil surface at a rate of five tons per acre for bidding purposes, based on 100% pure calcium carbonate ($CaCO_3$) equivalent approved by the Engineer. The Contractor is advised that the overall intent of this project is to create a suitable subsoil and isolate this layer from contamination from more acidic layers which exist below.

b. Agricultural lime may be rejected if it has become caked or sticky in the stockpiles, if the material contains particle sizes greater than 1/10 inch, if it contains large quantities of soil, or if it is found to be unacceptable for reasons determined by the Engineer. Some selective handling, sorting and wastage of the stockpiled material shall be anticipated.

c. The Engineer has not conducted testing of the lime material and it is the responsibility of the Contractor to provide such data to the Engineer at the Pre-Construction Conference. The results of the previous testing of Worland sourced sugar beet lime are tabulated below:

Percent $CaCO_3$ (Purity)	64%
Moisture Content	10%

The Engineer will conduct tests of the imported lime material and/or additional tests of the soil material requiring amendment to determine final lime application rate.

d. Application rates for agricultural lime are based on the use of materials which are 100% pure. The following equation will be used to take into account percent purity in the calculation of the bulk application rate for agricultural lime:

PAR = Pure Amendment Rate (as designated by these Specifications)

BAR = Bulk Amendment Rate (amount of supplied material to be applied)

BAR = PAR / Factor

MC = Moisture Content

Factor = (Percent Purity x Moisture Content)

Example:

PAR = 5.0 tons per acre of 100% pure agricultural lime (passing 100 mesh)

Purity = 64%

Moisture Content = 10% (dry basis 100-10 = 90%)

Factor = (0.64 x 0.90) = 0.576

BAR = (5.0 tons per acre) / 0.576 = 8.7 tons per acre of lime material

2.2 Seed – General Care and Certification Requirements

a. All seed shall be delivered in the vendor's original containers clearly marked to show analysis of seed mixture as detailed in 2.2(e) and 2.2(i) of this section. Wet or otherwise damaged packages will be rejected by the Engineer.

b. The Contractor shall collect all seed container tags. The Contractor shall write the seeding date on each tag and submit all tags to the Engineer on a daily basis.

c. The Contractor shall be responsible for monitoring and ensuring that seed is applied at the rate stipulated in these Specifications.

d. All seed used on this project shall be purchased through a dealer licensed with the Wyoming Department of Agriculture.

e. All seed shall be furnished in sealed, undamaged containers with labels plainly detailing:

   (1) The commonly accepted name of the species and variety of seed.

   (2) Lot number.

   (3) The percentage of pure seed, crop seed, inert matter, weed seeds by weight, germination, and hard seed.

   (4) The month and year of the germination test.

   (5) Origin of the seed.

   (6) Full name and address of the supplier.

   (7) Name and number of each kind of secondary noxious weed seed as listed in the Wyoming Seed Law. Seed shall not contain any of the primary noxious weed seeds as designated in the Wyoming Seed Law.

   (8) Net weight of seed in each container.

   (9) The words "POISONOUS TREATED" shall appear in bold print on the label of seeds treated with chemicals which are toxic to either humans or livestock.

f. The Contractor shall furnish to the Engineer, one original copy of a materials certification signed by the vendor prior to initiating seeding operations. This document shall certify that each lot of seed has been tested by a recognized State Seed Testing Laboratory or by a commercial laboratory employing a certified seed analysis technician(s). The seed must have been tested not more than 9 months prior to the date of seeding on the project.

g. The 9-month limitation on the date of test may be waived if the seed is hermetically sealed and the following conditions have been met:

   (1) The seed was packaged within 9 months after harvest.

(2) The container used does not allow water vapor penetration (WVP) through any wall, including the seals, greater than 0.05 grams of water per 24 hours per 100 square inches of surface at 100°F with relative humidity on one side of 90% and 0% on the other side. WVP is measured by the standards adopted by the U.S. Bureau of Standards as:

$$WVP = g \text{ of } H_2O / 24 \text{ hr} / 100 \text{ sq in} / 100°F / 90\% \text{ RH } \% \text{ RH}$$

(3) Seed does not exceed 8% moisture on a wet weight basis.

(4) The container is conspicuously labeled to indicate: (1) that the container is hermetically sealed; (2) that the seed has been preconditioned as to moisture content; and (3) the calendar month and year in which the germination test was completed.

h. Hermetically sealed seed must have been tested not more than 36 months prior to the date of seeding on the project.

i. The Contractor shall also furnish to the Engineer, one certified copy of the seed analysis reports as prepared by the respective Seed Testing Laboratory. A tetrazolium viability test will be accepted in lieu of the germination portion of the sample seed analysis report as prepared by the respective testing laboratory. The Wyoming Department of Agriculture reserves the right to random sample all seed entering the State of Wyoming. The table of tolerances acceptable to the State of Wyoming Department of Agriculture is as follows:

Offered % PLS	Allowed PLS Deviation (in percentage points)
96% or over	-5
90% or over but less than 96%	-6
80% or over but less than 90%	-7
70% or over but less than 80%	-8
60% or over but less than 70%	-9
60% or less	-10

j. If the percent Pure Live Seed (PLS) of the delivered seed is below the accepted tolerance, and if tested by the Wyoming State Seed Laboratory, the Wyoming State Seed Laboratory test results shall govern and the seed shall be rejected. The Contractor shall be required to replace the lot(s) of seed rejected with seed meeting the offered percent PLS. This may mean completely repeating any or all of the amendment, ripping, disking, pitting, and seeding as determined necessary by the Engineer.

k. The total percentage of crop seed shall not exceed 3% by weight. The species and varieties of seed, or blends of seeds, shall furnish the PLS at the rates as called for in the above seed mixture. No seed which has less than 85% pure seed or less than 80% live seed shall be used unless otherwise approved by the Engineer.

2.3 Upland Seed Mixture

The following seed mixture shall be applied to all areas to be reclaimed within the project area by broadcasting or by other methods approved by the Engineer. Material substitutions will not be allowed unless the Contractor can demonstrate to the satisfaction of the Engineer that the specified species or variety is not obtainable. All substitutions must be approved by the Engineer prior to mixing of the seed.

