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**US DEPARTMENT OF ENERGY (DOE), 1994, URANIUM MILL
TAILINGS REMEDIAL ACTION PROJECT (UMTRAP), NATURITA,
CO, FINAL DESIGN FOR REVIEW, BID SCHEDULE SPECIAL
CONDITIONS SPECIFICATIONS SUBCONTRACT DRAWING - (USED
AS A REFERENCE IN OU3 RI/FS/PP REPORT)**

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**UMTRA-DOE/AL 050425
USDOE/AL PUBLIC
22
REPORT**

7883

UNITED STATES DEPARTMENT OF ENERGY
Albuquerque, New Mexico

**Uranium Mill Tailings
Remedial Action Project
(UMTRAP)**

Naturita, Colorado

NAT-IIU

Subcontract Documents

Final Design for Review

Bid Schedule

Special Conditions

Specifications

Subcontract Drawings

November 1994

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MORRISON KNUDSEN CORPORATION
ENGINEERING, CONSTRUCTION & ENVIRONMENTAL GROUP

SECTION 02200EARTHWORKPART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers earthwork for, or related to, the following:

1. Construction of access roads to the processing site including improving existing haul roads.
2. Excavation of contaminated materials from the processing site and windblown areas and transporting and unloading in the Designated Dump Area at the Uravan Disposal Site.
3. Demolition of unknown and unidentified articles during excavation of contaminated materials and transportation and unloading in the Designated Dump Area at the Uravan Disposal Site.
4. Furnishing and placing of uncontaminated excavated material as fill for finish grading of the processing site.

1.2 WORK NOT INCLUDED

Earthwork related to construction facilities specified in Section 01500.

1.3 RELATED WORK

- A. Section 00800 - Special Conditions
- B. Section 01300 - Submittals
- C. Section 01500 - Construction Facilities
- D. Section 02050 - Demolition
- E. Section 02081 - Asbestos, Hazardous and Non-Hazardous Materials
- F. Section 02141 - Dewatering and Drainage
- G. Section 02935 - Seeding

Document No. 3885-NAT-S-01-01491-00
Issued for Review-Revision A

Earthwork
02200 - 1

NAT-IIU

WP51
111594

000002

1.4 DEFINITIONS

- A. Contaminated materials and uncontaminated materials are defined in Article SC-1 of the Special Conditions.
- B. Excavation: Excavation shall include excavation of all materials encountered regardless of the nature of the materials, including topsoil, silt, clay, sand, gravel, talus, soft or disintegrated rock, boulders or detached pieces of solid rock, and rippable rocks (as defined below) but shall exclude rocks requiring drilling and blasting operations. Excavation shall be further classified into the following categories:
1. Contaminated Materials Excavation.
 2. Uncontaminated Materials Excavation.
- C. Contaminated Materials Excavation: Contaminated materials excavation shall include excavation of contaminated materials from processing site, windblown areas, detention ponds, the washwater recirculation ponds, and any other contaminated areas identified by the Contractor.
- D. Uncontaminated Materials Excavation: Uncontaminated materials excavation shall include excavations of uncontaminated materials from the various areas of the sites including, but not limited to, excavations for finish grading.
- E. Overexcavation: Overexcavation is defined as (1) excavation carried out beyond the lines and grades indicated on the Subcontract Drawings or (2) excavation not authorized by the Contractor.
- F. Percent Maximum Density: Percent maximum density is a percentage of the maximum dry density obtained by the test procedure presented in ASTM D698.
- G. Topsoil: See Section 02110.
- H. Stockpiles of Demolished Material and Debris: Existing stockpiles consist of considerable amounts of scrap metals, process equipment, water tanks, miscellaneous machinery, trucks and tires, drums and other containers.
- I. Vicinity Properties Materials: These are contaminated materials from areas other than the processing site.
- J. Handling and Placing of Vicinity Property Materials: This shall include loading and hauling contaminated vicinity

property materials to the Designated Dump Area at the Uravan Disposal Site.

