



APPENDIX B

CONSTRUCTION/TECHNICAL SPECIFICATIONS  
INTERIM STABILIZATION/FINAL RECLAMATION PLANS  
UNITED NUCLEAR CORPORATION  
GALLUP, NEW MEXICO

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### CONSTRUCTION/TECHNICAL SPECIFICATIONS INTERIM STABILIZATION/FINAL RECLAMATION PLANS UNITED NUCLEAR CORPORATION GALLUP, NEW MEXICO

#### 1.0 INTRODUCTION

##### 1.1 General Description of Work

The work covered by these Specifications consists of construction and related activities for Interim Stabilization and Final Reclamation of the tailings disposal area and mill at the United Nuclear Corporation (United Nuclear) Mining and Milling Church Rock site, located northeast of Gallup, New Mexico. All work performed shall be in accordance with these Specifications and the Construction Drawings.

Materials, products, equipment, supplies, utilities, skill, labor and all other items necessary for the work described for the stabilization and reclamation of the tailings disposal and mill areas shall be provided. Work shall be performed in compliance with a health and safety plan. The materials and products used shall be as specified here for the services intended.

The methods used shall produce satisfactory work for the services intended and shall be in accordance with standard construction industry practices.

The following is a partial list of the primary work items which may be required to complete the job:

1. Mill demolition

2. Backfill and grading of Borrow Pit No. 2
3. Tailings grading
4. Soil cover
5. Haul road construction
6. Surface water control structures
7. Revegetation.

#### 1.1.1 Interim Stabilization

Interim stabilization shall be done to stabilize the tailings area and prevent further migration of tailings by either the wind or from surface water runoff. The primary activities to be performed during interim stabilization are as follows:

1. Drainage of Borrow Pit No. 2
2. Reconfiguration of tailings
3. Reconfiguration of embankment
4. Removal of wind-blown tailings
5. Construction of interim soil cover
6. Interim surface water control

7. Revegetation
8. Mill facilities decommissioning.

The work performed as part of these activities is described below:

1. Borrow Pit No. 2 shall be drained of any remaining water. Water from Borrow Pit No. 2 shall be used, as needed, to provide water for construction operations, including dust abatement and compaction activities.
2. The tailings surface shall be regraded to conform to the lines and grades shown on the Drawings. The regrading shall provide a relatively horizontal final surface (2 percent average slope). Regrading shall also provide a minimum of seven feet of coarse tailings or other acceptable fill material overlaying the cover slimes.
3. The soil embankment west and south of the tailings cells shall be graded to the lines and grades shown on the Drawings to partially provide soil materials for the interim soil cover. The maximum embankment slope allowable shall be five horizontal to one vertical (5H:1V).
4. An interim soil cover of approximately 12 inches of compacted soil, obtained from regrading soil embankment areas or borrow areas, shall be placed over the graded tailings shown on the Drawings.
5. Control of localized surface water runoff during construction shall be maintained by installing temporary drainage ditches, runoff control ditches, downdrains, gutters, and culverts as needed to minimize soil erosion.

Erosion shall be reduced by revegetating the interim stabilization soil cover, if necessary, and any other areas disturbed by interim stabilization.

6. The mill facilities shall be decommissioned by demolishing and disposing of the remaining mill structures, equipment, asphalt and appurtenances. Demolition rubble, asphalt, ore-pad materials, and contaminated soils shall be disposed of in Borrow Pit No. 2. Subsequent to decommissioning activities, the ore pad shall be covered with one foot of soil, and the area re-graded as shown on the Drawings.

#### 1.1.2 Final Reclamation

Final reclamation will provide final stabilization of the mill facilities and tailings areas. The primary activities are:

1. Completion of backfilling and grading Borrow Pit No. 2,
2. Modification of the Pipeline Arroyo,
3. Construction of surface water control channels, ditches, swales, and the buried jetty,
4. Placement of final soil cover and soil/rock matrix, and
5. Placement of riprap.

These activities are described below:

1. Borrow Pit No. 2 shall be backfilled with mill debris during interim stabilization. During final reclamation, excess soils containing tailings materials excavated from the drainage areas shown on the Drawings shall also be placed in Borrow Pit No. 2. After placement of these materials, Borrow Pit No. 2 shall be backfilled to the surface using soil from the adjacent stockpile, in accordance with these Specifications, if necessary to achieve the grades shown in the Drawings.
2. The Pipeline Arroyo channel shall be modified to have a consistent low-flow channel as shown on the Drawings. Soil materials generated during modification shall be subsequently placed over the tailings area for the final soil cover. In addition, the nickpoint area shall be stabilized by installing a buried jetty, shown in the Drawings.
3. Surface water control shall be maintained by constructing permanent drainage swales and channels, modifying the existing drainage ditches, and constructing a runoff control ditch and protective bench to minimize soil erosion.
4. A final soil cover shall be placed such that the total soil cover, including a 1.5 feet thick radon attenuation layer and a 6-inch soil/rock matrix erosion protection layer, will be placed over the entire tailings area in accordance with the Drawings and these specifications.
5. Soil-cover placement and reclamation shall be completed by revegetating all disturbed areas not receiving the soil/rock matrix. In addition, a fence shall be installed around the tailings area at specified locations.