Upland Seed Mixture Species	PLS Pounds/Acre
Thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*) "Critana"	7.0
Bluebunch wheatgrass (*Pseudoroegneria spicata* spp. *Spicata*) "Secar"	5.0
Western wheatgrass (*Pascopyrum smithii*) "Rosana"	5.0
Slender wheatgrass (*Elymus trachycaulus* spp. *trachycaulus*) "Pryor"	5.0
Indian ricegrass (*Achnatherum hymenoides*) "Nezpar"	2.5
Needle and thread grass (ssp. *Stipa comata*)	2.5
White prairie clover (*Dalea candida*) or	0.7
Wyoming big sagebrush (*Artemesia tridentate wyomingensis*)	0.1
Total Upland PLS Pounds per Acre	**27.8**

All seed with a named variety should be blue tag certified.

2.4 Bulk Seed Calculation

The following method shall be used to calculate the amount of bulk delivered seed to be planted which takes into account the variation of seed germination and purity of the seed source.

Pure Live Seed Factor = Germination % x Purity %

$$\frac{\text{Pure Live Seed to be Planted}}{\text{PLS Factor}} = \text{Bulk Seed to be Planted}$$

Example: A seed mixture requires planting of 7.0 lbs of Thickspike wheatgrass

Thickspike wheatgrass germination = 80%
Thickspike wheatgrass purity = 90%

PLS factor = 0.80 x 0.90 = 0.72

Bulk planting rate = (Plant PLS 7.0 lbs) / 0.72 = 9.7 lbs of bagged seed should be included in the mix, so that 7.0 lbs of PLS is planted.

2.5 Fertilizer (NOT REQUIRED)

a. Commercial grade fertilizer may be applied to all areas to be seeded. If required, the application rate shall be 80 lbs/acre for a fertilizer nutrient ratio of 18 pounds of available nitrogen, 40 pounds of available phosphate and 6 pounds of available potassium per acre.

b. Commercial grade fertilizer shall be obtained from an authorized vendor.

3.0 EXECUTION

3.1 General

a. Agricultural lime application, ripping, fertilizer application, disking, pitting, and seeding shall only be done when the soil and environmental conditions provide an acceptable seed bed for plant growth.

b. It is the responsibility of the Contractor to ensure that these or similar conditions do not prevent proper formation of pits. This may necessitate delaying seeding until the next allowable seeding period.

c. The Contractor shall be responsible for measuring the depth of ripping and disking to ensure that each operation is being performed on a consistent basis and meets the requirements of these Specifications.

d. Agricultural lime which is lost from the soil surface by wind or water erosion or by any other means, prior to incorporation shall be replaced at the Contractor's expense. The replacement rate for agricultural lime and fertilizer shall be as determined by the Engineer.

e. The Contractor shall be responsible for monitoring and ensuring that seed is broadcast evenly on the pitted surface at the rate stipulated in these Specifications.

f. Prior to the replacement of topsoil on the regraded surface, the compacted subgrade surface shall be scarified. The Contractor shall reference Topsoil, Section K-3.2 of the Specifications.

3.2 Agricultural Lime Application

a. The Engineer will determine the actual application rates of lime to be applied after sampling and analysis of the rough graded subgrade surface. The area where lime will be applied will be approximately 36 acres. The Contractor shall be responsible for determining bulk amendment rates for each designated area based on the method defined in these Specifications.

b. Agricultural lime shall only be applied during daylight hours when soil and environmental conditions are suitable. Daylight hours shall be defined for the purpose of the contract as being the period of time between sunrise and sunset on the day of application.

c. Agricultural lime shall only be applied when weather conditions are acceptable. The Engineer will evaluate wind conditions to ensure that wind gusts are not affecting the application of the lime. If excessive wind conditions are present, application of the lime will be delayed until more favorable conditions occur.

d. The sequence of operations for applying agricultural lime shall be as follows:

(1) Apply agricultural lime to the soil surface on the areas designated by Engineer at the rates designated by the Engineer for each area. Lime may need to be applied in lifts to ensure uniform incorporation across the 1-

foot overburden lift. Application equipment shall be specifically designed for such work and operated by personnel experienced in such work. If ordered by the Engineer, a test area shall be staked off by the Contractor and amendments applied thereto to determine the application rate for a given speed of the application equipment. This work shall be performed in a timely manner, as determined by the Engineer so that amendments are not lost from the site by wind or water erosion or by any other means.

(2) Incorporate applied agricultural lime in conjunction with topsoil preparation by disking as outlined in these Specifications within 12 hours after application to the soil surface. The Contractor is advised not to apply more lime than can be incorporated within 12 hours.

3.3 Agricultural Ripping

a. Agricultural ripping shall be done after topsoil has been properly placed on the soil surface and accepted by the Engineer. Agricultural ripping shall not be done more than 48 hours prior to completion of the seeding. The Contractor shall not agricultural rip more acres than can be seeded within 48 hours of the commencement of agricultural ripping.

b. Agricultural ripping shall be done to a depth of 12 inches and parallel to the contour at intervals sufficient to "shatter" compacted materials between rip lines on a <u>single pass</u> of the ripping equipment. The term "shatter" shall be defined for the purpose of these Specifications as sufficient breaking and/or bursting of the compacted soil/overburden such that a shovel can easily penetrate to a depth of 12 inches between rip lines. The depth of the ripping shall be sufficient to pass through the placed topsoil and penetrate the final graded surface to create a sufficient "interface" between the regraded surface and the placed topsoil. The depth shall not be deep enough to cause a large amount of mixing of the regraded surface soil into the placed topsoil.

c. The Contractor is advised that multiple passes of the ripping equipment will not be allowed. The Contractor should test the agricultural ripper on a small area to ensure that ripping done by the implement will adequately meet these Specifications.

3.4 Disking

a. Disking shall be done after agricultural ripping of topsoil has been completed and accepted by the Engineer.

b. Disking shall be done to a minimum depth of 6 inches parallel with the contour using a heavy duty mechanical double gang disk with a minimum diameter of 24 inches, or any other implement which is suitable for completion of this task and is approved by the Engineer. The disking operation shall produce soil conditions which provide suitable seed bed that is acceptable to the Engineer for plant growth.

c. The Contractor is advised that multiple passes by the disk may be necessary in order to achieve an acceptable seed bed as required by these Specifications. Multiple passes will be considered subsidiary to Disking.

