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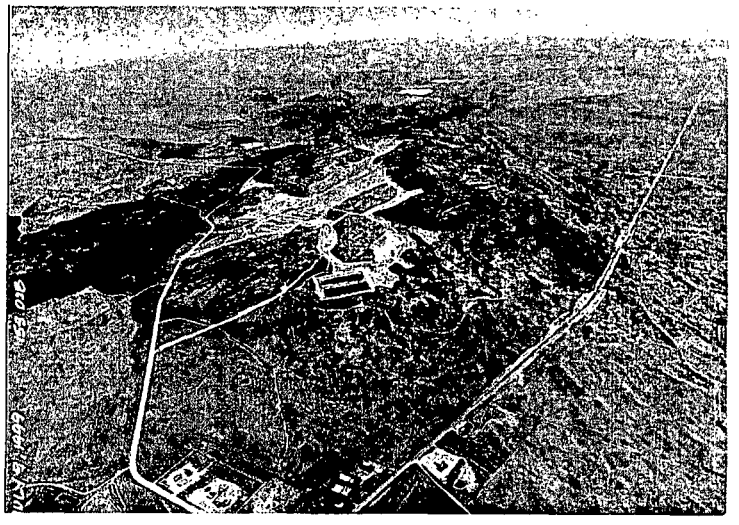
Split Rock Water Storage Ponds
Reclamation Construction Completion Report



July 10, 2007

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Split Rock Water Storage Ponds Reclamation Construction Completion Report

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1.0 INTRODUCTION

This report addresses the results of the construction work involved with reclamation of the Water Storage Ponds (also referred to as the Corrective Action Program Ponds (CAP)) at the Western Nuclear, Inc. (WNI) Split Rock Site, a uranium milling facility located approximately 2 miles north of Jeffrey City, Wyoming. The report that follows describes and documents each component of the reclamation construction, demonstrating that construction was completed in accordance with the approved design. The approved design consists of 1) WNI Split Rock Mill February 1994-Addendum A to Revision No. 5 to the June 30, 1987 Tailings Reclamation Plan (2/94 TRP) (WNI 1994), and 2) Reclamation of Ground Water Corrective Action Ponds (WNI 2006).

1.1 Background

The Split Rock Mill Reclamation Plan for the uranium tailings disposal area was approved by the Nuclear Regulatory Commission (NRC) on March 25, 1994 (NRC, 1994), as Amendment 71 to Source Material License SUA-56. Reclamation of the tailings disposal area began in 1988 and, with the exception of the water storage ponds, the work was completed in 1998. In 1999, the Split Rock Tailing Reclamation Construction Completion Report was issued (SMI, 1999). In the Construction Completion Report, it is stated that the reclamation of the ground water storage ponds (referred to as Area 2C) is to be completed after the ground water storage ponds are no longer required as part of the ground water corrective action program.

The hypalon-lined ponds encompass approximately 16 acres. Since construction, they have accumulated up to three feet of sediments. They contain no tailings, as they are only used to store and evaporate contaminated ground water which has been pumped from the ground water table beneath the tailings. As stated in Amendment 99, License Condition 74 G, WNI must confirm that the CAP ponds cover design approved in March 1994 is acceptable and must obtain NRC approval prior to placing the cover. Confirmation of the CAP ponds cover design was required because the 1994 design was based on an estimated source term for the ponds. After use of the CAP ponds was terminated, the final source term of the ponds was verified, and the thicknesses of clay and borrow soil layers in the cover were confirmed.

By letter dated July 25, 2006, WNI submitted a reclamation plan for the ground water CAP ponds to the NRC staff. NRC staff reviewed the cover design and radon calculations provided by WNI in its 2006 CAP ponds reclamation plan and approved the design as submitted. License Amendment No. 100 has been revised to reflect the July 25, 2006 submittal as the approved CAP ponds design. This licensing action does not require any environmental review under 10 CFR Part 51 because NRC staff previously reviewed the technical and environmental aspects of this design and approved it on March 25, 1994. For convenience, the 2006 reclamation plan, NRC approval letter, technical evaluation report, and License Amendment No. 100 are included in Appendix A of this report.

1.2 As-Built Summary

The as-built reclamation cover includes the following layers, from top to bottom:

- Soil/rock mulch – 10 centimeters (cm) or 4 inches (in) per Table 2C of 2/94 TRP (WNI, 1994),
- Borrow soil – 30 cm (12 in) per Reclamation of Groundwater Corrective Action Ponds (WNI 2006),

- Compacted clay – 15 cm (6 in) per Reclamation of Groundwater Corrective Action Ponds (WNI 2006), and
- Borrow soil – thickness varies.

Final surface reclamation construction was performed by High Country Construction of Lander, Wyoming in 2007. Construction observations were performed by WNI personnel. All surveying was performed by Trihydro Corporation of Lander, Wyoming. Inberg-Miller Engineers of Riverton, Wyoming performed quality assurance and quality control (QA/QC) testing of the compacted clay layer. Testing performed on the clay included Standard Proctor density (ASTM D 698) and field moisture/density using Sand Cone (ASTM D 1556) and Nuclear Gage (ASTM D 2922) tests methods.

2.0 CONSTRUCTION ASSESSMENT

2.1 Site Preparation

Prior to starting work, the contractor informed personnel that compliance with the health and safety program was mandatory. As part of their scope of work, the contractor reviewed the specifications and reclamation plan drawings and recorded all pre-construction documentation.

2.1.1 Clearing and Grubbing

Clearing and grubbing activities were performed in accordance with the requirements of Section 2.0 of the 2/94 TRP (WNI, 1994). Clearing and grubbing was conducted within the approximate limits of the soil borrow areas. Soil borrow areas included the southwest valley borrow area and a sacrificial clay stockpile (see Drawing 1). Clearing and grubbing was conducted to a minimum distance of 20 feet outside the limits to be disturbed by construction activities. Vegetative debris was placed in a stockpile for re-use in revegetation. Fill and reclamation cover materials were reasonably free of vegetative debris.

Topsoil containing roots, grasses, and forbs was stripped to the base of the organic layer or to a depth of six inches, whichever resulted in the greater depth of excavation. The topsoil was stockpiled and used as seed bed material for the areas to be revegetated.

Clearing and grubbing also included the demolition of approximately 4,900 linear feet of the 8-foot tall game fencing surrounding the water storage facility. The fence was placed within the subgrade fill material during reclamation of the water storage ponds, as discussed in Section 2.2.4.

2.1.2 Construction Water

Water used for dust suppression and moisture conditioning of compacted soils was obtained from the Jeffrey City Water and Sewer Association.

2.2 Excavation and Grading of Subgrade

2.2.1 Subgrade Description

Subgrade is defined as the surface configuration that had to be achieved over the water storage ponds prior to placement of the final reclamation cover. The work included the following activities:

- Removal of the existing hypalon liner from the upper anchor trench of the embankment and placement over the pond sediment.
- Regrading the existing embankments over the existing sediments.
- Decommissioning of used piping, pumps, fencing, and miscellaneous equipment and placement within the subgrade fill.
- Placement of soil fill material to achieve desired configuration and requirements as specified in the Reclamation Plan.

2.2.2 Subgrade Design Requirements

The requirements for the subgrade, as required by applicable components of Section 3.2.7 of the 2/94 TRP (WNI, 1994), are summarized as follows:

- The existing ground surface shall be proof rolled prior to placement of either additional fill or the final reclamation cover. Proof rolling shall consist of at least one pass with a Caterpillar 815 (or equivalent) smooth drum compactor.
- Fill placed prior to placement of the final reclamation cover will be placed in lifts not to exceed 8 inches in loose thickness and compacted with both local construction traffic and at least one pass with a Caterpillar 815 smooth drum compactor or equivalent.
- The fill shall be graded such that the surface of the final reclamation cover has a uniform grade without localized depressions.