## 1.2 Sanitary Facilities

Suitable sanitary facilities and potable water shall be provided and maintained on the construction site at all times. These facilities shall be subject to approval of the county and state health departments.

## 1.3 Construction Drawings

The Construction Drawings accompany and form a part of the Specifications and Contract Documents. The location, extent, and general character of the work is shown on the Construction Drawings and is described within these Specifications. The work shall be executed in accordance with these Drawings and such additional or supplemental Drawings as may be furnished as necessary.

## 1.4 As-Built Drawings

"As-built" drawings shall be prepared to properly record all dimensions that are necessary for construction but are not indicated on the plans, and all changes to any contours or dimensions on the plans.

## 1.5 State and Local Laws and Permits

State and local laws governing the work to be completed shall be followed. Permit acquisition for performance of any aspect of the work shall be completed.

## 1.6 Project Schedule

The project shall commence within 14 days after the "Notice to Proceed." Within this period, an estimate of the required time period for completion of the project shall be

submitted, with a detailed bar chart schedule of construction activities. This schedule shall be updated at regular intervals to reflect any significant schedule changes.

### 1.7 Codes and Standards

Work described herein shall be conducted in accordance with industry standards including, but not limited to, the most current designation of the Codes and Standards designated herein. The following definitions shall identify the abbreviations used in these specifications or on the plans:

1.     ASTM:                 American Society for Testing and Materials
  
2.     ASTM A 121:         "Specifications for Zinc-Coated (Galvanized) Steel Barbed Wire"
  
3.     ASTM A 760:         "Specifications for Pipe, Corrugated Steel, Zinc Coated (Galvanized)"
  
4.     ASTM D 698:         "Test Method for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb (2.49-kg) Hammer and 12-in (305-mm) Drop"
  
5.     ASTM D 422:         "Method for Particle-Size Analysis of Soils"
  
6.     ASTM D-4318:         "Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils"
  
7.     ASTM C-33:           "Specifications for Concrete Aggregate"

8. ASTM C-88: "Test Methods for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate"
9. ASTM C-97: "Test Methods for Adsorption and Bulk Specific Gravity of Dimension Stone"
10. ASTM C-127: "Test Methods for Specific Gravity and Adsorption of Coarse Aggregate"
11. ASTM C-150: "Specifications for Portland Cement".

## 1.8 Submittals

### 1.8.1 Permits

If mandated by federal, state, or local ordinances, copies of all permits shall be available for inspection at the site prior to commencement of the permitted activity including, but not limited to, the following:

1. Fugitive dust
2. Water control
3. Burning
4. Road use
5. General construction.

### 1.8.2 Equipment

A typed equipment list shall be prepared indicating the appropriate equipment types including the numbers, types, manufacturer, and model number of all excavators, loaders, scrapers, dozers, graders, compactors, and trucks prior to procurement and use of the equipment. The approximate duration of time the equipment shall be used on-site shall be designated on the equipment list.

### 1.8.3 Products

Prior to use, manufacturer's certification shall be provided for all products utilized in construction stating and supplying supporting data that products meet or exceed the requirements given for each product. The products requiring submittals prior to use are presented below:

1. Riprap
2. Corrugated steel pipe
3. Geotextile fabric
4. Seed mixture
5. Fertilizer
6. Mulch
7. Fence.

## 2.0 INTERIM STABILIZATION CLEARING AND GRUBBING

### 2.1 General

#### 2.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations related to interim stabilization clearing and grubbing shall be conducted in accordance with the Drawings and these Specifications. This work shall also include the preservation from injury or defacement of all vegetation and objects intended to remain.

#### 2.1.2 Related to Work

1. Section 3.0 - Interim Stabilization Haul Roads/Access Roads
2. Section 4.0 - Interim Stabilization Excavation and Grading.

### 2.2 Products

Not applicable.

### 2.3 Execution

Clearing and grubbing shall be performed within the construction work areas to be disturbed as shown on the Drawings. Clearing and grubbing on the United Nuclear property shall also be performed to a maximum distance of 20 feet outside of the limits to be disturbed by construction activities. The work performed shall provide a complete removal of all vegetative materials on the surface and major root systems adjacent to the

surface. All vegetative debris shall be placed in a designated stockpile or shall be burned, subject to approval. Under no circumstances shall cleared material be placed in fill areas or cover layers.

### 3.0 INTERIM STABILIZATION HAUL ROADS/ACCESS ROADS

#### 3.1 General

##### 3.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations related to construction and maintenance of interim stabilization haul and access roads shall be conducted in accordance with the Drawings and these Specifications.

##### 3.1.2 Related Work

1. Section 4.0 - Interim Stabilization Excavation and Grading
2. Section 5.0 - Interim Stabilization Surface Water Control Structures.

##### 3.1.3 Definitions

For the purposes of the work required, the following definitions shall identify the features shown on the Drawings and earth materials used during construction.

Haul Road - The haul road shall be constructed to a 75- or 50-foot width, as identified on the Drawings, during interim stabilization to provide access to construction areas by labor and equipment. The haul road includes a 50-foot wide access ramp as shown on the Drawings.

Access Roads - Access roads are roads which currently exist to provide access to the site, or which are constructed as required during the work.