- K. Finish Grading: Finish grading shall include excavation, fill and backfill of the various areas of the site including, but not limited to, backfilling of wastewater recirculation ponds, detention ponds, sumps, and temporary facilities areas as shown on the Subcontract Drawings.
- L. Coarse Grained Granular Material: Will consist of granular material with more than 30 percent retained on a 3/4-inch standard sieve.
- M. Stockpiles and Containers of Asbestos, Hazardous and Non-Hazardous Materials: These are materials removed from the mill buildings and facilities and stockpiled and containerized on site for transport and unloading in the Designated Dump Area at the Uravan Disposal Site by the Subcontractor.
- N. Rippable Rock: Rippable rock (classified as excavation in Paragraph B. above) is defined as mineral matter in place and of such hardness and texture that it can be effectively loosened or broken down by ripping in a single pass with a late model tractor-mounted hydraulic ripper equipped with one digging point of standard manufacturer's design adequately sized for use with and propelled by a caterpillar D9 bulldozer, or approved equal crawler-type tractor rated at a minimum of 360-net flywheel horsepower, operating in low gear.
- O. Frozen Material or Subgrade or Foundation: Material or Subgrade or Foundation that has a temperature below freezing and generally contains a visible amount of ice.

1.5 APPLICABLE PUBLICATIONS

- A. The Publications listed below form a part of this Specification to the extent referenced. The Publications are referred to in the text by the basic designation only:

- 1. American Association of State Highway and Transportation Officials (AASHTO):

T99-90	Standard Method of Test for Moisture-Density Relations of Soils Using a 5.5-lb. (2.5-kg) Rammer and a 12-in. (305-mm) Drop
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Document No. 3885-NAT-S-01-01491-00
Issued for Review-Revision A

Earthwork
02200 - 3

NAT-IIU

. WP51
111594

000001

T180-90 Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb. (4.54-kg) Rammer and a 18-in. (457-mm) Drop

2. American Society for Testing and Materials (ASTM):

- C136-84 Standard Method for Sieve Analysis of Fine and Coarse Aggregates
- D422-63 Standard Test Method for Particle-Size Analysis of Soils
- D698-91 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m))
- D1140-92 Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75-Micrometer) Sieve
- D1556-90 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- D2167-84 Standard Test Method for Density and Unit Weight of Soil In-Place by the Rubber-Balloon Method (R 1990)
- D2216-92 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock
- D2922-91 Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- D3017-88 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- D4643-87 Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method

1.6 QUALITY ASSURANCE

- A. The Contractor will take soil samples and perform moisture-density tests and particle size determinations to ascertain that the work is being performed in compliance with these Specifications. Samples may be taken on the fill itself.

Document No. 3885-NAT-S-01-01491-00
Issued for Review-Revision A

Earthwork
02200 - 4

NAT-IIU

WP51
111594

000005

The Contractor will conduct the density and other tests on the fill and related laboratory testing as frequently as the Contractor considers necessary. The Subcontractor shall remove surface material and render assistance as necessary to enable sampling and testing to be carried out.

B. Methods of Sampling and Testing:

1. Particle Size Analysis: ASTM D422
2. Percentage Passing No. 200 Sieve: ASTM D1140
3. In-Place Density: ASTM D1556, D2167, or D2922
4. Laboratory Moisture Content: ASTM D2216, D4643
5. Laboratory Moisture-Density Relations: ASTM D698
6. In-Place Moisture Content: ASTM D3017

C. Suitability of Materials: The suitability of all uncontaminated materials for foundations and backfill will be determined by the Contractor. Fill material shall be approved material from borrow areas or required excavations.

D. The Subcontractor shall make his own determination of any processing that may be required, and shall perform testing as required to ensure that the materials meet the Specification requirements.

E. The Contractor may direct that inspection trenches or test pits be cut into fills to determine that the Specifications have been met. Such trenches or pits will be of limited depth and size, and shall be backfilled with the material excavated therefrom, or other fill material meeting the requirements for the zones cut into. Backfill shall be compacted to a density at least equal to that specified for adjacent fills.

F. When the Contractor directs inspection trenches or test pits to be excavated into fills and backfills and materials are found to meet all Specification requirements, the excavation and refilling shall be paid for as additional work pursuant to the applicable provisions of the General Conditions. Inspection trenches or test pits, and the refilling of the same, shall be at the Subcontractor's expense when it is found that the materials do not meet the Specification requirements.

G. Tolerances: See Specification Section 01052, Article 1.7.

1.7 SUBMITTALS

General submittal requirements are specified in Section 01300.