2.2.3 Subgrade Materials

Subgrade materials consisted of soils removed from the existing water storage embankment and soils obtained from borrow areas. Borrow areas included the southwest valley borrow area and a sacrificial clay stockpile, as shown on Drawing 1. Approximately 57,000 cubic yards of soil were placed as subgrade fill.

In addition to the soils described, scrap material associated with the ground water corrective action program were incorporated into the subgrade. Materials included fencing, pumps, four-inch to ten-inch diameter polyethylene pipe, equipment, and other similar material.

Pond sediments were left in place, and were not cut into during reclamation activities.

2.2.4 Placement of Piping, Pumps, and Other Debris

The existing embankments were pushed over the sediments to form an approximately two-foot thick work pad. Upon this layer, scrap materials were incorporated in the fill, as described below.

Overland piping from Northwest Valley wells was removed from installed locations, cut into manageable pieces and transported to the storage ponds. This piping was placed in the subgrade fill material along with all piping located in a storage area adjacent to the ponds.

Piping, pumps, and other structural materials associated with the ground water corrective action program were placed above the pond sediments prior to placement of the reclamation cover. Piping was laid parallel and not overlapped to avoid creating significant voids. Structural materials were broken or cut to manageable size using typical equipment for demolition work. The material placement strategy for structural materials was to minimize void spaces around these materials by spreading or laying out these materials in lifts. Materials of large size were cut with a maximum dimension 20 feet. Large or odd-shaped materials were laid flat in the reclamation area, with longest dimension oriented horizontally. The structural materials were placed in lifts not exceeding eight inches, except where material with a vertical dimension exceeded eight inches. Each lift of material was covered with soil and compacted to minimize void spaces between scrap materials.

Compressible materials, such as thin-walled piping and thin-walled tanks, were flattened or crushed prior to final placement in the reclamation area. Flattening or crushing was done with a cutting torch and other steel-tracked construction equipment.

These materials were placed in the reclamation area and spread to form a lift with a maximum thickness of eight inches. Spreading was done in a manner resulting in flat-lying materials and reduced void spaces.

There were no large incompressible materials (such as thick-walled tanks or vessels) placed in the reclamation area.

2.2.5 Placement of Fill to Achieve Desired Subgrade

Subgrade fill was placed in accordance with requirements summarized in Section 2.2.2. Following placement of the scrap materials (see Section 2.2.4), additional soil was placed and compacted to achieve the desired subgrade elevations.

Water was used as needed for dust suppression on haul/access roads and on all areas where grading and compaction work was conducted.

2.2.6 Final Configuration of Subgrade

The top of the subgrade surface is shown on Drawing 2. The top of subgrade surface was field verified by surveying spot elevations on a 200-foot by 200-foot grid. Survey locations are shown on Drawing 5. As shown on the drawing, the limits of the erosion protection extend past the limits of the radon barrier. In order to assure a uniform final reclamation cover surface, i.e. top of rock mulch, the final configuration of the subgrade surface had to be lower where the radon barrier was constructed and higher where only the erosion protection was placed. Approximately 57,000 cubic yards of soil and scrap material were placed as subgrade fill.

2.3 Final Reclamation Cover Placement

2.3.1 Reclamation Cover Description

The final reclamation cover was placed above the subgrade and over the regraded water storage ponds area to the extent and configuration shown on the Drawings. The final reclamation cover consisted of the following components (described from bottom-to-top):

1) A clay layer with a minimum thickness of six inches. The clay layer was placed over subgrade material (i.e., regraded berm material, other fill material, and/or pond sediments);
2) a 12-inch thick borrow soil layer; and
3) a four-inch thick rock mulch layer.

The final reclamation cover was designed to contain pond sediments, and to reduce infiltration due to precipitation. License Amendment 100 (NRC, 2006), License Condition 74.G specifies that the groundwater corrective action evaporation ponds shall be reclaimed in accordance with the 2/94 TRP (WNI, 1994). In addition, the radon attenuation barrier for the ponds is to be constructed in accordance with the confirmed reclamation plan dated July 25, 2006 (WNI, 2006). The reclamation cover as specified in the July 25, 2006 document consists of six inches of compacted clay overlain by twelve inches of borrow soil. The final reclamation cover was stabilized with a rock mulch erosion protection layer. The clay layer and the borrow soil layer

are discussed in this section of the Construction Completion Report. The rock mulch erosion protection layer is discussed in Section 2.4.

2.3.2 Compacted Clay

2.3.2.1 Clay Design Requirements

In addition to the six-inch thickness approved in License Amendment 100, the compacted clay had the following requirements as specified in Section 4.2.2 of the 2/94 TRP (WNI, 1994):

1) The material for the clay layer shall be obtained from the designated borrow area and shall have at least 90 percent passing the number 200 sieve as determined by ASTM D 1140.
2) The maximum density of the cover soil shall be determined using the Standard Proctor method (ASTM D 698). The compacted material shall be placed at a density of greater than 90 percent of the maximum density for the first six-inch lift and 95 percent for any subsequent lifts. The moisture content shall be between two percent below to four percent above the optimum moisture content determined using the Standard Proctor method (ASTM D 698).
3) The clay layer shall be placed in lifts with a maximum nominal compacted thickness of six inches. Measurements will be taken at the intersecting points of a 200-foot by 200-foot survey grid to verify thickness.
4) Thickness measurements for the entire radon barrier shall be taken just prior to placement of the borrow soil layer to ensure that required thickness has been placed.
5) Measurements shall indicate that no single measurement shall be less than the required thickness. The compacted clay layer shall be graded to have a uniform grade without localized depressions.
6) After quality control testing assures the clay layer has been placed and compacted as specified (e.g., considering density and moisture criteria), moisture shall be added to the surface of the clay layer, as necessary, to prevent drying of the layer until the borrow soil layer is placed over the clay layer. In addition, the borrow soil layer shall be constructed, as specified below, over the clay layer, following completion of each portion of the clay layer as soon as practical as directed by the Owner.

2.3.2.2 Clay Testing Requirements

The testing requirements for the clay layer portion of the final reclamation, as required by applicable components of Section 7.2.3 of the 2/94 TRP (WNI, 1994), are summarized as follows:

- Gradation testing for percent passing the #200 sieve (ASTM D 1140), of off-site borrow soil to be used in the compacted clay layer shall be conducted at a minimum frequency of one test for each 1,000 cubic yards of clay material placed, and one test for each day when clay material in excess of 150 cubic yards is placed.
- The Standard Proctor test (ASTM D 698) will be used to determine the maximum density for compaction. The Standard Proctor test shall be conducted at a rate of one test for every 15 field density tests.

- Field tests of the clay layer as placed and as compacted shall be conducted at a minimum frequency of one test for each 500 cubic yards of placed clay layer, two tests for each day when clay layer material in excess of 150 cubic yards is placed, and one test per lift and a minimum of one test per full shift of clay layer compaction operations.
- Field tests to determine density and moisture content of the radon barrier layer may be conducted using the nuclear gauge with the quality control restrictions described in Section 7.2.6 of the 2/94 TRP (WNI, 1994).

2.3.2.3 Clay Materials

The material for the compacted clay layer was obtained from the existing clay stockpile located north of the water storage ponds. Gradation testing was performed in 1997 during the creation of the clay stockpile. Results from the gradation testing are presented in Table 7 of the Split Rock Tailing Reclamation Construction Completion Report (SMI, 1999). A total of 31 gradation tests were performed on 28,675 cubic yards of stockpiled clay (approximately one test per 925 cubic yards), and all tests indicated the gradation met requirements. No further gradation tests of the clay stockpile material are required.