Soil - Soil consists of all earth materials capable of being excavated with conventional earthwork excavation equipment without the use of rippers, hammers, or blasting, as may be required for rock. Soils shall be uncontaminated and free from ore, tailings materials, and rocks larger than 6 inches in diameter, debris, roots, branches, stumps, or other organic matter. In the case of materials for interim stabilization and final reclamation covers, soils shall be primarily fine-grained or shall be mixed with other soils to achieve a homogeneous, predominantly fine-grained mixture.

Soil to be used in the radon attenuation soil cover shall have a particle size distribution that is within the limits shown on Figure B-1 and classify as a silty clay (CL), clayey sand (SC), silt (ML), or silty sand (SM). The above soil types will be blended during excavation and construction to provide a homogeneous mixture. This soil mixture shall fit within the specified gradation envelope to be consistent with the soil-cover design.

Tailings - Tailings consist of milled ore materials, a by-product of the extraction of uranium. The tailings have been hydraulically placed in an acidic solution in the tailings disposal area identified in the Drawings. The tailings, for the purposes of this work, are subdivided into the three categories described below:

Coarse Tailings - Coarse tailings consist of all tailings materials of which the predominant (greater than 50 percent) fraction is sand size, retained on the No. 200 sieve using the procedures outlined by ASTM D 422.

Wind-blown Tailings - Wind-blown tailings consist of soils and materials which have been covered with tailings and transported by the wind. These tailings have been identified for removal as shown on the Drawings.

Slimes - Slimes are fine-grained, typically wet-to-saturated tailings, which consist of all tailings materials of which the predominant (greater than 50 percent) fraction passes the No. 200 sieve using the procedures outlined by ASTM D 422.

### 3.2 Products

Submittals for the following products shall be provided.

#### 3.2.1 Geotextile Fabric

Geotextile fabric shall be a non-woven synthetic material of 90 mil thickness or greater, such as Fibretex 300, manufactured by Crown Zellerbach Geotextile Fabrics (Washougal, Washington), or equivalent.

### 3.3 Execution

#### 3.3.1 Haul Road Construction

Haul road construction shall provide for a final alignment and configuration to the lines and grades shown on the Drawings. Construction of the haul road may involve excavation of both tailings materials and soil embankment materials. Excavation shall be coordinated so that tailings and tailings-contaminated soils are maintained separately from uncontaminated soils. Excavated tailings and tailings-contaminated soils shall be placed within the tailings cells and graded with tailings.

The haul road surface shall consist of at least 2 feet of uncontaminated soil placed prior to extensive traffic to preclude spreading of tailings. Existing base soils and tailings along haul road alignments shall be scarified to a minimum depth of 4 inches and recompact to 95 percent of the maximum dry density as determined by ASTM D 698. Geotextile

fabric shall be placed over the compacted tailings surface prior to placement of fill. Side edges and end sections of adjacent geotextile panels shall be lapped a minimum of 12 inches. Fill materials shall be placed in 8-inch maximum lift thicknesses measured loose, and mechanically compacted to a minimum of 95 percent of the maximum dry density obtainable by the Standard Proctor compaction method (ASTM D 698).

Throughout construction operations, haul roads shall be maintained in a satisfactory condition. Haul roads shall be graded and filled as necessary to allow year-round access.

### 3.3.2 Access Road Construction

Access roads shall be constructed to provide vehicular access via 20-foot minimum width roads in the locations necessary for conduct of the work, in addition to access provided by the haul roads. The surface of the access roads shall be cleared of obstructions, evenly graded, and maintained. Access roads shall be graded and filled as necessary to allow year-round access. Compaction shall be required only as necessary to meet the performance standard above.

## 4.0 INTERIM STABILIZATION

### 4.1 General

#### 4.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations related to interim stabilization excavation and grading shall be conducted in accordance with the Drawings and these Specifications.

Work shall include, but not be limited to, the following:

1. Excavation and grading for haul/access roads,
2. Excavation and grading of tailings materials,
3. Excavation and grading of soil embankments,
4. Excavation and grading of wind-blown tailings,
5. Placement and grading of interim stabilization soil cover materials.

Areas subject to earthwork operations identified herein shall be designated by staking. Surveying necessary to conduct earthwork to the lines and grades specified shall be provided.

#### 4.1.2 Related Work

1. Section 2.0 - Interim Stabilization Clearing and Grubbing

2. Section 3.0 - Interim Stabilization Haul Roads/Access Roads
3. Section 5.0 - Interim Stabilization Surface Water Control Structures.

#### 4.1.3 Definitions

For the purposes of the work required, the following definitions shall identify the earth materials used during construction.

Soil - Soil consists of all earth materials capable of being excavated with conventional earthwork excavation equipment without the use of rippers, hammers, or blasting, as may be required for rock. Soils shall be uncontaminated and free from ore and tailings materials, rocks larger than 6 inches in diameter, debris, roots, branches, stumps, or other organic matter. In the case of materials for interim stabilization cover, soils shall be primarily fine-grained or shall be mixed with other soils to achieve a homogeneous, predominantly fine-grained mixture.

Soil to be used in the radon attenuation soil cover shall have a particle size distribution that is within the limits shown on Figure B-1 and classify as a silty clay (CL), clayey sand (SC), silt (ML), or silty sand (SM). The above soil types will be blended during excavation and construction to provide a homogeneous mixture. This soil mixture shall fit within the specified gradation envelope to be consistent with the soil-cover design.