1.8 PROTECTION

A. The Subcontractor shall preserve and protect the following:

1. Trees, shrubs and other features remaining as a portion of final grading.
2. Bench marks and monuments, existing structures, fences, walks, pavings, curbs, etc. which are not to be demolished.
3. Utilities not specified for removal.
4. Excavations from cave-in by shoring, bracing, sheet-piling, underpinning or by other methods.
5. Excavation surfaces from frost.
6. Perimeter of excavations to prevent surface water runoff into excavation.
7. Monitor wells not to be sealed or demolished.
8. Plant species identified to be protected.
9. Sites of historic and/or archaeological importance as defined in the Cultural Resource Clearance Report.
10. Finish work.

PART 2 - PRODUCTS

2.1 UNCONTAMINATED FILL MATERIALS

A. General:

1. Uncontaminated fill material shall further be divided into the following categories:
 - a. General Fill
 - b. Topsoil Material

Document No. 3885-NAT-S-01-01491-00
Issued for Review-Revision A
Earthwork
02200 - 6

NAT-IIU

WP51
111594

000007

2. Topsoil and general fill materials shall be obtained from required excavations to the extent available. Where the excavated materials do not meet the requirements of the Specifications or they are not available, the materials shall be furnished from local borrow sources approved by the Contractor.
 3. Submittals for approval of sources proposed for use by the Subcontractor shall include boring logs, borrow area maps and supporting laboratory test data. The Subcontractor also shall provide evidence of availability, right of access to private property including access by the Contractor for sampling and testing, and his plan for hauling the materials to the site. Submittals for approval of sources for uncontaminated fill materials shall be received by the Contractor at least 30 days before use of the material at the site. The Contractor may perform additional tests to determine if the materials meet the requirements specified herein.
 4. Approval will be based on evidence of compliance with the requirements specified herein and on verification by the Subcontractor that the volume of materials available is sufficient for construction requirements.
- B. Topsoil: Top 6 inches of fill used in finish grading of the processing site shall be topsoil obtained from stripping of borrow and other uncontaminated areas of the site and from approved local borrow sources.
- C. General Fill: General fill to be used as fill or backfill below the top 6 inches of fill used in finish grading of the processing site shall conform to the following requirements:
1. Uncontaminated general fill material shall not contain more than 5 percent organic material by volume.
 2. Maximum particle size shall not be greater than three-fourths (3/4) the compacted lift thickness in any dimension, except as noted hereinafter. Individual large stones shall be distributed within the fill materials to provide visual voidfree mass, and be able to meet the requirements of Article 3.8.

2.2 CONTAMINATED MATERIALS

Contaminated materials resulting from the clearing, stripping and excavation operations in contaminated areas are defined in Article SC-1 of the Special Conditions. These materials

Document No. 3885-NAT-S-01-01491-00
Issued for Review-Revision A

Earthwork
02200 - 7

NAT-IIU

WP51
111594
000008

shall include materials excavated from millyard, former ore storage area, former tailings pile area, the windblown areas, contaminated sediments from drainage ditches and wastewater detention ponds, sumps and recirculation ponds and from any other areas designated by the Contractor including vicinity properties, demolished debris and radiological hazardous materials.

2.3 DEMOLISHED MATERIALS AND DEBRIS

- A. Materials from the stockpile of demolished materials and debris shall be hauled to the Designated Dump Area at Uravan Disposal Site.
- B. Demolished materials and debris resulting from work specified under Section 02050 shall be hauled to the Designated Dump Area.

2.4 VICINITY PROPERTIES MATERIALS

Contaminated materials from the stockpile resulting from cleanup of vicinity properties shall be hauled to the Designated Dump Area at the Uravan Disposal Site.

2.5 ASBESTOS, HAZARDOUS AND NON-HAZARDOUS MATERIALS

Asbestos, hazardous and non-hazardous waste materials shall be transported to the Designated Dump Area as directed by the Contractor.

2.6 COMPACTION EQUIPMENT

All compaction equipment shall be capable of achieving the required compaction and will be subject to approval by the Contractor.

2.7 WEIGH SCALES

The Subcontractor shall install weigh scales at the Naturita Processing Site as shown on the Subcontract Drawings and as specified in Section 01025. The scales shall be capable of accurately recording the weight in tons of each dump truck loaded with radiologically contaminated materials for transport to the Designated Dump Area at the Uravan Disposal Site.