2.3.2.4 Clay Placement

Placement and compaction of the clay layer were done in accordance with the above requirements in Section 2.3.2.2. Two Standard Proctor tests (ASTM D 698), 30 Nuclear density and moisture content tests (ASTM D 2922), three sand cone density tests (ASTM D 1556), and three oven-drying moisture contents were performed for the approximately 11,000 cubic yards of compacted clay placed in the reclamation cover. Density/Moisture tests locations were chosen randomly and tests were not taken until a desired grade and thickness had been achieved. In all instances, moisture content and density requirements were met. Visual observations were used to confirm that completed surfaces were kept moist until the next lift could be placed. The frequency of moisture/density tests was one test per 367 cubic yards of compacted clay, with a minimum of two tests per day of compaction. The frequency of Standard Proctor tests was one test per 15 density/moisture tests. Approximately every tenth Nuclear Gauge Method was field verified with a sand cone density (ASTM D 1556) and oven-drying moisture content (ASTM D 2216). These testing frequencies meet or exceed frequencies required in the 2/94 TRP (WNI, 1994). Locations of the moisture/density tests are shown on Drawing 5, results of the Standard Proctor moisture/density tests are presented in Appendix B, and field density test results are presented in Appendix C.

Prior to placement of the compacted clay layer, the subgrade was surveyed to determine surface elevations at the intersecting points of a 200-foot by 200-foot survey grid. The points were surveyed again after placement and compaction of the clay to determine the thickness of the clay layer. Thickness measurements of the clay layer were taken just prior to placement of the borrow soil layer. Locations of the thickness measurements are shown on Drawing 5, and the measured thicknesses are shown in Appendix D. With the exception of one point, all measurements indicated a minimum clay thickness of six inches. At a location with a Northing of 5000 feet and an Easting of 6600 feet, survey data indicated 0.2 feet of compacted clay. However, the location was hand-excavated and the clay thickness was confirmed to be six inches. The hole was recompacted with clay, and no further actions were required.

2.3.2.5 Clay Layer Configuration

The as-built extent and elevation of the clay layer is shown on Drawing 3 (adjusting for twelve inches of the borrow soil and four inches of rock mulch. The clay layer was graded such that the surface had a uniform grade without localized depressions. Approximately 11,000 cubic yards of compacted clay were placed in the reclamation cover.

2.3.3 Borrow Soil

2.3.3.1 Borrow Soil Design Requirements

The requirements for the borrow soil, as required by applicable components of Section 4.2.2.2 of the 2/94 TRP (WNI, 1994), are summarized as follows:

- The borrow soil layer shall be constructed as soon as practical over the clay layer following completion of each portion of the clay layer.
- The borrow soil layer shall be at least 12 inches thick as measured at the intersecting points of a 200-foot by 200-foot survey grid. Thickness measurements of the borrow soil layer shall be taken just prior to placement of the rock mulch layer to ensure the required thickness of borrow soil layer has been placed. The top surface of the borrow soil layer shall be graded to have a uniform grade without localized depressions.
- After quality control testing assures that the required thickness of the borrow soil layer has been placed, moisture shall be added to the surface of the borrow soil layer, as necessary, to prevent drying of the layer until the layer is temporarily stabilized. The borrow soil layer shall be temporarily stabilized by placing either a physical agent or the rock mulch over the borrow soil layer. In addition, the temporary stabilization of the borrow soil layer shall be achieved following completion of each portion of the borrow soil layer.
- There are no compaction or moisture specifications for the borrow soil layer.

2.3.3.2 Borrow Soil Testing Requirements

The testing requirements for the Borrow Soil layer portion of the final reclamation, as required by applicable components of the 2/94 TRP (WNI, 1994) Section 7.2.2, are as follows:

- The borrow soil layer will be compacted using passive means in that compaction will be achieved by construction traffic. No active compaction will be used and no density requirements or testing for the borrow soil layer is specified herein.

2.3.3.3 Borrow Soil Materials

The material for the borrow soil layer was obtained from the Southwest Valley Soil Borrow and a sacrificial clay stockpile located to the north of the approved clay stockpile. These areas are shown on Drawing 1.

2.3.3.4 Borrow Soil Placement

Placement and completion of the borrow layer were done in accordance with the requirements in Section 2.3.3.2. Prior to placement of the borrow layer, the top surface of the clay layer was surveyed to determine surface elevations at the intersecting points of a 200-foot by 200-foot survey grid. The points were surveyed again after placement of the borrow layer to determine the thickness of the borrow layer. Thickness measurements of the borrow layer were taken just

prior to placement of the rock mulch layer. Locations of the thickness measurements are shown on Drawing 5, and the measured thicknesses are shown in Appendix D. In survey locations where the compacted clay thickness was measured in excess of six inches, the thickness of the borrow soil includes the portion of the clay layer in excess of six inches. All surveyed locations indicate adequate thickness of borrow material has been placed.

2.3.3.5 Borrow Soil Configuration

The as-built extent and elevation (adjusting for four inches of rock mulch) is shown on Drawing 3. The borrow soil layer was graded such that the surface had a uniform grade without localized depressions. Approximately 22,000 cubic yards of borrow soil was placed in the reclamation cover.

2.4 Erosion Protection

2.4.1 Erosion Protection Description

The erosion protection consisted of rock mulch 1) placed over the reclamation cover, 2) placed over existing soils located between the reclamation cover and key trenches, and 3) placed in key trenches where the rock mulch transitions to existing ground. The erosion protection is designed to withstand the flooding that would result from a Probable Maximum Precipitation event.

2.4.2 Rock Mulch Design Requirements

The design requirements for the rock mulch are specified in section 5.1.4.3, 5.2.1, and 5.2.5 of the 2/94 TRP (WNI, 1994). The 2/94 TRP (WNI, 1994) specified a soil/rock matrix to be used for erosion protection. The soil/rock matrix specified consisted of a 2-inch layer of soil placed over a layer of rock mulch. However, Amendment 74 to SUA-56 added License Condition 27 E to read as follows: "The soil component of the erosion protection layer, consisting of soil/rock matrix, is deleted. This erosion protection layer, to be placed over the final reclamation soil cover, will consist of a minimum of 4-inch thickness of rock with a minimum D_{50} of two inches." A summary of these requirements is presented below, modified to remove references to the soil portion.

The rock mulch shall consist of sized angular granite, resistant to abrasion and weathering, and shall be free from cracks, seams, and other defects that would tend to increase weathering by water and frost action. Rock shall be well graded and sized as follows (as presented in Table 2C of 2/94 TRP (WNI, 1994)):

Design D50 (in)	Thickness (in)	Allowable Percent Passing					
		6"	4"	3"	2"	1"	¾"
2	4	100	88-100	52-84	25-50	2-20	0-12

Rock should meet requirements of durability and oversizing as specified in NRC's Staff Technical Position (STP) "Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites" (NRC 1990).

Placement of the rock mulch shall commence following placement of the final soil cover. The rock mulch gradation specified in Table 2C (of 2/94 TRP (WNI, 1994)) shall be placed at the locations and to the depths specified. Care shall be taken while placing the rock to prevent segregation of materials. The rock mulch shall be placed first by end or belly dump trucks or

other means in a manner that shall minimize degradation and separation of the material. The material shall be spread with a road grader or comparable equipment to achieve the desired configuration. The thickness of the emplaced rock mulch shall be at least four inches (per Table 2C of 2/94 TRP (WNI, 1994)) and verified by construction control, staking, and probing. Material that does not meet the requirements specified above shall be either reworked, or removed and replaced as necessary to meet these Specifications.