Rock - Rock shall consist of all earth materials harder than soil which must be excavated by ripping with a D-9 Caterpillar bulldozer or equivalent equipped with a single shank ripper, hammering, or blasting.

Tailings - Tailings consist of milled ore materials, a by-product of the extraction of uranium. The tailings have been hydraulically placed in an acidic solution in the tailings

disposal area identified in the Drawings. The tailings, for the purposes of this work, are subdivided into the three categories described below:

Coarse Tailings - Coarse tailings consist of all tailings materials of which the predominant (greater than 50 percent) fraction is sand size, retained on the No. 200 sieve using the procedures outlined by ASTM D 422.

Slimes - Slimes are fine-grained typically wet-to-saturated tailings which consist of all tailings materials of which the predominant (greater than 50 percent) fraction passes the No. 200 sieve using the procedures outlined by ASTM D 422.

Wind-blown Tailings - Wind-blown tailings are soils and rock materials which have been mixed or covered with tailings transported by the wind and which have been identified for removal as shown on the Drawings.

Ore - Ore is material which has been mined for uranium extraction. The ore shall be distinguished from tailings through evaluations.

Tailings Cells - The tailings disposal area is divided into three cells designated as the North, Central, and South Cells.

Soil Embankment - The soil embankment which is located along the west side of the tailings cells between the cells and Pipeline Arroyo.

Pipeline Arroyo - Pipeline Arroyo refers to the ephemeral stream channel located along the east side of State Highway 566 between the highway and the tailings disposal area as shown on the Drawings.

## 4.2 Products

Not applicable.

## 4.3 Execution

### 4.3.1 General

Excavation and grading operation shall begin in undisturbed areas by clearing and grubbing of the work area in accordance with Section 2.0 - Interim Stabilization Clearing and Grubbing, of these Specifications. Throughout excavation and grading operations, debris in graded material and fill material shall be removed and disposed of prior to placement of the material. Debris shall be disposed of only in designated locations.

All work shall be performed in a manner that minimizes surface water runoff into tailings disposal areas and construction or fill areas. Surface runoff from exposed tailings grading areas shall be routed to areas in the tailings and shall not be allowed to flow outside the tailings disposal area.

All slopes and excavations shall be configured by either cutting existing materials to form the design lines and grades, or by placing compacted fill to beyond the lines and grades and trimming to the design configuration. The acceptable tolerance limit for earthwork and rock excavation is to within  $\pm 0.33$  foot of the lines and grades shown in the Drawings.

Adequate water shall be utilized for dust suppression on haul/access roads and in all grading and compaction work areas. A water supply shall be at the mill site or other suitable location.

#### 4.3.2 Tailings Regrading

Tailings materials within the designated tailings cells shall be graded during interim stabilization to conform to the lines and grades shown on the Drawings. Grading of tailings shall provide an entire regraded surface of coarse tailings. A minimum 7-foot thickness of coarse tailings or other suitable uncontaminated material shall be placed over all slime areas by progressive pushing of the material in approximate 18- to 24-inch thick lifts across the slimes from peripheral areas. In areas where greater than seven feet of material is placed over slime materials, at least the upper seven feet of material shall contain either coarse tailings or other uncontaminated fill material. Compaction of the final coarse tailings surface shall be performed prior to placement of the overlying interim soil cover to a minimum of 90 percent of the maximum dry density as determined by the Standard Proctor method of compaction (ASTM D 698).

Tailings materials outside the limits of the tailings cells as identified on the Drawings shall be excavated from their present location and placed within the confines of the cells. The locations outside of the cell areas from which materials are to be excavated during interim stabilization include, but are not limited to, the wind-blown areas and other areas as noted on the Drawings. Tailings materials uncovered as part of other excavation activities, including, but not limited to, embankment grading, south cell drainage channel excavation, and haul road construction, shall also be excavated and placed within the tailings cells. Tailings being graded or placed in fill sections shall be placed in 18-inch maximum thickness lifts by track-mounted earthmoving equipment. The final tailings surface shall be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 698.

### 4.3.3 Soil Excavation and Grading

Soil excavation and grading shall include, but not be limited to, soil embankment excavation and grading, south cell drainage channel excavation, stripping of soils containing wind-blown tailings, excavation and grading of surface water control structures, and soil cover placement.

#### 4.3.3.1 Soil Embankment Grading

Soil embankment grading shall consist of operations necessary for cut and fill operations on the west and south soil tailings retention embankment of the disposal area. Excavation and grading shall be performed to the lines and grades shown on the Drawings. Excess soil from these grading operations shall be used as interim stabilization soil cover.

In general, the slopes of the soil embankment shall be regraded to a maximum slope of 5H:1V. Fill shall be placed as required to attain the lines and grades in a 12-inch maximum horizontal lift thickness measured loose. Each lift shall be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 698. Depressions on slopes shall be filled beyond the lines and grades shown in the Drawings and subsequently trimmed to the desired configuration. Acceptable tolerance for the lines and grades shown on the Drawings is to within  $\pm 0.33$  foot.