PART 3 - EXECUTION

3.1 PROTECTION OF EXPOSED SURFACES

A. During seasonal shutdowns and during other periods of prolonged exposure of excavated or filled areas, the Subcontractor shall provide labor, materials and equipment, as approved by the Contractor, to maintain and protect exposed surfaces of uncontaminated and contaminated materials against wind erosion and excessive stormwater erosion. Prior to the application of protective erosion control measures, the exposed surfaces shall be sloped to drain and compacted with a smooth drum roller to eliminate ruts and ridges formed by construction equipment. Unless otherwise approved by the Contractor, acceptable methods of erosion protection are as follows:

1. Spraying with Water containing Chemical Additives: Acceptable chemical additives are CPB-12 as manufactured by Wen-Don Corporation, 206 South 2nd Street, Price, Utah, 84501 and "Soil Seal Concentrate" as manufactured by Soil Stabilization Products Company of Merced, California, or approved equal. Mixing and application shall be in accordance with the manufacturer's recommendations, or
2. Covering exposed surfaces with geotextile fabric such as "Supac" as manufactured by Phillips Fibers Corporation of Sacramento, California, or approved equal. Handling and installation shall be as recommended by the manufacturer of the product.

B. Following a seasonal shutdown or period of prolonged exposure, the Contractor will verify by density tests, that the last lift of materials previously placed and accepted by tests has been maintained at the applicable minimum specified density. Verification by density tests will be performed at frequencies commensurate with those specified in Article 3.6.B.1 of this Section. Materials failing to meet specified density requirements shall be removed or reworked to satisfy the minimum specified density requirements.

3.2 EARTHWORK - GENERAL

A. Preparation:

1. Clearing and stripping shall be as specified in Section 02110.

Document No. 3885-NAT-S-01-01491-00
Issued for Review-Revision A

Earthwork
02200 - 9

NAT-IIU

WP51
111594
000010

2. Required lines, levels, contours and datum shall be identified before the start of earthwork operations.
 3. The Subcontractor shall verify the existing above-ground and underground utilities, identify them, and notify the Contractor immediately of his finding, if any, for appropriate action.
- B. Dewatering and Drainage: Prior to commencement of earthwork operations, the Subcontractor shall verify that the dewatering and drainage facilities are constructed and operational in accordance with the requirements of Section 02141. Temporary drainage ditches shall be constructed and maintained to provide drainage during construction.
- C. In order to avoid cross-contamination of uncontaminated material, the contaminated and uncontaminated materials shall be kept separated during earthwork operations. Stockpiles of contaminated materials shall be placed on contaminated areas only.
- D. The excavated uncontaminated materials shall be used as fill in various areas of the processing site including the construction of dikes, general fill, roadway fill, structure fill, backfill, and fill for the final grading of the processing site, as required. Uncontaminated excavated material may be stockpiled for later use, but shall be stockpiled on uncontaminated areas only.
- E. Earthwork shall conform to lines and grades indicated on the Subcontract Drawings or specified in this Section.
- F. Moisture Addition to Contaminated Materials: Moisture shall only be added to contaminated materials for environmental dust control requirements as directed by the Contractor. The Subcontractor shall use special measures such as fine spray nozzles to add moisture to contaminated materials, as approved by the Contractor, to minimize the amount of moisture added for dust control. The Subcontractor shall perform his operations to minimize the need for moisture addition to the extent practicable. Moisture addition shall not be permitted for the convenience of the Subcontractor. Water from the wastewater detention pond may be used for dust control only in contaminated areas.

3.3 EXCAVATION

A. General:

1. Excavation shall be carried out to the lines and grades indicated on the Subcontract Drawings or specified herein, or, in the case of contaminated materials, as required by the Contractor's Health Physics Personnel.
2. At all times, the Subcontractor shall conduct his operations in such a manner as to prevent free standing water and contamination of uncontaminated materials. The Subcontractor shall, as a minimum, take the following measures to safeguard against such problems:
 - a. Water leaving a contaminated area shall be routed into a detention pond as specified in Section 02141.
 - b. Exposed surfaces of contaminated and uncontaminated materials excavations shall be protected from erosion as specified in Article 3.1 above.
3. The Subcontractor shall remove all uncontaminated excavated material from the excavation site and dispose of it in fills required at the site or in the designated spoil areas or use it for other purposes, as approved.
4. Unsuitable or low density subgrade material not readily capable of in-place compaction shall be excavated as directed by the Contractor and disposed of as specified in Article 3.4.
5. Adequate working space for safety of personnel shall be provided within the limits of the excavation.
6. Except as otherwise noted, care shall be exercised to preserve the material below and beyond the lines of all excavation. Where excavation is carried below grade, the Subcontractor shall at his cost backfill to the required grade or to indicated invert grade, as specified, and recompact the backfill as specified in Article 3.5.
7. Excavation for the convenience of the Subcontractor shall conform to the limits approved by the Contractor and shall be at no additional expense to the Contractor.
8. Excavated material shall be placed at sufficient distance from the edge of excavations to prevent cave-ins or bank slides.