3.5 Fertilizing (NOT REQUIRED)

a. Fertilizer application shall be done after the disking of the topsoil has been completed and accepted by the Engineer.

b. Commercial grade fertilizer will be applied to all areas to be seeded at the rate of 30 pounds of available nitrogen, 20 pounds of available phosphate and 10 pounds of available potassium per acre.

c. The fertilizer shall be applied with a commercial agriculture spreader cart or spreader truck. Prior to applying the fertilizer, the Contractor shall furnish the Engineer a copy of the delivery ticket from the vendor.

3.6 Pitting and Seeding

a. Pitting and seeding shall be completed in accordance with these Specifications after disking and fertilizing has been completed by the Contractor and accepted by the Engineer. Pitting and seeding shall be completed within 48 hours after commencement of agricultural ripping.

b. Final surface tillage operations shall consist of digging approximately 8,000 to 10,000 pits per acre as shown on the Drawings. Pits shall range in width from 8 to 18 inches parallel to the slope and in length of 8 to 24 inches parallel to the contour. Completed basins shall have a minimum depth of 6 inches and a maximum depth of 8 inches when measured by the method shown on the Drawings. Pit forming devices shall be preceded by ripper teeth sufficient to reach below the bottom of the pits.

c. Pit shall be constructed in rows parallel to the contour, so that the downslope flow of water is entrapped by the next row of pits. The pitted surface shall have a staggered pattern between adjacent rows of pits. The berm constructed between adjacent pits in the same row shall be sufficient to eliminate any flow of water parallel to the contour.

d. Pits shall be constructed prior to seeding and seed shall be broadcast immediately thereafter with a broadcast seeder, or other special equipment approved by the Engineer, as part of the pitting process.

e. Prior to general seeding activities, test plots shall be established for the initial seeding in order to calibrate the mechanical seeder and ensure proper seed application rate. Initial calibration is the responsibility of the Contractor and shall be done in the presence of the Engineer. Maintaining the proper seed application rate shall be the responsibility of the Contractor. Periodic calibration tests of the seeding equipment may be required as determined necessary by the Engineer.

f. Fall seeding shall be done between September 15 and the time that frost prevents preparation of a proper seed bed as determined by the Engineer. Spring seeding shall be done after the frost leaves the ground and until May 15.

g. Pitting and seeding shall only be done during daylight hours, which shall be defined for the purpose of this contract as being the period of time between sunrise and sunset on the day of pitting and seeding.

h. Construction of pits shall not destroy or cause blockage of erosion control ditches. Any damage shall be repaired at the Contractor's expense.

3.7 Broadcasting Seeding

Small areas that cannot be pitted as determined by the Engineer, may be ripped, disked, and broadcast seeded. Broadcast seeding shall occur at all topsoil stockpile locations after the stockpiles have been excavated. The specified seed mix shall be uniformly distributed with a mechanical seeder specifically designed for such work and the ground thoroughly raked or dragged *immediately* after seeding to cover the seed with approximately 0.25 inch of soil. Raking or dragging will be done parallel to the contour with suitable equipment approved by the Engineer.

4.0 MEASUREMENT AND PAYMENT

4.1 Special Considerations

a. All revegetation pay items including agricultural ripping, disking, agricultural lime, fertilizer, and pitting and seeding are not included in the 30% variance of quantities as shown in the construction cost estimate and the unit price will not be negotiated.

b. Accepted agricultural ripping, disking and pitting, and seeding operations on authorized areas will be measured on a *per plane acre* basis to the nearest 0.1 (one tenth) of an acre. Areas to be included for measurement shall be those areas authorized for and containing accepted agricultural ripping and disking. Areas disturbed or caused to be disturbed by the Contractor for his convenience or by his negligence shall be ripped, disked, pitted and seeded as directed by the Engineer at the Contractor's expense.

c. Mobilization for revegetation equipment and materials will be paid under Section J of these Specifications. Multiple mobilizations and demobilizations of agricultural equipment for the Contractor or his subcontractor's convenience will not be measured for payment. Multiple mobilizations may be required if specifically directed by the Engineer due to soil conditions as discussed in 1.1(k) above.

4.2 Agricultural Lime

a. Application of agricultural lime to the soil surface will be measured for "Agricultural Lime" on the ton basis to the nearest 0.5 ton on the quantity of material meeting these Specifications placed evenly on the soil surface and accepted by the Engineer. The method by which the tons of lime will be determined shall be mutually agreed to by the Contractor and the Engineer. Any additional agricultural lime which is placed on the soil surface in excess of that designated by the Engineer will not be measured for payment, without prior approval of the Engineer.

b. Any plant nutrients which may be present in the agricultural lime will be considered subsidiary to "Agricultural Lime" and not measured for payment.

c. Purchase, loading, hauling, and surface application of the agricultural lime will not be measured for payment and will be considered subsidiary to "Agricultural Lime."

d. Multiple mobilizations and demobilizations of agricultural lime loading, hauling and application equipment as well as labor and any other items required to complete agricultural lime application will not be measured for payment and will be considered subsidiary to "Agricultural Lime."

4.3 Revegetation

a. Payment for agricultural ripping, disking, fertilizing, and pitting and seeding will be made when each item has been completed and accepted by the Engineer. Each item will be considered incidental to Revegetation. The accepted quantities of revegetation will be paid for at the contract unit price per acre.

b. The Contractor's attention is specifically called to the fact that the method of measurement is on a plane acre basis.

c. The accepted quantities will be paid for at the contract unit price per acre to the nearest 0.1 acre.

d. No payment will be made for purchased seed prior to completion of seeding and acceptance by the Engineer.

4.4 Pay Items

a. The following pay items apply to Revegetation as defined in this Section of the Contract Documents:

Pay Item		Pay Unit
N-1	Agricultural Lime	Ton
N-2	Revegetation	Acre

END OF SECTION N

Health and Safety Plan

ANC URANIUM MILL TAILINGS SITE HEALTH AND SAFETY PLAN – TP-1 INTERIM STABILIZATION

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1.0 INTRODUCTION

This document provides the Site Health and Safety Plan (HASP) prepared by Lidstone & Associates, a Wenck Company (LA) for the American Nuclear Corporation (ANC) Uranium Mill Tailings Pond No. 1 (TP-1) interim Stabilization Project, Wyoming Department of Environmental Quality/Land Quality Division (LQD) Contract PS 0694. This HASP is designed to comply with the industrial health and safety standards and requirements of applicable federal and state regulatory agencies. The objective of this HASP is to provide a mechanism for establishing safe working conditions for LA and subcontractor personnel working at the ANC site. The safety organization, procedures and protective equipment have been established based upon an analysis of potential physical, biological, and radiological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of accident, injury, and exposure to any potentially hazardous situation.