Following to grading operations, the soil embankment shall be revegetated in accordance with the requirements of Section 6.0 - Interim Stabilization Revegetation.

#### 4.3.3.2 Wind-Blown Tailings Removal

Soils containing wind-blown tailings shall be removed to a depth of 6 inches from the surface in the areas shown on the Drawings or in designated areas. Excavated soils shall be placed to a uniform thickness over the entire regraded coarse tailings surface in up to a 12-inch thick maximum lift thickness, measured loose, and compacted by tracking with construction equipment. The stripped areas shall be regraded to meet the approximate contours of adjacent areas and shall be revegetated in accordance with Section 6.0 - Interim Stabilization Revegetation.

#### 4.3.3.3 Soil Cover Materials Placement

Soil cover shall be placed over tailings during the interim stabilization phase to attain a 12-inch uniform thickness over the regraded tailings. Interim stabilization soil cover shall be placed over all exposed tailings materials. The soil for the interim cover shall be placed in lifts of up to 12-inch maximum thickness measured loose. The total compacted thickness of the interim soil cover shall be a minimum of 12 inches.

Soils used for interim soil cover shall be fine-grained clays, silts, and sands, well-mixed, having the Unified Soil Classification System (USCS) symbols CL, ML, or SC. The soil shall be placed at a moisture content of optimum to +2 percent of optimum as determined by the Standard Proctor method of compaction (ASTM D 698). The lifts shall be compacted by tracking with construction equipment. Each lift shall be compacted to at least 95 percent of the maximum dry density attainable as measured using the Standard Proctor method of compaction (ASTM D 698). Subsequent to placement, the entire soil cover shall be scarified and revegetated in accordance with Section 6.0 - Interim Stabilization Revegetation.

#### 4.3.4 Rock Excavation

Rock excavation shall be performed by ripping and finishing to the lines and grades shown for removal of any rock materials encountered while grading between the North and Central Cells. Excavated rock material shall be used as fill in the large depression along the channel alignment prior to the confluence with the arroyo as shown on the Drawings. Rock materials placed in fill sections shall be placed in 18-inch thick maximum lifts, measured loose, and shall be compacted by tracking with construction equipment.

#### 4.4 Interim Stabilization Soil Cover Quality Control Program

The quality control program originally outlined in the specifications for the proposed plan in 1987 represented the design engineer's minimum acceptable program to confirm that the construction meets the design intent. United Nuclear has been conducting interim reclamation of the tailings impoundment and performing quality control monitoring at the direction of the National Regulatory Commission (NRC) since 1989.

A minimum of one foot of soil cover has been placed over regraded tailings in the North and Central Cells. In placing that cover, United Nuclear has conducted a quality control program that exceeds the minimum acceptable program stipulated by the original design specifications and more closely complies with the guidance provided by NRC's Staff Technical Position (STP) on Testing and Inspection Plans. The NRC has inspected this work on two occasions and has found the field quality control program to be in compliance with the NRC requirements.

However, NRC indicated that greater quality control monitoring in the field would be necessary for the thinner soil cover. Therefore, United Nuclear has agreed to expand the quality assurance/quality control (QA/QC) program for future reclamation activities. Table B.1 summarizes the required testing frequencies in the Field Testing and Inspection Plan

(FTIP) for the soil cover. At a minimum, QA/QC testing shall be conducted at the frequencies provided in Table B.1 during interim stabilization activities beginning in 1991.

The testing shall include the following:

1. Standard Proctor Compaction Testing (ASTM D 698)
2. One-Point Proctor testing
3. Field moisture/density verification test using Sand Cone methods, and
4. Gradation and Soil Classification testing.

The testing frequencies are described in more detail in Section 10.0 - Final Reclamation Excavation and Grading of these Specifications. The acceptable soil types for use in the soil cover construction shall classify as silty clay (CL), clayey sand (SC), silt (ML), or silty sand (SM) in accordance with the Unified Soil Classification System (USCS). The gradation limits of the mixed soil to be placed in the soil cover are presented on Figure B-1 as approved by the NRC.

#### Nuclear Density Gauge Correlation

As stipulated in NRC's Testing STP, moisture/density compaction verification testing performed by nuclear density gauge methods was correlated to one in-situ field density Sand Cone test (ASTM D 1556) and one oven-dry moisture test for every ten nuclear density gauge tests performed. During initial interim stabilization activities, 20 Sand Cone tests were performed on the interim soil cover in the North and Central Cells. Sand Cone tests were used exclusively to verify moisture/density compaction of the North Cell interim cover when a good correlation between the nuclear gauge and Sand Canonie Environmental Services Corp. (Canonie) one tests could not be obtained. Future

moisture/density verification testing shall meet the frequency requirement of NRC's Testing STP.

Based on performance-to-date for interim construction activities, it has been determined that test results obtained by the nuclear densimeter are erratic. The as-built report for the North Cell Interim Reclamation Activities documented the erratic nature of the nuclear densimeter testing. Therefore, only the Sand Cone method of in-place density determinations was used in the 1990 construction activities and shall be used in all future construction.