B. Contaminated Materials Excavation:

1. The Subcontractor shall minimize the open excavation area of contaminated materials at all times during excavation work. The Subcontractor shall operate from one or two sides at one time, progressing uniformly to opposite sides for completion, unless directed otherwise by the Site Manager. Contaminated materials shall be excavated to the depths indicated on the Subcontract Drawings, or as required by the Contractor based on continuous or frequent monitoring of the excavations.
2. During the excavation operation, tests will be performed by the Contractor to determine radioactive contamination of the material to be excavated.
3. The Highway 141 road crossing shall be decontaminated and haul stopped as required to allow through access of local traffic. Signs shall be posted as appropriate to notify traffic of expected delays. The Subcontractor shall provide at the Highway 141 road crossing two flagmen, a minimum of one laborer, and a means for decontamination of the crossing. The Subcontractor shall design and submit for approval by the Contractor a system for collection of the decontamination runoff. A Traffic Control and Decontamination Procedure Plan shall be submitted to the Contractor for review and approval 30 days prior to the start of transportation of contaminated materials from the former ore storage area via the millyard to the Uravan Disposal Site.

C. Uncontaminated Materials Excavation:

1. Drainage Ditches Excavation:
 - a. General: Ditches shall be cut accurately to the cross sections and grades as shown on the Subcontract Drawings. All roots, stumps, rock, and foreign matter in the sides and bottom of ditches shall be trimmed and dressed or removed to conform to the slope, grade, and shape of sections indicated. Care shall be taken not to excavate ditches below the grades indicated. Excessive ditch excavation shall be backfilled to grade with satisfactory and thoroughly compacted material as specified in Article 3.5 at no additional cost to the Contractor. Ditches shall be maintained until final acceptance of the Work. Cracks in exposed rock surfaces in ditches shall be shotcreted where necessary to reduce seepage.

- b. Temporary Drainage Ditches: Temporary drainage ditches shall be excavated at locations shown on the Subcontract Drawings or as designated by the Contractor to collect and transport storm runoff, wastewater and water-bound contaminated material to the detention ponds during construction. Temporary drainage ditches will not be subject to the requirements of Article 3.8 but will be subject to testing as determined by the Contractor.

3.4 DISPOSAL OF EXCAVATED MATERIALS

- A. Contaminated Materials: All contaminated materials excavated from former ore storage area, millyard, including stockpiles of demolition materials and debris, radiological hazardous materials and vicinity properties, former tailings pile area and surrounding windblown areas shall be transported to the Designated Dump Area at the Uravan Disposal Site. In the course of excavation, buried foundations and structures may also be encountered. All such contaminated materials shall be hauled to the Designated Dump Area.
- B. Uncontaminated Materials:
1. Uncontaminated materials excavated from the sites shall be used as uncontaminated material fill for construction of various features including site grading, or stockpiled for later use.
 2. Where used in fills, such material shall be transported directly from the excavation and placed in its final position in such fills whenever possible. If required by the Subcontractor's schedule, the material may be placed temporarily in stockpiles at approved locations. Material in stockpile shall be protected from erosion and contamination of any kind that would render it unsuitable for use in fills.
 3. Excess uncontaminated materials remaining at the site after completion of all required fills shall be distributed over the site in the final grading. Larger rock particles shall be placed in the lower portions of the grading fills. The maximum rock size permitted on the surface shall be 3 inches in diameter. Rocks larger than 3 inches shall be buried a minimum of 8 inches below the surface in a manner so as to eliminate voids between the rocks by uniform distribution and compaction of soil around the rocks.