2.4.3 Rock Mulch Testing Requirements

The testing requirements for the rock mulch layer portion of the final reclamation, as required by applicable components of the 2/94 TRP (WNI, 1994) Section 7.2.4.1 and 7.2.5 is summarized as follows:

Durability testing frequency will include a minimum of initial testing before use and testing for each additional 10,000 cubic yards of rock from a particular rock source. Additional tests more frequent than every 10,000 cubic yards may be conducted as directed by the Owner if it is suspected that the rock has changed substantially from that previously tested. Any visual change that is noted will be recorded. (Note: On August 21, 1995, the NRC authorized a change in the testing frequency from one test for every 10,000 cubic yards to one test for every 20,000 cubic yards).

The rock gradation testing frequency will include a minimum of initial testing and testing for each additional 10,000 cubic yards of the particular rock size (i.e., gradation requirement). A minimum of three gradation tests will be required for those riprap sizes with less than 30,000 cubic yards of rock required.

Section 7.2.5 of the 2/94 TRP (WNI, 1994) describes a method for determining the thickness of the rock mulch that involves using a spade to make a vertical cut into the rock mulch and a horizontally-placed straight-edge to measure the depth of the rock mulch to the nearest 0.1 foot, at a 200-foot by 200-foot spacing.

2.4.4 Rock Mulch Material

The rock mulch consisted of sized angular granite obtained from the specified on-site D_{50} 2-inch rock mulch stockpile that was established during the initial reclamation construction. Durability and gradation testing was performed during the creation of the rock mulch stockpile. Therefore, no further durability or gradation tests of the rock mulch stockpile material are required. The test results from the initial reclamation construction are summarized below:

Twenty nine durability tests were performed for a total of 354,312 cubic yards of rock produced, or one test per 12,220 cubic yards on average. This meets the frequency requirements in effect after August 21, 1995. Test results indicate that all durability ratings were greater than 80, indicating the rock is sufficiently durable to meet requirements, with no oversizing required. The test results are summarized in Section 2.3.5.2 and Tables 29 and 30 of the Split Rock Tailing Reclamation Construction Completion Report (SMI, 1999).

Rock gradation testing was performed at a frequency of at least one test for every 10,000 cubic yards with a total of 22 gradation tests being performed on the two-inch D_{50} rock mulch. Test results indicate that all 22 tests met all gradation specifications. The test results are summarized in Section 2.3.5.3 and Table 31 of the Split Rock Tailing Reclamation Construction Completion Report (SMI, 1999).

2.4.5 Rock Mulch Placement

Placement of the rock mulch was done in accordance with the above requirements. Prior to placement of the rock mulch, the top surface of the borrow soil layer was surveyed to determine surface elevations at the intersecting points of a 200-foot by 200-foot survey grid. After placement of the rock mulch, grade stakes were placed at the grid locations and pounded into the cover until the top of the grade stake matched the elevation of a straight edge placed horizontally across the top of the rock mulch. The top of the grade stake was then surveyed to determine the thickness of the rock mulch layer. Locations of the thickness measurements are shown on Drawing 5, and the measured thicknesses are shown in Appendix D. The procedure for measuring the rock mulch thickness varies from that specified in section 7.2.5 of the 2/94 TRP (WNI, 1994). However, the principal of the procedures is similar, and the frequency of testing and thickness requirements meet requirements.

2.4.6 Key Trenches

Key trenches were constructed in areas where the rock mulch layer over the reclamation cover transitions to existing soil. The key trenches consist of trenches backfilled with the same rock mulch used for reclamation cover erosion protection. The key trenches are designed to prevent head cutting and long-term erosion. The location of the trenches is shown on Drawing 1 and the minimum dimensions of the trenches are shown on Drawing 4. The design requirements, as presented on Figure 10 of the 2/94 TRP (WNI, 1994), indicate a trapezoidal-shaped excavation backfilled with the same size rock as was used for the rock mulch on the reclamation cover. The design requires an 18-inch bottom width, 1H :1V side slopes, and an excavated depth of 18 inches. Figure 10 of the 2/94 TRP (WNI, 1994) shows that the 6-inch thick soil/rock matrix layer is extended over the rock in the key trench. This results in a total key trench depth of 24 inches. However, since the 2-inch thick soil portion of the soil/rock matrix was deleted by license condition 27 E, the revised depth of the key trench is 22 inches, as shown in Drawing 4 of this report.

2.4.7 Configuration

The as-built extent and elevation of the rock mulch and key trenches are shown on Drawing 3. Approximately 16,000 cubic yards of rock mulch was placed on the reclamation cover and in key trenches.

2.5 Revegetation

2.5.1 Revegetation Description

Revegetation efforts were directed at all areas disturbed by construction and include soil borrow areas and Contractor staging areas.

2.5.2 Revegetation Requirements

Revegetation requirements as specified by Section 6 of the 2/94 TRP (WNI, 1994) are summarized as follows:

All seed for the disturbance areas shall be fresh, clean, new crop seed available locally for rangeland pasture rehabilitation. The application rate of pure live seed (PLS) per acre shall not be less than 15 pounds PLS per acre via drill seeding. The application rate for broadcast seeding shall be 1.5 times the drill seeding rate; i.e. 22.5 pounds PLS rate. All seed shall be furnished in original containers showing analysis of seed mixture, seed source, and production location, percentage of PLS, 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.

Mulch shall be certified weed-free, small-grain hay or straw in a dry condition. Mulch shall be free of foreign matter detrimental to plant life. Wood fiber mulch, if used, shall be virgin long fiber aspen mulch, Douglas fir mulch, or other similar wood fiber such as mulch from trees located on-site that will be cleared from borrow areas. The mulch shall not be from recycled material and shall be free of foreign material such as printers ink, glues, etc.

The area to be revegetated shall be prepared by first replacing topsoil removed and stockpiled during clearing and grubbing, if available. Construction staging areas will be ripped to a depth of 6 to 12 inches prior to topsoil placement to alleviate compaction that may have occurred. Available topsoil shall be spread evenly over the area to be revegetated in a nominal six-inch unconsolidated layer. If topsoil is not available to replace over an area to be revegetated, the soil shall be prepared by first cultivating to a minimum depth of six inches.

Fertilizer shall be added, if required, to the soil at an application rate to be determined after soil analyses are conducted by the Owner and shall be worked into the upper six inches of soil by disking along the contours to the extent practical. Fertilizer shall be applied, as necessary, using broadcast, hydrofertilization, or drill methods. The method used will be dependent on climatic conditions, rate of application, time of application, and will be determined on an area-by-area basis and pre-approved by the Owner.

2.5.3 Implementation

Revegetation efforts were performed to meet the above requirements. Seed mixtures placed contained the composition shown in Table 1.

Table 1: Seed Mixture Composition

Scientific Name	Common Name	Seeding Rate (pounds of PLS per acre)
Elymus lanceolatus	Thickspike Wheatgrass Bannock	2.54
Elymus trachycaulus	Slender Wheatgrass Revenue	4.30
Pseudoroegneria spicata	Bluebunch Wheatgrass Whitmar	2.84
Achnatherum hymenoides	Indian Ricegrass Rimrock	1.93
Nassella viridula	Green Needlegrass Lodorm	3.39
	Total	15.00

Fertilizer was applied at a rate of 100 pounds per acre.

Certified weed-free grass straw was applied to all seeded areas immediately following seeding. Straw was anchored with a crimper. Supporting documentation from the revegetation efforts is included in Appendix E.