#### Soil Cover Materials

It is not expected that other sources of borrow material will be required other than those identified in this plan. However, if other borrow sources are required, then gradation and classification tests shall be performed to ensure that these materials meet project specifications. Representative samples shall be obtained by means of borehole drilling and sampling or test pit excavation and sampling and analyses for gradation and classification. The on-site quality assurance engineer shall review and accept or reject the test results prior to placement of imported fill as soil cover material. Additionally, the gradation results for the soil sample shall be compared to the graphical representation of the range of allowable soil types for use in the soil cover to assure consistency with the soil types modeled in the design of the soil cover (Figure B-1).

## 5.0 INTERIM STABILIZATION SURFACE WATER CONTROL STRUCTURES

### 5.1 General

#### 5.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations related to construction of interim stabilization surface water control structures shall be conducted in accordance with the Drawings and these Specifications.

#### 5.1.2 Related Work

1. Section 3.0 - Interim Stabilization Haul Roads/Access Roads
2. Section 4.0 - Interim Stabilization Excavation and Grading.

### 5.2 Products

Submittals for all of the following products shall be provided for approval prior to use.

#### 5.2.1 Corrugated Steel Pipe

All corrugated steel pipe shall be 24-inch diameter corrugated (2 2/3-inch x 1/2-inch) galvanized steel pipe with a minimum wall thickness of 0.109 inches. A 10 1/2-inch wide dimpled band connector shall be used to join the pipe. Culverts shall have material specifications in accordance with ASTM A 760.

### 5.2.2 Riprap

Riprap shall be angular, dense, sound limestone, abrasion and weather-resistant, and free from cracks, seams or other defects that would tend to increase their destruction by water and frost action. Only approved riprap shall be used. Riprap shall be well-graded limestone size-specific to each particular application shown on the Drawings unless otherwise approved. Riprap material shall have a rock quality designation of at least 50.

## 5.3 Execution

### 5.3.1 Culverts

Culverts shall be placed during interim stabilization in locations required to conduct the work. Large diameter culverts, as approved, shall be required for installation of any crossing of Pipeline Arroyo. Culverts placed during interim stabilization may remain until final reclamation. However, before the completion of final reclamation operations, all culverts shall be removed, and the areas shall be recontoured to provide natural surface drainage.

Culverts which are used to carry construction traffic shall be placed in an excavation on a base compacted to a minimum of 95 percent of the maximum dry density as determined by the Standard Proctor method of compaction (ASTM D 698). Compaction of fill to the final grade around and over the pipe shall also be to a density at least 95 percent of the soil's maximum dry density (ASTM D 698). Backfill over the culvert shall provide a minimum thickness of 24 inches from the top of the culvert to grade.

## 6.0 INTERIM STABILIZATION REVEGETATION

### 6.1 General

#### 6.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations related to interim stabilization revegetation shall be conducted in accordance with the Drawings and these Specifications. Revegetation efforts shall be directed at areas disturbed by construction where required.

#### 6.1.2 Related Work

1. Section 4.0 - Interim Stabilization Excavation and Grading,
2. Section 5.0 - Interim Stabilization Surface Water Control Structures.

### 6.2 Products

Submittals for each of the following products shall be provided.

#### 6.2.1 Seed Mixture

All seed shall be fresh, clean, new crop seed. Areas that will not be covered with the soil/rock matrix layer in the final reclamation cover (e.g., areas where wind-blown tailings have been removed) shall be vegetated with a native seed mixture of the following composition by weight of pure live seed (PLS) per acre (AC):

<u>Scientific Name</u>	<u>Common Name</u>	<u>Growth Habit</u>	<u>Pounds PLS/AC</u>
<u>Agropyron smithii</u>	Western Wheat-grass	NS	5.0
<u>Bouteloua gracilis</u>	Blue Grama	NB	2.0
<u>Oryzopsis hymenoides</u>	Indian Ricegrass	NB	4.0
<u>Sporobolus airoides</u>	Alkali Sacaton	NB	0.5
<u>Bouteloua curtipendula</u>	Sideoats Grama	NB	2.0
<u>Hilaria jamisii</u>	Galleta	NS	3.0

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Notes:

1. NB - Native bunchgrass.
2. NS - Native sodgrass.

In interim stabilization, areas that will be covered with the soil/rock matrix layer in the final reclamation cover (e.g., regraded tailings disposal area and embankment slopes) shall be vegetated as required with either the native seed mixture identified above or a temporary grass seed mixture of the following composition by weight of PLS/AC:

<u>Scientific Name</u>	<u>Common Name</u>	<u>Growth Habit</u>	<u>Pounds PLS/AC</u>
<u>Agropyron tricophorum</u>	Pubescent Wheat-grass	IS	8.0
<u>Agropyron intermedium</u>	Intermediate Wheatgrass	IS	4.0
<u>Agropyron elongatum</u>	Tall Wheatgrass	IB	8.0
<u>Agropyron desertorum</u>	Crested Wheatgrass	IB	2.0
<u>Elymus junca</u>	Russian Wildrye	IB	2.0

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Notes:

1. IS - Introduced sod former.
2. IB - Introduced bunchgrass.

The specified application rates are for drill seeding. All seed shall be furnished in original containers showing analysis of seed mixture, percentage of pure live seed, year of production, net weight, date, and location of packaging. Seed which has become moldy, or otherwise damaged in transit or storage shall not be accepted.