Anticipated field activities covered by this HASP include excavation of mine overburden, Willow Springs Draw sediment (wicking barrier material), and topsoil from various existing topsoil piles for placement onto TP-1. As part of this interim stabilization project, surface water diversion channels and a retention dam/reservoir will also be constructed. Training and safety procedures will be specific to hazards involved with these types of activities being performed at a uranium mill tailings site. This HASP is subject to change if site conditions change and additional hazards are identified. The Project Manager and Project Health and Safety Officer are authorized to modify the contents of this HASP to respond to changing site conditions to ensure continued health and safety protection of project personnel.

1.1 Site Location and Description

The ANC Uranium Mill Tailings Site is located in the Gas Hills Uranium Mining District, eastern Fremont County, Wyoming. The Site is approximately 45 miles east of Riverton and 70 miles west of Casper. The site is licensed by the U.S. Nuclear Regulatory Commission (NRC) and encompasses approximately 550 acres of land. Of this total acreage, less than half was used for uranium mining and milling activities between 1959 and 1981. Of the 550 total acres within the licensed area, approximately 140 acres includes the decommissioned mill site and two tailings ponds that are in different stages of reclamation. TP-1 encompasses approximately 40 acres, and Tailings Pond No. 2 (TP-2) encompasses approximately 120 acres. The mill was decommissioned and the mill site reclaimed in 1989. TP-2 has been completely reclaimed but TP-1 has been partially reclaimed. The purpose of this project is to provide interim stabilization of TP-1 by covering it with nearby uranium overburden material, sand wicking barrier excavated from Willow Springs draw and topsoil obtained from several nearby piles. The primary constituents of concern from a health and safety standpoint are the low concentrations of natural uranium, radium-226 and its daughter product radon-222 and thorium-230 that may be present within the overburden material.

2.0 RESPONSIBLE PERSONNEL

Position	*Name*
Project Manager	Chris Lidstone
Project Health and Safety Officer	Greg Steed
Field Supervisor	Varies
Project Support Personnel	Varies

All LA personnel must comply with this HASP during the performance of their work. LA does not assume responsibility for the health, safety and working conditions of their subcontractors, but will require subcontractors to acknowledge (**Appendix E.2**) the following health and safety plan and adopt one similar

to this HASP. Each person is responsible for completing tasks safely and reporting any unsafe acts or conditions to his/her supervisor and/or the Project Manager. No person may work in a manner which conflicts with these HASP procedures. Any person who continues to violate safety procedures after being duly warned and informed will be dismissed from the project.

The Project Manager and Field Supervisor, together with the subcontractor project supervisor(s), will be responsible for monitoring the execution of safe work practices and the provisions of this Plan. These personnel are also responsible for knowing the provisions of the plan, communicating plan requirements to workers under their supervision and to site visitors, and for enforcing the plan.

The Project Manager or designee is responsible for:

- Conducting on-site safety orientation for subcontractors, including the procedures within this HASP.
- Conducting safety inspections of work activities to ensure compliance with this HASP.
- Maintaining required health and safety documents and records.

In Case of an On-Site Visit by any Regulatory Agency (eg., OSHA, BLM or the State Mine Inspector), the Project Manager and Health and Safety Officer must be notified as soon as possible. The Field Supervisor will notify the Project Manager that an agency inspector is on the jobsite. It is the responsibility of all site personnel to be informed of all pertinent regulations, employees' rights and responsibilities under the law, and to make the inspector's visit on the jobsite as pleasant and productive as possible.

Since cell phone coverage is limited in the Gas Hills, LA requires that the Field Supervisor contact the Project Manager or designee each evening to ensure that all field personnel have safely returned from the field. A similar protocol requires that all subcontractors inform LA of their proposed field schedule in advance of their work. Contact can be by cell phone, text message or email. If contact is not made, a search and rescue effort will be deployed. Emergency contact numbers are provided in Section 4.1 and Attachment F of this HASP.

3.0 PREPARATION FOR TRAVEL

Prior to embarking on any field work, the Project Manager shall ensure that all field personnel and subcontractors are aware of current weather and road conditions. LA endeavors to ensure that all company vehicles are equipped with emergency equipment including, but not limited to, jacks, spare tires, shovel, flashlights, extra batteries, matches, emergency flares, rope, garbage bags, first aid kit, and sand bag(s). Kits containing these items will also be provided for use in rental vehicles. If using a rental car, or if your company vehicle is missing any of the above equipment, contact Pam Sanders or any other administrative personnel to ensure that adequate safety equipment is obtained before departing for the field. Items should not be removed from company vehicles for use in rental vehicles. While in the field, if there is concern about the adequacy or the type of emergency equipment in the field vehicle, each LA employee is responsible for, and is authorized to, purchase said emergency equipment at any local store. Given the personal nature of certain types of equipment, each employee shall provide their own sleeping bag, spare blanket, water, extra food, and/or similar personal emergency equipment prior to embarking to the field. Be aware that hypothermia (lowering of body temperature) or hyperthermia (heat exhaustion) is the greatest danger faced by most of our employees during field work in remote areas. Always stay calm in an emergency situation and stay warm (or cool) and well hydrated. Never go into remote areas without a full fuel tank and investigate all stream or drainage "crossings" on foot before you

travel forward with the vehicle. Appropriate clothing for anticipated field conditions and a change of clothing should always accompany each person to a remote field location. Always take adequate maps that cover or address the field area location and all travel routes.

Should it be determined that the vehicle tires, windshield wipers, fluids, etc. are inadequate for the conditions to which the vehicle and employee will encounter, the employee is responsible for upgrading or replacing said equipment. Employees will be reimbursed for such upgrades or replacements. Upon returning all vehicles, company or rental, the employee must (1) fill the fuel tank and (2) report all problems or missing safety equipment, etc. to Pam Sanders or any other administrative personnel. Administrative personnel are responsible for making sure that Pam Sanders and, if necessary, Chris Lidstone are notified.