REFERENCES

U.S. Nuclear Regulatory Commission (NRC) (1990) *Staff Technical Position, Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailing Sites*, August.

U.S. Nuclear Regulatory Commission (NRC) (1994) *Memorandum for Docket No. 40-1162, Proposed Amendment to Source Materials License SUA-56 to Revise the Approved Disposal Area Reclamation and Closure Plan for Western Nuclear, Inc.'s Split Rock Mill near Jeffrey City, Wyoming.* March 25, 1994.

Shepherd Miller, Inc. (SMI) (1999) *Split Rock Tailing Reclamation Construction Completion Report* prepared for Western Nuclear, Inc. March 1999.

Western Nuclear, Inc. (WNI) (2006) *Reclamation of Ground Water Corrective Action Ponds – License Condition 74E, License SUA-56.* July 25, 2006.

Western Nuclear, Inc. (WNI) (1994) *Split Rock Mill, Addendum A (February 1994) to Revision No. 5 to the June 30, 1987 Uranium Tailings Reclamation Plan.* February 1994.

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: "WATER STORAGE PONDS RECLAMATION CONSTRUCTION COMPLETION JEFFREY CITY, WYOMING"

WITHIN THIS PACKAGE...

D-01

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED:

DRAWING NO.: ASBLT-T1.DWG # 1, "CONSTRUCTION COMPLETION WATER STORAGE PONDS SITE MAP"

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D-02

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D-03

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DRAWING NO.: ASBLT-2-4.DWG # 3, "CONSTRUCTION COMPLETION WATER STORAGE PONDS TOP OF RECLAMATION SURFACE"

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D-04

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DRAWING NO.: ASBLT-2-4.DWG # 4, "CONSTRUCTION COMPLETION WATER STORAGE PONDS CROSS SECTIONS A-A' THRU D-D' "

WITHIN THIS PACKAGE... OR, BY SEARCHING USING THE DOCUMENT/REPORT DRAWING NO. ASBLT-2-4.DWG # 4

D-05

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED:

DRAWING NO.: ASBLT-5.DWG # 5, "CONSTRUCTION COMPLETION WATER STORAGE PONDS QUALITY ASSURANCE TEST LOCATIONS"

WITHIN THIS PACKAGE... OR, BY SEARCHING USING THE DOCUMENT/REPORT DRAWING NO. ASBLT-5.DWG # 5

D-06

APPENDIX A
2006 PONDS RECLAMATION PLAN, NRC APPROVAL LETTER, TECHNICAL EVALUATION REPORT, AND LICENSE AMENDMENT NO. 100

WESTERN NUCLEAR, INC.

2801 YOUNGFIELD, SUITE 340, GOLDEN, COLORADO 80401
TELEPHONE (303) 274-1767 FAX (303) 274-1762

July 25, 2006

United States Nuclear Regulatory Commission
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
Attn: Gary Janosko, Chief
Mail Stop T8A33
Washington, D.C. 20555-0001

RE: Western Nuclear, Inc. Split Rock Mill; Reclamation of Groundwater Corrective Action Ponds - License Condition 74E, License SUA-56

Dear Sirs:

It is anticipated that alternative concentration limits (ACLs) will be granted for the Western Nuclear Split Rock Mill site in the near future. That action will enable the groundwater corrective action program (CAP) to be discontinued. Once the CAP is discontinued, the CAP evaporation ponds can be reclaimed.

License condition 74 E addresses the reclamation of the groundwater corrective action evaporation ponds. The license condition is as follows:

The licensee shall reclaim the groundwater corrective action evaporations ponds in accordance with their February 7, 1994 report titled, "Western Nuclear, Inc. Split Rock Mill, Addendum A (February 7, 1994) to Revision 5 to the June 30, 1987, Uranium Tailings Reclamation Plan" with the following exception:

1. *The preliminary radon attenuation barrier design for the Winter Storage Ponds (Area 2C, Figure 4 Drawing No. 91-225-E53 (Addendum A to Revision 5) consists of 6 inches of Cody Shale and 12 inches of Soil Borrow. This design is considered acceptable for estimating the surety amount. However, once the storage ponds are dismantled the Licensee shall confirm the design and obtain NRC approval prior to placing the radon cover on the ponds. Reclamation to the Winter Storage ponds shall be completed by the licensee within three years after cessation of use as determined by the NRC.*

Samples of the sludge in the bottom of the evaporation ponds have been taken periodically to determine the radium-226 and thorium-230 concentrations so that the radon barrier thickness can be confirmed. Samples were taken in 1999, 2000, 2004 and 2005. The results are summarized on Table 1.

As can be seen, the thorium-230 concentrations are all less than 1 pCi/g. Most of the radium-226 concentrations are also less than 1 pCi/g. The 2005 data indicate radium-226 concentrations are approximately 3 pCi/g.

Calculations were performed to determine the anticipated radon flux from the reclaimed evaporation ponds. The parameters used in the calculations were obtained from the previously approved reclamation

plan dated February 7, 1994. The parameters used are presented in Table 2. The cover design for the evaporation ponds in the 1994 reclamation plan is shown on Figure 1.

The anticipated radon flux from the reclaimed evaporation ponds as originally designed was determined to be 1.7 pCi/m^2/sec. This is much less than the regulatory limit of 20 pCi/m^2/sec. Therefore, the assumed cover configuration in the 1994 reclamation plan can be used for final reclamation of the evaporation ponds. We are therefore requesting that approval of reclamation of the evaporation ponds in accordance with the 1994 plan be granted. The results of the radon calculations are presented in Attachment 1.

The pond reclamation will occur as soon as practical after permission to discontinue the groundwater CAP has been obtained and the water in the evaporation pond has evaporated. It is anticipated that this could occur as soon as September or October 2006. We are therefore asking you to review and approve this request as soon as possible so we can begin the contracting process.

Should you have any questions regarding the data contained in this report, please contact me or our technical consultant, Lou Miller (970-223-9600) at your convenience.

Sincerely,

L. J. Corte by L.M.

Lawrence J. Corte, President
Western Nuclear, Inc.

cc: B.K. DeWaard, WNI – Wyoming
L.L. Miller, MFG, Inc.
H.W. Shaver, Esq.
WNI Central File – Golden