### 6.2.2 Fertilizer

Fertilizer shall be applied at the rate of 30 pounds of nitrogen and 40 pounds of phosphate per acre. All fertilizer shall be delivered in waterproof bags or other standard containers with the name of material, name of manufacturer, net weight, and analysis on each bag or container.

### 6.2.3 Mulch

Mulch shall be small-grain hay or straw in a dry condition. Mulch shall be free of weeds and foreign matter detrimental to plant life.

## 6.3 Execution

### 6.3.1 General

Revegetation shall be conducted as specified on the embankments, channels, covers, and any other areas disturbed by the interim stabilization activities, as required.

### 6.3.2 Soil Preparation

The soil to be revegetated shall be prepared by first cultivating to a minimum depth of 6 inches. Fertilizer shall be added to the soil at an application rate to be determined after soil analyses are conducted and shall be worked into the upper 6 inches of soil by disking

along the contours to the extent practical. This application shall not precede seeding by more than one day.

### 6.3.3 Seeding

Seeding shall be conducted by drill seeding the specified seed mixture at the specified application rate along the contours or opposite the direction of the prevailing wind. Hydro seeding may be allowed on steep slopes or broadcast seeding on gentle slopes, upon approval, using twice the application rate specified for drill seeding. Seeding shall not be performed immediately following a heavy rain, during windy periods, or when the ground is too dry. Drill seeding shall use a roller attachment, or its equivalent, attached behind the drill to inhibit movement of seeds previously sown. Prior to mulching, water free from oils, acids, alkalis, and salt, which may inhibit grass growth, shall be applied with a fine spray after an area has been seeded. No seeding shall be performed in areas in excess of that which can be mulched the same day. If broadcast seeding is conducted, seed application rates shall be twice the rate specified previously.

### 6.3.4 Mulching

Mulch shall be applied to seeded areas at the application rate of 2 tons per acre and crimped into the surface utilizing dozer tracks or other approved means.

### 6.3.5 Restoration

Planted areas damaged during execution of this work shall be restored. The areas which fail to show a "catch" or uniform stand, for any reasons whatsoever, shall be reseeded during the next growing season with the specified seed moisture and methodology.

## 7.0 MILL DECOMMISSIONING

### 7.1 General

#### 7.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations in connection with decommissioning the mill facilities shall be performed in accordance with the Drawings and these Specifications.

The work consists of dismantling and removal or demolition and cleanup of designated mill structures and mill areas including, but not limited to, those indicated on the Drawings. The work shall include, but not be limited to, the removal of asphalt paving, fencing, concrete slabs and foundations, tanks and associated piping, discontinued utilities, miscellaneous wood, metal, and masonry structures, and the transport and disposal of said demolished materials within Borrow Pit No. 2. Cleanup of miscellaneous debris exposed at the surface and randomly distributed across the site has not been specifically identified due to the impracticality of such extensive identification. However, it is the intent of these Specifications to require removal and disposal of all surface debris which shall be included in the scope of work. Demolition and hauling procedures shall be conducted in accordance with the Mill Decommissioning Plan submitted to the NRC in December 1988, with supplementary information submitted in April 1990, and approved by the NRC in January 1991.

Work shall also include final site grading to the contours shown on the Drawings.

7.1.2 Related Work

Section 10.0 - Final Reclamation Excavation and Grading.

7.2 Products

Not applicable.

7.3 Execution

7.3.1 Site Preparation/Precautions

Demolition procedures shall be conducted to minimize dust generation and shall provide, erect, and maintain temporary barriers and security devices as necessary to ensure safety. Operations shall be conducted with minimum interference to public or private thoroughfares and shall maintain egress and access at all times.

Care shall be exercised to protect existing utilities and landscaping materials which are not to be demolished or relocated. Utility lines in use shall be relocated from within demolition areas as required, the location marked, and as-built drawings of the relocated utilities provided.

Required permits for the demolition work shall be secured.

7.3.2 Demolition

The following sequence of events shall be conducted for demolition and regrading:

1. Dismantling of all remaining wood stave tanks,
2. Removal of equipment attached to the precipitation and countercurrent decantation (CCD) building frames,
3. Removal of standing equipment within the floor space of the CCD and precipitation buildings which would impede disassembly of the structures,
4. Dismantling of the CCD and precipitation building structures,
5. Removal of any remaining equipment within the concrete foundations of these buildings,
6. Removal of the covers, walkways and platforms associated with the solvent extraction tanks,
7. Dismantling of the semiautogenous grinding (SAG) mill conveyor housing and the grizzly,
8. Removal and cutting of any remaining steel storage tanks, if any,
9. Decontamination or demolition of the solvent extraction tank concrete,
10. Decontamination or demolition of other above-grade or on-grade concrete,
11. Decontamination of below-grade concrete, if feasible, followed by backfilling of the void space with clean soil,

12. Removal of the tailings discharge lines and the support structures over Pipeline Arroyo,
13. Ripping and removal of the asphalt paving and the solvent extraction dump pond,
14. Radiological surveying of the exposed soil and buried piping,
15. Removal of contaminated soil and sealing of buried pipe openings,
16. Removal of radium contaminated soils in and near the Catch Basins,
17. Removal of the mill yard fencing,
18. Stripping the surface of the ore storage area,
19. Final grading for drainage,
20. Revegetation of the disturbed area.