4.0 EMERGENCY PROCEDURES

4.1 Emergency Contact Information

Police/Fire/Ambulance: 911; other contact numbers include:

- Fremont County Sheriff's Office: 307-857-3600
- Fremont County Fire District: 307-857-3030 or 307-856-5410
- US BLM Cody Interagency Dispatch Center: 307-578-5740
- Fremont County Ambulance: 307-857-3669
- Air Ambulance: 941-639-7855

Hospital: Sage West Health Care – Riverton (Formerly Riverton Memorial Hospital)

2100 W. Sunset Drive, Riverton, WY 82501
307-856-4161 (General) 307-857-3420 (ER)

A map showing the hospital location is provided in **Attachment F**.

Project Manager: Chris Lidstone - 970-420-5257 (cell)

Health and Safety Officer: Greg Steed 970-819-1783 (cell)

LA Office: 970-223-4705

4.2 Reporting of Injuries/Illnesses

Any person who becomes ill or injured on site should be assessed for severity, and administered first aid, as necessary, prior to transport to any medical facility. All injuries and illnesses must be immediately reported to the Project Manager and/or the Health and Safety Officer at the phone numbers provided in Section 4.1 above. A "Notice of Injury Report" is required to be written as soon as possible after an injury or illness occurs, even if medical treatment is not required. The report should be made at or near the time of the injury/illness but at a minimum on the same day of the injury/illness. Relevant information pertaining to the injury/illness should be provided to the Project Manager and the Health and Safety Officer who will make the report to company management. The report should include, but not be limited to, the following information:

- How the injury/illness occurred.
- What they were doing at the time.
- Who they were working with at the time.
- When and where it occurred.

- Other pertinent information that will aid in the investigation of the injury/illness.

Failure to report an injury/illness immediately (meaning at or near the time of the injury/illness and on the same day of occurrence) is a violation of this HASP.

If the injured individual has been taken to the hospital, the Field Supervisor or the Health and Safety Officer shall notify the Project Manager as soon as possible. Statements from witnesses shall be taken. Statements are to be signed by witnesses and should include the time and date. Photographs should be taken of the area where the incident occurred and any other areas or equipment relevant to the injury/illness. Management will assist in the investigation. The completed "Notice of Injury Report" will be sent to the Project Manager.

4.3 Fire or Explosion

In the event of a fire or explosion, the local fire department should be notified immediately. Since most of the Project lands are public lands administered by the BLM, the BLM fire dispatcher located in the Cody Field Office should also be notified at the number provided in Section 4.1 and in **Attachment F**. If it is safe to do so, site personnel may use available firefighting equipment to control or extinguish the fire and remove or isolate any flammable materials that may contribute to the fire. If fighting the fire is not safe, all personnel should move upwind to a safe distance away from the fire and await arrival of the firefighting team.

4.4 Spills or Leaks

During the site work, the most likely spills or leaks will be oil, grease or other petrochemicals leaking or spilling from construction equipment, and associated light duty trucks. To minimize the impact of potential spills and leaks, at least the following shall be performed at the site:

- Construction equipment and other site vehicles shall be inspected daily, and any oil leaks shall be identified and repaired immediately.
- Spill containment and cleanup materials, such as drip pans, absorbent cloths, dams, etc., will be readily available at the site.
- All petrochemicals shall be stored in approved containers.

In the event of a leak or spill, construction activities will be suspended until the spill has been cleaned up and the leaking equipment repaired. The Project Manager or Health and Safety Officer will be notified of the spill and any containment and recovery actions that were necessary to effect cleanup of the area. The Project Manager and/or the Health and Safety Officer will determine if the spill needs to be reported as a hazardous materials release.

4.5 Emergency Equipment

Each LA field or rental vehicle will contain, at a minimum, the following emergency equipment:

- First aid kit, including a snake bite kit;
- Shovel; and
- Fire extinguisher.

Other safety equipment may be required as determined by site conditions and described in section 3.0 of this HASP.

4.6 Basic First Aid Procedures

4.6.1 Shock

Symptoms can include cold sweat, weakness, irregular breathing, chills, pale or bluish lips and finger nails, rapid weak pulse, and nausea.

First aid consists of the following:

- Call 911 or seek medical help immediately;
- While waiting for medical help:
  - Do not give victim anything to eat or drink.
  - Lay victim on back, but do not move if a neck or back injury is suspected.
  - If vomiting or severe injury to the lower jaw or face is present, move person to their side and be sure person is getting adequate air.
  - Keep person warm using blankets or clothes, but do not over heat.
  - Raise person's feet and legs with a pillow if it does not cause pain.

4.6.2 Bleeding and Wounds

First aid consists of the following:

- Place a clean cloth or gauze and gloved hand over the wound; apply firm, steady pressure for at least 5 minutes.
- Call 911 or other emergency personnel if bleeding is severe.
- Elevate an injured arm or leg above the level of the victim's heart if practical.
- When bleeding stops, secure the cloth with a bandage. Do not lift the cloth from the wound to check if bleeding has stopped. Be sure the bandage is not too tight—it may cut off circulation.
- Check the victim for shock.

Never use a tourniquet unless you cannot control the bleeding. Tourniquets may result in subsequent medical amputation.

4.6.3 Burns

Chemical or compressed gas burns

- Use a drench hose, emergency shower or eyewash, or bottled water for at least 15 minutes to rinse away all traces of chemicals while removing any contaminated clothing from the victim.
- Cover the burn loosely with a clean, dry cloth or special burn dressing.
- Check the victim for shock.
- Call 911 or seek medical attention as soon as possible.

Heat or electrical burns

- If necessary, use water to stop actual burning of skin.
- If the skin is not broken, submerse the burned area under cool running water, or gently apply a cool compress until pain is relieved. Bandage with a clean, dry cloth.
- Do not break a blister if one forms.

- Do not apply ointments or creams.
- If skin is broken, or if burns are severe:
  - Call 911 or other emergency personnel;
  - Do not clean the wound or remove embedded clothing;
  - Cover the burn loosely with a clean, dry cloth; and
  - Expect shock and treat accordingly.

4.6.4 Choking (Persons over one year of age)

If the victim can speak or cough forcibly and is getting sufficient air, do not interfere with his/her attempts to cough the obstruction from the throat. If the victim cannot speak or is not getting sufficient air, have someone call 911 while you perform abdominal thrusts.

- Stand directly behind the victim and wrap your arms around the stomach.
- Make a fist with one hand and place that fist just above the navel and well below the ribs, with the thumb and forefinger side toward you.
- Grasp this fist with the other hand and pull it quickly toward you with an inward and slightly upward thrust. Repeat if necessary.