Table 1 Radium and Thorium Analysis from CAP Ponds

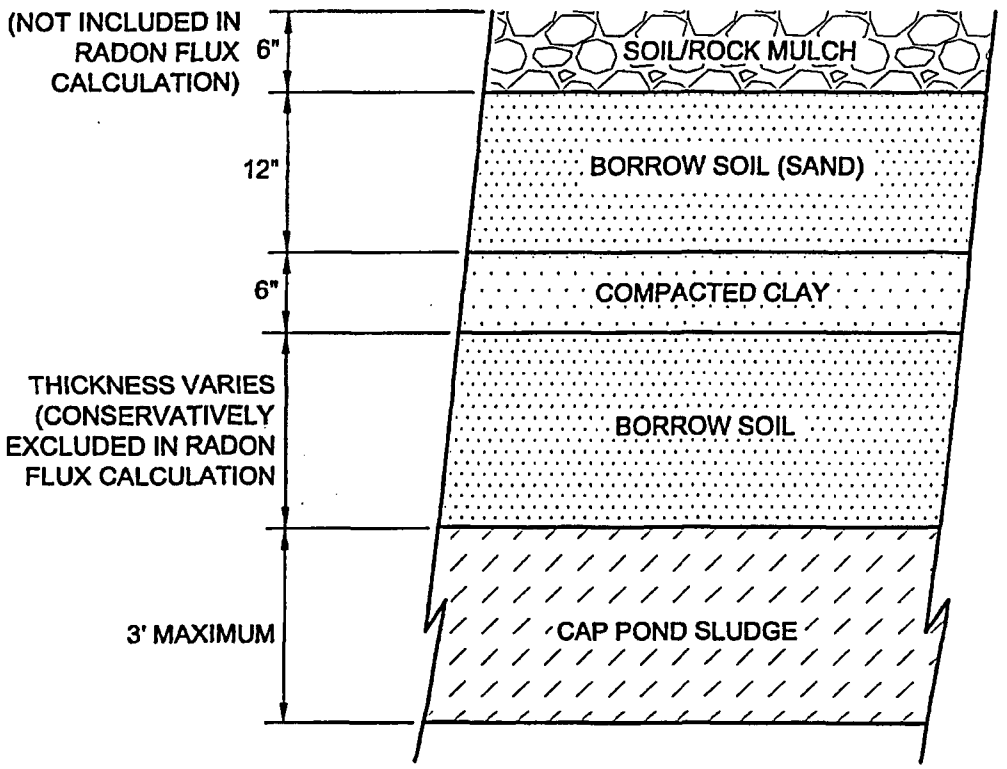
Year	Location	Th-230 (pCi/g)	Ra-226 (pCi/g)
1999	West Pond Composite	0.47	0.41
	East Pond Composite	0.18	0.31
2000	West Pond Composite	0.41	0.53
	East Pond Composite	0.28	0.41
2004	West Pond Composite	<0.2	<0.1
	East Pond Composite	<0.2	<0.1
2005	West Pond Composite	<0.1	3
	East Pond Composite	0.1	3

Table 2 Radon Flux Model Parameters

	Sludge[2]	Clay[1]	Cover Sand[1]
Porosity	0.4	0.44	0.4
Mass density (g/cm^3)	1.55	1.56	1.55
Radium Concentration (pCi/g)	3	0	1.1
Emanation Coefficient	Default	--	Default
Long-term Moisture Content (%)	1.5	16.9	2.0
Thickness (cm)	91	15.24	30.48

[1] Clay and sand parameters are the same as those used in the 1994 design. Assume clay compacted to 90 percent Proctor density.

[2] Sludge parameters are the same as tailings, except radium concentration – used maximum from Table 1 – and thickness. Maximum thickness of sludge is approximately three feet, or 91 cm.



MFG, Inc. *consulting scientists and engineers*	FIGURE 1 CAP POND COVER CONFIGURATION	Date: JULY 2006 Project: 180888 File: CAP-FIG-001.DWG

ATTACHMENT 1

RADON FLUX CALCULATION

-----*****! RADON !*****-----

Version 1.2 - MAY 22, 1989 - G.F. Birchard tel.# (301)492-7000
U.S. Nuclear Regulatory Commission Office of Research

RADON FLUX, CONCENTRATION AND TAILINGS COVER THICKNESS ARE CALCULATED FOR MULTIPLE LAYERS

OUTPUT FILE: SplitRock

DESCRIPTION: Split Rock Water Storage Ponds

CONSTANTS

RADON DECAY CONSTANT	.0000021	s^-1
RADON WATER/AIR PARTITION COEFFICIENT	.26	
DEFAULT SPECIFIC GRAVITY OF COVER & TAILINGS		2.65

GENERAL INPUT PARAMETERS

LAYERS OF COVER AND TAILINGS	3	
DEFAULT RADON FLUX LIMIT	20	pCi m^-2 s^-1
LAYER THICKNESS NOT OPTIMIZED		
DEFAULT SURFACE RADON CONCENTRATION	0	pCi l^-1
SURFACE FLUX PRECISION	.001	pCi m^-2 s^-1

LAYER INPUT PARAMETERS

LAYER 1 Sludge

THICKNESS	91	cm
DEFAULT POROSITY	.4	
MEASURED MASS DENSITY	1.55	g cm^-3
MEASURED RADIUM ACTIVITY	3	pCi/g^-1
DEFAULT LAYER EMANATION COEFFICIENT	.35	
CALCULATED SOURCE TERM CONCENTRATION	8.544D-06	pCi cm^-3 s^-1
WEIGHT % MOISTURE	1.5	%
MOISTURE SATURATION FRACTION	.058	
CALCULATED DIFFUSION COEFFICIENT	5.758D-02	cm^2 s^-1

LAYER 2 Clay

THICKNESS	15	cm
POROSITY	.44	
MEASURED MASS DENSITY	1.56	g cm^-3
MEASURED RADIUM ACTIVITY	0	pCi/g^-1
DEFAULT LAYER EMANATION COEFFICIENT	.35	
CALCULATED SOURCE TERM CONCENTRATION	0.000D+00	pCi cm^-3 s^-1
WEIGHT % MOISTURE	16.9	%
MOISTURE SATURATION FRACTION	.599	
CALCULATED DIFFUSION COEFFICIENT	7.440D-03	cm^2 s^-1

LAYER 3 Borrow Soil

THICKNESS	30	cm
DEFAULT POROSITY	.4	
MEASURED MASS DENSITY	1.55	g cm^-3
MEASURED RADIUM ACTIVITY	1.1	pCi/g^-1
DEFAULT LAYER EMANATION COEFFICIENT	.35	
CALCULATED SOURCE TERM CONCENTRATION	3.133D-06	pCi cm^-3 s^-1
WEIGHT % MOISTURE	2	%
MOISTURE SATURATION FRACTION	.077	
CALCULATED DIFFUSION COEFFICIENT	5.395D-02	cm^2 s^-1

DATA SENT TO THE FILE `RNDATA' ON DRIVE A:

N	F01	CN1	ICOST	CRITJ	ACC
3	-1.000D+00	0.000D+00	0	2.000D+01	1.000D-03

LAYER	DX	D	P	Q	XMS	RHO
1	9.100D+01	5.758D-02	4.000D-01	8.544D-06	5.812D-02	1.550
2	1.500D+01	7.440D-03	4.400D-01	0.000D+00	5.992D-01	1.560
3	3.000D+01	5.395D-02	4.000D-01	3.133D-06	7.750D-02	1.550

BARE SOURCE FLUX FROM LAYER 1: 2.327D+00 pCi m^-2 s^-1

RESULTS OF THE RADON DIFFUSION CALCULATIONS

LAYER	THICKNESS (cm)	EXIT FLUX (pCi m^-2 s^-1)	EXIT CONC. (pCi l^-1)
1	9.100D+01	1.419D+00	1.304D+03
2	1.500D+01	~~1.359D+00~~	1.254D+02
3	3.000D+01	1.707D+00	0.000D+00

Received 10/30/2006 AIT

xc: L Corte
P Dewhard
A Shaller
A Thompson
L Miller

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 26, 2006

Mr. Lawrence J. Corte, President
Western Nuclear, Inc.
2801 Youngfield, Suite 340
Golden, CO 80401

SUBJECT: LICENSE AMENDMENT 100, APPROVING THE GROUND WATER CORRECTIVE ACTION PONDS RECLAMATION PLAN AND UPDATED SURETY, WESTERN NUCLEAR, INC., JEFFREY CITY, WYOMING, SUA-56 (TAC LU0139)

Dear Mr Corte:

By letter dated July 25, 2006, Western Nuclear, Inc. (WNI) submitted a reclamation plan for the ground water Corrective Action Program ponds (CAP ponds) to the U.S. Nuclear Regulatory Commission (NRC) staff, as required by License Condition (LC) 74.G of Source Materials License SUA-56. LC 74.G currently states that WNI must confirm that the CAP ponds cover design approved on March 25, 1994, (Amendment 71, LC 27.B) is still acceptable and must obtain NRC approval prior to placing the cover. NRC staff has reviewed the cover design and radon calculations provided by WNI in its 2006 CAP ponds reclamation plan and approves the design, as submitted. NRC staff's technical review is documented in the enclosed Technical Evaluation Report (TER). License Amendment No. 100, enclosed herein, has been revised to reflect the July 26, 2006, submittal, as the approved CAP ponds design. This licensing action does not require any environmental review under 10 CFR Part 51 because NRC staff previously reviewed the technical and environmental aspects of this design and approved it on March 25, 1994.