- C. Uncontaminated garbage, refuse, debris, oil, and any waste material which is harmful to the environment shall be removed from the job site and disposed of offsite in a manner approved by the authority having jurisdiction over the offsite disposal facility.
- D. All operations in the stockpile areas throughout the Work shall be in strict conformity with the requirements of this Section. The Subcontractor shall ensure that silty water from the stockpile areas does not enter nearby waterways. If required, temporary berms, detention ponds or silt fences shall be constructed by the Subcontractor at no additional cost to the Contractor.

3.5 FILL CONSTRUCTION

A. General Requirements:

1. Fill materials shall be placed and compacted to the lines and grades shown on the Subcontract Drawings or as required by the Contractor.
2. If any portion of the materials placed as fill does not meet the specified requirements, the Subcontractor shall remove such material and replace it with fill materials meeting the specifications at no additional cost to the Contractor.
3. Prior to backfilling with uncontaminated fill materials, the subgrade will be radiologically surveyed by the Contractor to confirm that EPA standards have been met. These radiological surveys may cause delays to backfill operations of up to seven working days. The Subcontractor shall plan his work accordingly.
4. Constructed fills shall be maintained to meet the requirements of this Specification until final completion and acceptance of the Work. This shall include all measures to prevent erosion or contamination during construction, including contamination by radioactive material. During seasonal or other extended shutdowns, all exposed surfaces shall be protected with special treatments specified in Article 3.1 above.

B. Placing Requirements:

1. Prior to placement of materials, the in-place density of the subgrade shall be as specified in Article 3.7.

2. No material shall be placed on any portion of the subgrade or against or upon any structure until consent to place such fill has been obtained from the Contractor.
3. Fill materials may require moisture conditioning (wetting or drying) prior to compaction. Some materials may require spreading and extended drying time prior to compaction.
4. The loose thickness of each layer of material shall not be greater than that required to achieve the specified compaction. For material containing particles having a maximum diameter of less than 10 inches, the loose lift thickness shall not exceed 12 inches. For material containing rock greater than 10 inches in diameter, the loose lift shall be kept to the minimum constructible thickness, as approved by the Contractor, and the material between the larger particles shall receive adequate compaction as approved by the Contractor. Loose thickness of each layer of material placed in dewatered excavations at the processing site shall not exceed 24 inches, and shall not be less than the maximum particle size in the backfill.
5. Unless otherwise indicated, fill materials shall be placed to a grade no flatter than 2 percent to facilitate drainage of water. In areas where ponding cannot be prevented or ponding has occurred and fill is required to be placed, placing shall begin only after the area is dewatered and permission to place is obtained from the Contractor.
6. When no longer needed for control of contamination, as determined by the Contractor, detention ponds, recirculation ponds, sumps, and the like shall be removed and the area restored and finish graded as shown on the Subcontract Drawings.
7. When fill is placed against an existing slope steeper than 3 (horizontal) to 1 (vertical), the existing slope shall be terraced as the fill is constructed. Terraces shall be cut nearly horizontal a minimum of 6 feet into the existing slope as the fill is brought up in layers. Material cut for terraces shall be used for the adjacent fill, if suitable, or shall be used elsewhere for site grading.

C. Compaction Requirements:

1. Each lift of fill materials shall be compacted to a minimum density specified in Article 3.8, except for

Document No. 3885-NAT-S-01-01491-00
Issued for Review-Revision A

Earthwork
02200 - 15

NAT-IIU

WP51
111594

000016

materials with more than 30 percent retained on a 3/4 inch sieve. Such material shall be compacted in accordance with Article 3.5.C.6.

2. During compaction, the moisture content of fill material shall be maintained to achieve specified density and as otherwise specified herein. Uniform moisture distribution shall be obtained by disking, blading, or other methods approved by the Contractor prior to compaction of a lift.
3. If the compacted surface of any lift of the fill in place is too wet for proper compaction of the layer of fill material to be placed thereon, it shall be removed, allowed to dry or worked with harrow, scarifier, or other suitable equipment to reduce the water content to the required amount, and then re-compacted before the next succeeding layer of fill is placed.
4. Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content shall be reworked to meet the density and moisture requirements or removed and replaced by acceptable fill compacted to meet these requirements.
5. Uncontaminated fill material in the stockpile areas shall be adequately compacted to maintain slope stability. Compaction may be accomplished by routing of hauling and spreading equipment units.
6. Compaction of fill with more than 30 percent retained on a 3/4-inch sieve:
 - a. Prior to compaction, materials shall be moisture conditioned. Moisture addition shall be limited to the amount of water required to lubricate rock particles, if required.
 - b. Compaction shall be accomplished by any of the following combinations of passes and equipment or approved equal combinations:
 - 1) Three passes of a CAT 433 Vibratory Roller.
 - 2) Three passes of a CAT Compactor Model 825C.
 - 3) Three passes of an empty or loaded CAT Wheel Tractor Scraper Model 657.