If the victim becomes unconscious:

- Lay the victim on their back.
- If the object that is blocking the airway is visible, reach a finger into the victim's mouth (along the inside of the cheek) and try to sweep the obstruction out of the victim's throat, being careful not to push the object deeper into the victim's airway.
- Even if this is not successful, attempt rescue breathing.
- If the victim is still not breathing or moving, begin chest compressions (CPR).

4.6.5 Electrical Shock

The danger from an electrical shock depends on the type of current, how high the voltage is, how the current passed through the body, the person's overall health and how quickly medical treatment is provided. An electrical shock may cause burns, or it may leave no visible mark on the skin. In either case, an electrical current passing through the body can cause internal damage, cardiac arrest, or other injury. Under certain circumstances, even a small amount of electricity can be fatal.

- Do not touch the victim until electrical contact is broken.
- If possible, unplug or switch off the source of electricity.
- Any person who has been injured by contact with electricity should be seen by a doctor as soon as possible.
- Do not move a person with an electrical injury unless the person is in immediate danger.
- Call 911 or seek medical attention immediately if the victim experiences any of the following:
  - Severe burns
  - Confusion
  - Difficulty breathing
  - Heart rhythm problems

- Cardiac arrest
- Muscle pain and contraction
- Seizures
- Loss of consciousness

- Begin CPR if the victim shows no signs of circulation, such as breathing, coughing or movement.
- Keep the victim warm
- Cover any burned areas with sterile gauze bandage, or a clean lintless cloth.

4.6.6 Eye Injury

Chemical

- Call 911
- Hold the eyelids apart and flush the eyeball with lukewarm water for at least 15-30 minutes. Be careful not to let runoff water flow into the other eye.
- Do not bandage the eye.

Blow to the Eye

- Apply a cold compress to the eye, but do not put pressure on the eye.
- Provide Tylenol or ibuprofen for pain.
- If there is bruising, bleeding, change in vision, or pain when the eye moves, seek immediate medical assistance.

Cut, scratch or embedded object

- Do not rub the eye.
- Pull the upper lid down and blink repeatedly.
- If particle is still there, flush with clean water.
- If flushing does not help, close eye, bandage it lightly.
- Seek medical assistance.

4.6.7 Fainting

- Lay the victim down on their back and make sure they have plenty of fresh air.
- Reassure the victim and apply a cold compress to the forehead.
- If the victim vomits, roll the victim on his/her side and keep the windpipe clear.
- Transport victim to a medical facility emergency room. Note that fainting victims typically regain consciousness almost immediately. If this does not happen, the victim could be in serious danger and you should call 911 as soon as possible.

4.6.8 Dehydration

- For mild dehydration, replace lost body fluids with water, juice or sports drinks; for severe dehydration, encourage fluid intake and transport to medical facility emergency room.

4.6.9 Heat Exhaustion

- Move the victim to a cool or shady area, provide cool water or other non-alcoholic or non-caffeinated fluids, cool skin with wet compresses or spray with water, and have the person rest

for the remainder of the day; if symptoms get worse or nausea and/or vomiting occurs, call 911 and transport the victim to a medical facility emergency room.

4.6.10 Heat Stroke

Heat stroke can be life threatening. Symptoms can include a body temperature of 105°F or higher; dry, hot, flushed skin; rapid pulse; unconsciousness; and lack of perspiration.

- Call 911.
- Get the victim out of the heat and into a cooler place.
- Place the victim in the shock position, lying on the back with feet up.
- Remove or loosen the victim's clothing.
- Cool the victim by fanning and applying cloth-wrapped cold packs or wet towels.
- Treat for shock.

4.6.11 Hypothermia

Hypothermia can be life threatening. Symptoms include lower than normal body temperature, shivering, apathy, disorientation, drowsiness, and eventually, unconsciousness.

- Call 911.
- Immediately move the victim into the best available nearby shelter.
- Get the victim out of wet clothes and replace with dry clothes, sleeping bag or blankets.
- Have the victim drink a warm, sweet, non-alcoholic beverage, if possible.

4.6.12 Unconsciousness

- Determine responsiveness by gently tapping the victim's shoulder and asking, "Are you okay?"
- If there is no response, shout "Help!" and look for a medical alert tag on the victim's neck or wrist.
- If the victim is not breathing and has no pulse, begin CPR.
- Call 911 and transport to medical facility as soon as possible.

4.7 Work Limitations

- In high ambient temperatures, follow heat exhaustion precautions including: Provide plenty of cool water and electrolytes; remove protective clothing during breaks; check resting pulse and increase number of breaks if pulse does not return to normal during work breaks.
- Sun and wind exposure may result in dehydration; apply sunscreen to exposed skin and drink adequate non-caffeinated fluids throughout the work day.
- In low ambient temperatures (<32°F), follow hypothermia precautions.
- Work may progress only during daylight hours or under conditions of adequate lighting. Where night work or remote work is required, adequate personal protection, including "Buddy Notification" is required. Never leave a remote site without first notifying your "buddy". Before leaving any site after dark, ensure that all personnel are accounted for.

4.8 Basic Safety Rules

- Compliance with applicable federal, state, county and city regulations, and client and company safety rules is mandatory.

- Clothing must provide adequate protection to the body. Shorts and sandals are not allowed in the field. Professional clothing will be required at all times on an LA job.
- All personnel will be required to attend safety meetings as stipulated by project requirements to meet OSHA safety standards.
- Firearms, alcoholic beverages or illegal drugs are not allowed on project sites or in company vehicles at any time.
- Housekeeping shall be an integral part of every job. Subcontractor supervisors and LA employees are responsible for keeping the project site clean and hazard-free.
- Drinking water containers are to be used for drinking water and ice only.
- "Horseplay" on the jobsite is strictly prohibited.
- The jobsite speed limit, where posted, shall be adhered to with no exceptions. Employees must be sitting down inside the truck when the vehicle is in motion with seatbelts securely fastened. Riding in the bed or on the tailgate of a moving truck or SUV is not allowed.
- Report all unsafe conditions to your supervisor, the Project Manager and/or the Health and Safety officer.
- All floor openings or excavations must be barricaded on all sides to ensure employees are aware of the hazards.
- Warning signs, barricades, and tags will be used to the fullest extent possible and shall be obeyed.