The cutting, crushing, or other size reduction of scrap equipment will proceed simultaneously with the above activities as required to minimize void space during burial.

Once debris is reduced in size or its shape modified, organized placement shall be followed when disposing into Borrow Pit No. 2. The material shall be placed in lifts not exceeding 5 feet and compacted using soil to work into any existing void spaces. Each lift shall be covered with a uniform lift of one-foot minimum thickness of soil, measured loose that has been compacted to a minimum of 90 percent of the maximum dry density as determined by the standard Proctor method of compaction (ASTM D698).

Relics, antiques, and similar objects shall be identified for removal and/or resale.

Structures that can be easily and economically decontaminated by processes such as acid rinsing, sand blasting, or scrapping shall be treated in that manner. Foundations, foundation walls and footings not decontaminated shall be removed and disposed of in Borrow Pit No. 2. Asphalt paving and any soil contaminated by tailings materials, as designed, shall be removed.

Buried process lines, tanks and sumps shall be excavated and disposed of in Borrow Pit No. 2. Specific exemptions may be requested, if supported by information including contamination levels, the reason for the exemption request and the location of the item. Generic exemptions shall not be allowed.

An adequate water supply system for dust suppression on haul roads and demolition work areas shall be provided.

Depressions resulting from demolition operations shall be filled with approved soil materials from on-site unless located in an area where further excavation is required to yield a uniformly graded site similar to the reclamation contours shown on the Drawings. The fill materials shall be clean natural soils free of debris and rubble and shall be compacted to at least the density of the surrounding undisturbed soil.

Decommissioning activities with regard to soils in the mill area shall be limited to removal of the asphalt surface in all areas, except around the administration building, warehouse, lube storage area, tire storage shed, and guard/change house buildings, and scraping of approximately six inches of soils to remove possible surface contamination. Ore materials remaining in the ore storage area shall be removed and disposed of in the tailings disposal area. Approximately six inches of surface material shall then be scraped

from the ore storage area to remove possible surface contamination. Refer to Drawings for areas which shall be stripped except within the unrestricted use areas.

Finally, a verification gamma survey shall be conducted to identify possible "hot spots" remaining. Identified hot spots shall be dealt with on a case-by-case basis.

Before removing all materials from the mill area for disposal, all remaining excavations shall be backfilled and the entire mill site shall be graded to the lines and grades shown on the Drawings. This grading shall provide for a minimum 1-foot thick soil cover over the ore pad area. Soil used for cover shall be obtained either on, or directly adjacent to, the demolished mill area. Excess soil shall be placed over deep backfilled foundation areas as directed to accommodate consolidation which may occur in soils unable to be thoroughly compacted. The mill area disturbed by decommissioning activities shall be revegetated in accordance with Section 12.0 - Final Reclamation Revegetation.

### 7.3.3 Salvaging Materials

Materials shall not be salvaged after initiating Mill Decommissioning. Salvaged materials from the structures may be stored on-site temporarily, provided that they do not hinder completion of the work and provided that they are not stored beyond the date specified for completion.

## 8.0 FINAL RECLAMATION CLEARING AND GRUBBING

### 8.1 General

#### 8.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations related to final reclamation clearing and grubbing shall be conducted in accordance with the Drawings and these Specifications. This work shall also include the preservation of all vegetation and objects intended to remain from injury or defacement.

#### 8.1.2 Related Work

1. Section 9.0 - Final Reclamation Haul Roads/Access Roads
2. Section 10.0 - Final Reclamation Excavation and Grading.

### 8.2 Products

Not applicable.

### 8.3 Execution

Clearing and grubbing shall be performed within the construction work areas to be disturbed as shown on the Drawings. Clearing and grubbing on the United Nuclear property shall also be conducted no more than 20 feet outside of the limits to be disturbed by construction activities. The work performed shall provide for complete removal of all vegetative materials on the surface and major root systems adjacent to the surface in areas to be disturbed, including the interim soil cover. Clearing operations shall

be conducted in a manner so that the interim soil cover placed previously is not penetrated by more than 4 inches. All vegetative debris shall be placed in a designated stockpile or shall be burned, with written approval. Under no circumstances shall cleared material be placed in fill areas or cover layers.

## 9.0 FINAL RECLAMATION HAUL ROADS/ACCESS ROADS

### 9.1 General

#### 9.1.1 Scope of Work

Unless otherwise specified, labor, materials and required equipment shall be furnished, and operations related to grading and maintenance of final reclamation haul and access roads shall be conducted in accordance with the Drawings and these Specifications.

#### 9.1.2 Related Work

1. Section 10.0 - Final Reclamation Excavation and Grading
2. Section 11.0 - Final Reclamation Surface Water Control Structures.

#### 9.1.3 Definitions

For the purposes of the work required, the following definitions shall identify the features shown on the Drawings and earth materials used during construction.

Haul Roads - Haul roads are roads constructed previously during interim stabilization along the top of the tailings embankment and traversing the embankment.

Access Roads - Access roads are roads which currently exist to provide access to the site, or which are constructed as required during the work.

Soil - Soil consists of all earth materials capable of being excavated with conventional earthwork excavation equipment without the use of rippers, hammers, or blasting as may