- c. Depending on soil conditions, the Subcontractor may be required to change the compaction equipment or increase the number of passes to achieve the desired compaction. Approval of a combination of equipment and number of passes suitable for certain soil types and conditions may not apply to different soil conditions.
- d. Materials shall not be subject to the requirements of Article 3.8.A.

3.6 FIELD QUALITY CONTROL

- A. General: The Contractor reserves the right to perform quality control tests when deemed necessary to verify compliance with the requirements of this Specification. The Contractor will take samples and perform tests throughout the construction period, and the Subcontractor shall cooperate in providing access for the Contractor to areas where testing is to be performed and shall schedule his placing to avoid interference with the testing operations.
- B. Tests: The Contractor will perform the following tests on a regular basis. These tests are a minimum requirement:
 - 1. In-place density and moisture content tests for compacted materials, where density is specified, will be as follows:
 - a. One test per 3000 cubic yards of general fill materials.
 - b. At least two tests for each day of material placement in excess of 150 cubic yards for each material.
 - c. At least one test per lift of material placed and at least one test for every full shift of compaction operations.

3.7 SUBGRADE PREPARATION

- A. Subgrade Preparation: Subgrade preparation shall include fine grading and, where specified, compaction of excavations, backfills, and embankments (including stockpiles) upon which fill, backfill, pavement, surfacing, base, subbase, and riprap or other structures are constructed. Compaction shall be as specified in Article 3.8.

- B. Where feasible, pneumatic-tired roller suitable to produce the specified density and moisture content, shall be used for compaction. Where compaction by roller is not feasible, mechanical tampers or vibratory compactors shall be used.
- C. Compaction shall be carried out for the full area below finished subgrade to at least the density specified in Article 3.8 below. Soft areas developed or encountered during work shall be corrected.

3.8 COMPACTION DENSITIES

- A. Each layer of backfill shall be compacted to at least the following percentage of maximum dry density, as determined by the ASTM D698 test method:
 - 1. Road Embankment: 98 percent
 - 2. Site Restoration: 90 percent
- B. Compaction of subgrade, and backfills within the Colorado State Highway right-of-way shall comply with Section 203.11 of the Colorado Standard Specifications.
- C. Backfill materials containing more than 30 percent by weight of material greater than 3/4 inches, shall be compacted in accordance with Article 3.5.C.6.
- D. Compaction densities shall be rounded to the nearest whole percent and the moisture content to the nearest tenth of a percent.

3.9 DISPOSAL OF DEMOLISHED MATERIALS AND DEBRIS

Material from the stockpile of demolished materials and debris from processing site and demolished materials and debris resulting from demolition work specified in Section 02050 shall be transported and unloaded in the Designated Dump Area at the Uravan Disposal Site.

3.10 DISPOSAL OF VICINITY PROPERTY MATERIALS

Material from the stockpile of contaminated vicinity properties materials shall be transported and unloaded in the Designated Dump Area at the Uravan Disposal Site.