5.0 HAZARDS

The types of hazards that may be encountered at the site during the project include biological and physical hazards, including radiological hazards. Common physical hazards associated with large earth moving construction projects include, but are not limited to, those related to light construction, such as slip-trip-fall hazards associated with the field environment, hot or cold weather, sun and wind exposure, and noise and dust from heavy equipment. Mechanical hazards include, but are not limited to, sudden equipment movement, swinging backhoe booms, snapping cables and loss of hydraulics. Biological hazards include biting insects, ticks, spiders, and poisonous snakes. Radiological hazards include the potential for low concentrations of natural uranium, radium-226 and associated daughter products, in soils.

5.1 Hazard Protection

5.1.1 Physical Hazards

Temperature Extremes: Construction workers may be exposed to heat, cold and the sun. Too much heat or cold, especially if combined with high humidity or high winds, can harm a worker's health and interfere with work productivity. Hot, humid conditions can cause heat exhaustion, cramps and fainting. Working in very cold conditions can result in chapped skin, hypothermia and frost-bite.

To protect against heat related illnesses, drink small amounts of water frequently, wear light colored, loose fitting clothing, take frequent short breaks in cool shade, and avoid caffeine or large quantities of sugar.

To protect against cold related illnesses, wear several layers of clothing rather than one thick layer, wear gloves and a warm hat or a warm liner under the hard hat, wear warm footwear with one or two pairs of warm socks, wear a scarf or face mask in cold, windy weather, and take frequent short breaks in a warm shelter.

Sun/Wind Exposure: To avoid over exposure to the sun and wind, use sun screen with a protection factor of at least 30 and long-sleeved shirts and long pants. When not in a hard hat area, wearing a large brimmed hat will help protect the neck, ears, eyes, forehead, nose, and scalp from sun exposure. Wear UV-absorbent eye protection.

Slips, Trips and Falls: Keep the construction staging area(s) and associated work and storage areas as clean and free of tripping hazards as possible. Sturdy water-resistant boots should be worn when working under wet or muddy conditions. While walking, be alert and observe terrain and tripping hazards, such as hoses, sagebrush, etc. to minimize slips, trips, and falls. Wearing long pants and long-sleeved shirts will prevent abrasion in the event of a slip, trip or fall.

Lifting: Always use proper lifting techniques when lifting objects from the ground, back of a vehicle, etc. Lifting of heavy items should be performed by more than one person. Proper gloves should be used to avoid hand injuries. Where the risk of handling sharp items occurs, cut resistant gloves shall be worn.

Noise: Exposure to continuous high noise levels or short-duration, impact type noise can lead to temporary or permanent hearing loss. Staying away from noise sources and wearing proper hearing protection can control the effects of noise exposure. Ear protection (ear plugs or ear muffs) is required for all site personnel when working in close proximity to operating heavy equipment (eg., scrapers, dozers, etc.) or other loud operating equipment for extended periods of time.

Heavy Equipment: Work in or around heavy equipment presents several hazards, including the potential for being struck by the equipment or falling materials. Prior to entering the work area, all personnel shall review the work plan, including the equipment being used, and the operating sequence. The risk of injury is reduced by staying clear of operating equipment, being observant of work activities, wearing appropriate protective equipment (eg., hard hat, hard toed boots, eye, and ear protection) and making the equipment operator aware of your presence before approaching. All site personnel shall wear high visibility vests at all times.

Summer Storms: If thunder or lightning is heard or seen, construction equipment should be shut down, and all personnel seek shelter until the threat of lightning strikes passes.

Radiological Hazards: The mine overburden spoils that will be used and are currently present as cover over TP-1 may contain low concentrations of natural uranium and radium-226. Although the hazard is considered low, appropriate cautionary measures should be employed when working around the overburden material. Dust suppression using adequate quantities of water or other approved dust suppression methods, shall be required of the contractor during the transportation of material to ensure that airborne dust emissions will be minimized. Dust suppression will be required on all access and haul roads, on the overburden stockpile and on TP-1 during all earth moving activities. If dusty conditions occur, the Contractor will be required to use dust masks to prevent inhalation of dust or will be required to shut down operations. Protective eyewear, long-sleeved shirts and long pants should be worn to prevent excessive material on exposed skin. Kevlar coveralls, respirators and latex, rubber or nitrile gloves may be required as an additional layer of protection. All field personnel shall clean hands and face with soap and water or waterless cleaner prior to eating, drinking or tobacco use and prior to leaving the site each day. The Contractor will be required to clean all field equipment at the end of the project and/or prior to any equipment leaving the site.

5.1.2 Biological Hazards

Snakes and Stinging Insects: Rattlesnakes are commonly found in the Gas Hills during the spring and summer months. Personnel should be constantly vigilant in the field to avoid contact with snakes. A snake bite kit should be maintained in each field vehicle first aid kit. Heavy long pants and boot extenders will help in prevention of snake bites. Long-sleeved shirts and long pants that fit tightly around the boots will help prevent stings from insects. Use of insect repellant will also be helpful. Personnel should check exposed skin for ticks prior to leaving the site each day. Personnel with allergies to insects should be identified and ensure that appropriate emergency treatment is available.

Poisonous Plants: Poisonous plants, such as poison ivy, stinging nettle, etc. are not common in the Gas Hills. However, use of long-sleeved shirts and long pants will minimize contact with brush and other plant material that could cause abrasion or allergic reaction. Personnel with allergies to certain plants should be identified and ensure that appropriate emergency treatment is available.

Noxious Weeds: Noxious weeds, such as Russian thistle, are common in Wyoming and are invasive in areas where the surface soils have been disturbed. To prevent the introduction of noxious or other varieties of invasive weeds, the Contractor will be required to steam clean all field equipment prior to entering the site.

Attachments

ATTACHMENT A
JOB SAFETY CHECKLIST

The following Job Safety Checklist has been condensed and edited from the Occupational Safety and Health Act, Part 1926, Construction Safety and Health Regulations.

A. Safety Rules

_____ Adequate clothing for site and field conditions. Spare clothing and water available.
_____ Hard toed work shoes worn. Sunscreen, hard hats and eye/ear protection as required.
_____ Contractor's personnel hold safety meetings as indicated by project requirements in accordance with OSHA Safety standards.
_____ Work areas safe and clean.
_____ No use of alcoholic beverages or controlled substances.

B. Recordkeeping

_____ Safety meeting sign-in logs maintained in a folder.
_____ Report all problems with LA vehicle safety equipment or vehicle to LA office.