By letter dated March 28, 2006, WNI submitted an updated corporate guarantee for its surety instrument to NRC staff. NRC staff has reviewed and approves this corporate guarantee. Therefore, NRC staff is amending LC 29, as part of License Amendment No. 100, to include a reference to this latest surety document. This licensing action is categorically excluded under 10 CFR 51.22(c)(11), which precludes the need for further environmental review of license amendments that are organizational or procedural in nature, provided that there is no significant increase in amounts or types of effluents or occupational radiation exposure, no significant construction impact, and no significant increase in radiological accident potential.

In addition to the surety and CAP ponds amendments, Source Materials License SUA-56 is being amended to reflect organizational changes that became effective on October 1, 2006. LC 76 has been amended to state that all correspondence shall be sent to the Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, Mail Stop T-7E18, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

If you have any questions regarding this licensing action, please contact Stephen J. Cohen, Project Manager, at 301-415-7182, or via e-mail, to: sjc7@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at: http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

Keith I. McConnell, Deputy Director
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 040-01162
License No.: SUA-56

Enclosures:
1. Technical Evaluation Report
2. License Amendment No.100

cc: M. Thiesse, Wyoming DEQ
J. Wagner, Wyoming DEQ

TECHNICAL EVALUATION REPORT
GROUND WATER EVAPORATION PONDS RADON BARRIER
WESTERN NUCLEAR, INC., SPLIT ROCK SITE
JEFFREY CITY, FREMONT COUNTY, WYOMING

DOCKET NO.:	40-1162
LICENSE NO.:	SUA-56
DATE:	October 3, 2006
FACILITY:	Split Rock Site, Jeffrey City, Wyoming
TECHNICAL REVIEWERS:	Stephen J. Cohen, Robert G. Lukes
PROJECT MANAGER:	Stephen J. Cohen

1.0 SUMMARY AND CONCLUSIONS

By letter dated July 25, 2006, Western Nuclear, Inc. (WNI) submitted to the U.S. Nuclear Regulatory Commission (NRC) staff confirmation that the radon barrier for the ground water Corrective Action Program evaporation ponds (CAP ponds) cited in the License Condition 74.G is sufficient to reduce radon emissions to below 20 pCi/m^2/sec, as required by 10 CFR 40, Appendix A, (WNI, 2006). NRC staff reviewed WNI's submittal, including barrier design and radon emission calculations, and determined that the radon barrier, as proposed, is sufficient to meet the radon emissions standards. Therefore, NRC staff approves the radon barrier for the CAP ponds.

2.0 BACKGROUND

In a memorandum to Docket File No. 40-1162 dated March 25, 1994, NRC staff approved a license amendment for the Reclamation and Closure Plan for the Split Rock uranium mill tailings site, Jeffrey City, Wyoming (NRC, 1994). Included in this memorandum were assessments of the cover design, resistance to erosion, structural integrity, liquefaction, settlement, hydrologic assessments, filter design, rock durability and gradation, radon attenuation, construction specifications, and quality control. In this memorandum, NRC staff specifically stated that the CAP ponds radon barrier design cannot be finalized until the ponds are dismantled and the source term is verified. This verification is required to determine the appropriate radon barrier thickness.

By letter dated July 25, 2006, WNI submitted a request for CAP ponds cover approval that included a verification of the source term. This submittal included sample analytical data, radon emissions computations, and a cover design drawing. This document formed the basis for NRC staff's review.

3.0 TECHNICAL EVALUATION

WNI provided information regarding the radium-226 and thorium-230 concentrations in the sludge remaining in the CAP ponds (WNI, 2006). These samples were collected at various times between 1999 and 2005. A review of the data indicates that radium-226 concentrations range from <0.1 to 3.0 pCi/g, and thorium concentrations ranged from <0.1 to 0.47 pCi/g.

The calculated average radon emission from the sludge alone is 2.37 picocuries per meter per second (pCi/m/s). This emission rate is considerably below the 20 pCi/m/s limit specified in 10 CFR 40, Appendix A, Criterion 6. Although radon emission standards are met without a cover, a minimal cover is still required to isolate the waste from the environment, as required in 10 CFR 40, Appendix A, Criterion. Therefore, WNI is proposing a clay cover with erosion protection that consists of the following layers:

To address these issues, WNI provided a design that includes the following layers, from top to bottom:

- soil/rock mulch - 15 centimeters (cm) or 6 inches (in)
- borrow soil (sand) - 30 cm (12 in)
- compacted clay - 15 cm (6 in)
- borrow soil - thickness varies

According to the computations provided by WNI, radon emissions from the sludge, clay, and soil are 1.7 pCi/m/s. NRC staff independently estimated radon emissions using the RADON code, the results of which were similar to WNI's (see Attachment A). Therefore, NRC staff finds that the CAP ponds cover, as designed, meets the standards in 10 CFR 40, Appendix A, Criteria 1 and 6.

4.0 PROPOSED LICENSE AMENDMENTS

29. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination of the mill and mill site, for reclamation of any tailings or waste disposal areas, ground-water restoration, as warranted, and the long-term surveillance fee. Within three months of NRC approval of a revised reclamation/decommissioning plan, the licensee shall submit, for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs in the newly approved plan exceed the amount covered in the existing financial surety. The revised surety shall then be in effect within three months of written NRC approval.

    Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to the NRC at least three months prior to the anniversary date which is designated as December 30 of each year. If the NRC has not approved a proposed revision to the surety coverage 30 days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing surety arrangement for one year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency fee, changes

in engineering plans, activities performed and any other conditions affecting estimated costs for site closure. The licensee shall also provide the NRC with all surety related correspondence submitted to the State, a copy of the State's surety review, and the final approved surety arrangement. The licensee shall also ensure that the surety, where authorized to be held by the State, expressly identifies the NRC portion of the surety. The basis for the cost estimate is the NRC approved reclamation/decommissioning plan or NRC approved revisions to the plan. The previously provided guidance entitled "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates" outlines the minimum considerations used by the NRC in the review of site closure cost estimates. Reclamation/decommissioning plans and annual updates should follow this outline.

Western Nuclear's currently approved surety, a Parent Company Guarantee, issued by Phelps Dodge Corporation on March 28, 2006, committing Phelps Dodge Corporation, among other things, to take certain actions in the event the licensee fails to fulfill its decommissioning or financial assurance obligations, shall be continuously maintained in accordance with the recitals of the Parent Company Guarantee in an amount no less than $12,279,018 for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9 and 10, until a replacement is authorized by the NRC.

[Applicable Amendments: 24, 45, 53, 64, 66, 70, 72, 76, 85P, 93, 94, 95, 97, 100]

74. The licensee shall implement a compliance monitoring program containing the following:

G. The licensee shall reclaim the groundwater corrective action evaporation ponds in accordance with its February 7, 1994, report titled, "Western Nuclear, Inc. Split Rock Mill, Addendum A (February 7, 1994) to Revision 5 to the June 30, 1987, Uranium Tailings Reclamation Plan." The Winter Storage Ponds radon attenuation barrier shall be constructed according to the design in the confirmed reclamation plan dated July 25, 2006.