3.11 HANDLING AND DISPOSAL OF ASBESTOS, HAZARDOUS AND NON-HAZARDOUS MATERIALS

- A. Existing stockpiles and containers of asbestos, hazardous and non-hazardous materials from the processing site shall be transported and unloaded in the Designated Dump Area at the Uravan Disposal Site.
- B. The Subcontractor shall comply with the applicable provisions of (1) the Special Conditions and (2) Section 02081.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Measurement for payment for the following items of material excavation will be by the cubic yard of material excavated at the Naturita processing site. The quantities for payment will be computed by the average end area method from surveys conducted before and after excavation operations.
 - 1. Excavation of Contaminated Materials including Demolition Debris, if Required, from Millyard, Tailings Pile Area and Ore Storage Area, and Transportation and Unloading at the Designated Dump Area at Uravan Disposal Site (Bid Schedule Item 401)
 - 2. Excavation of Contaminated Materials including Demolition Debris, if Required, from Windblown Areas, and Transportation and Unloading at the Designated Dump Area at Uravan Disposal Site (Bid Schedule Item 402)
- B. Measurement for payment for the following items will be by the cubic yard of material excavated at Naturita processing site. The quantities for payment will be computed by the average end area method from surveys conducted before and after excavation operations.
 - 1. Handling and Removal of Stockpiles of Vicinity Properties Contaminated Materials and Contaminated Demolition Debris Resulting from Demolition Subcontract in Phase I and Transportation and Unloading at the Designated Dump Area at Uravan Disposal Site (Bid Schedule Item 403)
 - 2. Handling and Removal of Stockpiles and Containers of Asbestos, Hazardous and Other Non-Hazardous Materials Resulting from Demolition Subcontract in Phase I and

Transportation and Unloading at the Designated Dump Area
at Uravan Disposal Site (Bid Schedule Item 404)

- C. Measurement for payment for the following items of fills will be by the cubic yards of materials placed and compacted. The quantities for payment will be computed by average end area method from surveys conducted before and after placement and compaction:
1. Placement of Uncontaminated Material Excavated from the Naturita Processing Site as Fill for Finish Grading of the Naturita Processing Site (Bid Schedule Item 801)
 2. Furnish and Place Topsoil Fill for Finish Grading of the Naturita Processing Site (Bid Schedule Item 802)
- D. Measurement for payment for haul stoppage during decontamination of Highway 141 road crossing as specified in Article 3.3.B.3 above will be by the Spread Hour. Spread hours will be tabulated by the Subcontractor and agreed to by the Contractor at the end of each shift. (Bid Schedule Item 405)
- E. Separate measurement for payment will not be made for the following items, and such work will be considered incidental to the related items of work:
1. Subgrade preparation.
 2. Temporary stockpiling of excavated materials.
 3. Required rehandling of materials.
 4. Protection of exposed surfaces.
- F. Overexcavation: Overexcavation for the Subcontractor's convenience or due to error or lack of control by the Subcontractor will not be measured for payment. At the discretion of the Contractor, such overexcavation shall be backfilled with compacted contaminated or uncontaminated fill, or shotcrete as required, at the Subcontractor's expense.
- G. Separate measurement for payment will not be made for any other excavations or fills specified in this Section.

4.2 PAYMENT

- A. Payment for the items of Article 4.1.A above will be by their applicable unit prices per cubic yard quoted therefor in the

- Bid Schedule. The prices quoted shall include full compensation for excavating, hauling, transporting and unloading the excavated materials at the Designated Dump Area including all clearing at the processing site, stripping, grading, shaping, preparing subgrade, moisture conditioning, compacting, temporary stockpiling and required rehandling.
- B. Payment for the items of Article 4.1.B above will be by the applicable unit prices per cubic yard quoted therefor in the Bid Schedule. The prices quoted shall include full compensation for loading, hauling, transportation and unloading the materials at the Designated Dump Area and for performing all work as shown on the Subcontract Drawings, as specified in these Specifications, and as required by the Contractor.
- C. Payment for the items of Article 4.1.C above will be by their applicable unit prices per cubic yard quoted therefor in the Bid Schedule. The prices quoted shall include full compensation for hauling the materials from excavated areas or retrieving the materials from temporary stockpiles, as required, and placing the excavated materials in their final locations including all clearing at the processing site, stripping, grading, shaping, preparing subgrade, and compacting, as required.
- D. Payment for haul stoppage during decontamination of Highway 141 road crossing will be by the unit price per Spread Hour quoted therefor in the Bid Schedule. The price quoted shall include full compensation for all costs attributed to the stoppage of the equipment spread engaged in the excavation and haul to the Designated Dump Area of contaminated material from former Ore Storage Area.
- E. Separate payment will not be made for the items mentioned in Article 4.1.E above. All costs for such work will be considered to be included in the prices quoted for the applicable related items of work.
- F. Separate payment will not be made for prolonged maintenance of stockpiles, slopes, cuts or fills, as stated in Articles 3.1.A.1 and 3.1.A.2 of Seasonal Shutdown.
- G. Separate payment will not be made for any other excavations or fills specified in this Section. All costs for excavations or for furnishing and placing such fills will be considered to be included in the related items of excavation.

END OF SECTION 02200

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