C. Housekeeping and Sanitation

_____ General neatness.
_____ Regular disposal of trash.
_____ Passageways, driveways, and walkways clear.
_____ Adequate lighting.
_____ Oil and grease removed.
_____ Waste containers provided and used.
_____ Adequate supply of drinking water.

D. First Aid

_____ First aid kits with supplies and equipment.
_____ Injuries promptly and properly treated and reported.

E. Personal Protective Equipment

_____ Hard hats, safety glasses, and steel toed boots.
_____ Hearing protection, when warranted.
_____ Safety vests, when warranted.

F. Motor Vehicles

_____ Fully equipped as discussed in Section 3.0.
_____ Seat belts worn at all times.

G. Material Storage and Handling

_____ Material at least 2 feet from edge of excavation site.
_____ Proper temperature and moisture levels for safe storage of materials to prevent deterioration or volatile hazards within the storage area.
_____ Inventory maintained and inspected frequently.
_____ Proper protective gear worn when handling chemicals.

ATTACHMENT B
SAFETY EQUIPMENT CHECKLIST

The following is a list of Safety Equipment that should be available at the job site, if required, or available from the Project Manager or Health and Safety Officer at all times. Equipment should be checked at intervals in accordance with the applicable OSHA Safety Standards to ensure that all required equipment is present and in good condition.

_____ Safety goggles, shields, and glasses.
_____ Hearing protection.
_____ Shovel.
_____ Hard hats and steel toed boots.
_____ Fire extinguishers (properly charged).
_____ First aid kit (check list inside kit).
_____ Trash bags.
_____ Site HASP provided to and reviewed with all site personnel.
_____ Adequate maps of area and navigation devices as necessary.
_____ Personal equipment: sleeping bag, spare clothing; head protection, food, water, etc.

ATTACHMENT C
SAFETY MEETING REPORT

A Safety Meeting Report is signed to indicate attendance and understanding. The form has room for all employees and subcontractor personnel to sign after attending the scheduled safety meeting. This form shall be filled out for each jobsite safety meeting that is held. After completion of the form, make a copy to maintain at the jobsite and return the signed original copy to the Engineer.

Safety Meeting Date: _____

Topic: _____

Safety Meeting Conducted By: _____

Employee Name (PRINTED)	Employee Signature	Job Title

Employee Name (PRINTED)	Employee Signature	Job Title

ATTACHMENT D
DRUG AND ALCOHOL POLICY

Engineer is committed to providing a workplace which is free from drug and alcohol abuse. We are concerned about the wellbeing of our employees whose drug or alcohol dependency may affect their job performance, job safety, the safety and the wellbeing of their co-workers and the expectations of our clients. To ensure the fulfillment of these goals, Engineer has adopted the following policy:

Engineer prohibits drug and alcohol abuse on the part of all employees. Reporting to the work place, driving a company vehicle or reporting to the premises of any client under the influence of alcohol or any controlled substance is strictly prohibited. The only exception will be for a controlled substance prescribed for the employee by the employee's physician. In order to meet specific rules and requirements by some of our clients we have enacted a specific drug testing policy. It will apply directly to all employees who work or anticipate working with a client that requires testing for illegal drugs and controlled substances in advance of working on the job site. It will also be required should an accident occur at a job site or in transit to or from a job site as determined by Management or on a "cause" basis.

The drug testing can be carried out at CONCENTRA Medical Center located at 2620 E. Prospect Road, Suite 160, Fort Collins, CO 80520, Phone- 970-221-5811.

ATTACHMENT E.1
EMPLOYEE ACKNOWLEDGMENT

I state that I have attended the safety orientation and have received and read a copy of the Lidstone & Associates, a Wenck Company site specific HASP for the ANC Tailings Site Soils Investigation Project. I understand the hazards and controls associated with this work and will implement the controls as indicated. I will inform my supervisor and the Project Manager if there are changes to the hazards or if controls appear to be inadequate.

I further state that I understand the requirements contained in this HASP and acknowledge that compliance with this HASP is a condition of employment. If I violate the HASP or fail to report an accident or injury to my supervisor immediately, I understand that I am subject to termination, in accordance with company policy.

_____

EMPLOYEE SIGNATURE

_____

DATE

_____

SIGNATURE (Responsible Person)

_____

DATE

cc: Supervisor

ATTACHMENT E.2
SUBCONTRACTOR ACKNOWLEDGMENT

I state that I have attended the safety orientation and have received and read a copy of the Lidstone & Associates, a Wenck Company site specific HASP for the ANC Tailings Site Soils Investigation Project. I understand the hazards and controls associated with this work and will implement the controls as indicated. I will inform my supervisor and the Project Manager if there are changes to the hazards or if controls appear to be inadequate.

I further state that I understand the requirements contained in this HASP and acknowledge that compliance with this HASP is a condition of working on this site. If I violate the HASP or fail to report an accident or injury to my supervisor immediately, I understand that I am subject to termination, in accordance with LA and Subcontractor policy.

_____

SUBCONTRACTOR SIGNATURE

_____

DATE

_____

SIGNATURE (Responsible Person)

_____

DATE

cc: Supervisor

ATTACHMENT F
EMERGENCY CONTACT INFORMATION
AND
NEAREST HOSPITAL LOCATION AND DIRECTIONS

Emergency Contact Information

Police/Fire/Ambulance: 911; other contact numbers include:

Fremont County Sheriff's Office: 307-857-3600
Fremont County Fire District: 307-857-3030 or 307-856-5410
US BLM Cody Interagency Dispatch Center: 307-578-5740
Fremont County Ambulance: 307-857-3669
Air Ambulance: 941-639-7855

Hospital: Sage West Health Care – Riverton (Formerly Riverton Memorial Hospital)
2100 W. Sunset Drive
Riverton, WY 82501
307-856-4161 (General) 307-857-3420 (ER)

Map (see next page) and Driving Directions to Sage West Health Care: WY Hwy 136 west to WY Hwy 789, turn right onto Hwy 789 N, turn left onto E Main St., turn right onto College View Dr., take the 3rd right onto W Sunset Dr., Sage West Health Care facility is on the left.

Project Manager: Chris Lidstone 970-420-5257 (cell)
Health and Safety Officer: Greg Steed 970-819-1783 (cell)
LA Office: 970-223-4705