[Applicable Amendment: 92, 99, 100]

76. Notification to NRC under 10 CFR 20.2202, 10 CFR 40.60, and specific license conditions should be made as follows:

Required written notice to NRC under this license should be given to: Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, Mail Stop T-7E18, U.S. Nuclear Regulatory Commission, Washington, DC, 20555.

[Applicable Amendment: 73, 95, 100]

5.0 REFERENCES

U.S. Nuclear Regulatory Commission. 1994. Memorandum for Docket No. 40-1162, Proposed Amendment to Source Materials License SUA-56 to Revise the Approved Disposal Area Reclamation and Closure Plan for Western Nuclear, Inc.'s Split Rock Mill near Jeffrey City, Wyoming. March 25, 1994 [Accession No. 9404280059]

Western Nuclear, Inc. 2006. Reclamation of Ground Water Corrective Action Ponds - License Condition 74E, License SUA-56. July 25, 2006 [ADAMS Accession No. ML062080442].

ATTACHMENT A
NRC STAFF RADON CALCULATIONS

Reference

RG-3.64

Radon cover caluclation

---------- Input Parameters ----------
Number of Layers: 3
Radon Flux into Layer 1: 0 pCi/m2s
Surface Radon Concentration: 0 pCi/L
Bare Source Flux (Jo) from Layer 1: 2.958 pCi/m2s
Specific Bare Source Flux from Layer 1: 0.986 pCi/m2s per pCi_Ra-226/g

Layer No.	Thickness [m]	Ra-226 [pCi/g]	Emanat Fract	Porosity	Moisture [dry wt_%]	Diff Coeff [m2/s]
1	0.91	3	.35	0.4	1.5	5.750E-6
2	0.15	0	.35	0.44	16.9	744.0E-9
3	0.3	1.1	.35	0.4	2	5.395E-6

-------- Results of Radon Diffusion Calculation --------

Layer No.	Thickness [m]	Exit Flux [pCi/m2s]	Exit Conc [pCi/L]
1	0.91	1.823	1.632E3
2	0.15	1.744	161.7E0
3	0.3	**2.103**	0E0

Total cover radon retention: 28.92%

Regulatory analysis

2.103 pCi/m^2-s is much less then the regulatory limit of 20 pCi/m^2-s.

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and the applicable parts of Title 10, Code of Federal Regulations, Chapter I, Parts 19, 20, 30, 31, 32, 33, 34, 35, 36, 39, 40, 51, 70, and 71, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Western Nuclear, Inc.	3. License Number SUA-56, Amendment 100
2. 2801 Youngfield Street, Suite 340 Golden, Colorado 80401 [Applicable Amendment: 34, 52, 92, 96]	4. Expiration Date Until terminated (Applicable Amendments: 31, 32, 41) 5. Docket No. 40-1162 Reference No.

6. Byproduct Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum amount that Licensee May Possess at Any One Time Under This License
Natural Uranium	Any	Unlimited

9. The licensee is hereby authorized to possess byproduct material in the form of uranium waste tailings generated by the licensee's past milling operations authorized under SUA-56.

[Applicable Amendments: 32, 46, 58]

10. Authorized Places of Use: The licensee's uranium milling facilities located approximately two miles north of Jeffrey City, Wyoming.

[Applicable Amendments 46, 50, 60, 82]

11. DELETED by Amendment No. 49.

12. DELETED by Amendment No. 49.

13. DELETED by Amendment No. 49.

14. DELETED by Amendment No. 49.

15. DELETED by Amendment No. 49.

16. DELETED by Amendment No. 54.

17. DELETED by Amendment No. 33.

18. DELETED by Amendment No. 49.

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19. DELETED by Amendment No. 56.

20. DELETED by Amendment No. 49.

21. DELETED by Amendment No. 56.

22. DELETED by Amendment No. 54.

23. DELETED by Amendment No. 33.

24. The licensee shall collect surface water samples from the Sweetwater River at the following five locations: 1) upstream of the proposed long-term care boundary near the western boundary of Section 3, township 29 N and range 92 W; 2) in a sharp meander directly upstream of well JJ-1R (SR-A); 3) approximately 3,000 river feet downstream of SR-A in riffle section (SR-B); 4) in tight meander downstream of Site, approximately 1,600 river feet upstream of diversion dam, in Section 31, township 30 N and range 91 W; 5) downstream of proposed long-term care boundary in Section 5, township 29 N and range 91 W. Samples shall be collected at the same sampling frequency and for the same constituents [excluding static water level] as required under LC No. 74.A for the first 12 wells. The data obtained from this monitoring program shall be reported semiannually to the NRC in accordance with requirements of 10 CFR 40.65.

    [Applicable Amendments: 26, 28, 30, 44, 49, 56A, 84, 89, 98]

25. The licensee shall conduct a quality assurance program as contained in their submittal dated March 25, 1981. In addition, the licensee shall be required to document the results and recommendations of each annual audit of the environmental monitoring program. Any requested changes to the "Environmental Monitoring Manual" submitted on March 23, 1981, as revised by letters dated March 27, 1991, January 28 and March 11, 1992, shall be in the form of a license amendment.

    [Applicable Amendments: 49, 63]

26. DELETED by Amendment No. 49.

27. DELETED by Amendment No. 92.

28. DELETED by Amendment No. 87.

29. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination of the mill and mill site, for reclamation of any tailings or waste disposal areas, ground-water restoration as warranted and the long-term surveillance fee. Within three months of NRC approval of a revised reclamation/decommissioning plan, the licensee shall

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submit, for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs in the newly approved plan exceed the amount covered in the existing financial surety. The revised surety shall then be in effect within three months of written NRC approval.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to the NRC at least three months prior to the anniversary date which is designated as December 30 of each year. If the NRC has not approved a proposed revision to the surety coverage 30 days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing surety arrangement for one year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency fee, changes in engineering plans, activities performed and any other conditions affecting estimated costs for site closure. The licensee shall also provide the NRC with all surety related correspondence submitted to the State, a copy of the State's surety review, and the final approved surety arrangement. The licensee shall also ensure that the surety, where authorized to be held by the State, expressly identifies the NRC portion of the surety. The basis for the cost estimate is the NRC approved reclamation/decommissioning plan or NRC approved revisions to the plan. The previously provided guidance entitled "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates" outlines the minimum considerations used by the NRC in the review of site closure cost estimates. Reclamation/decommissioning plans and annual updates should follow this outline.

Western Nuclear's currently approved surety, a Parent Company Guarantee, issued by Phelps Dodge Corporation on March 28, 2006, committing Phelps Dodge Corporation, among other things, to take certain actions in the event the licensee fails to fulfill its decommissioning or financial assurance obligations, shall be continuously maintained in accordance with the recitals of the Parent Company Guarantee in an amount no less than $12,279,018 for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9 and 10, until a replacement is authorized by the NRC.

[Applicable Amendments: 24, 45, 53, 64, 66, 70, 72, 76, 85P, 93, 94, 95, 97, 100]

30. DELETED by Amendment No. 69.

31. DELETED by Amendment No. 46.

32. A. DELETED by Amendment No. 56.

    B. DELETED by Amendment No. 50.

33. DELETED By Amendment No. 88

34. In order to ensure that no disturbance of cultural resources occurs in the future, the licensee shall have an archeological and historical artifact survey of areas of its property, not previously surveyed, performed prior to their disturbance, including borrow areas to be used for reclamation cover. These surveys must be submitted to the NRC and no such disturbance shall occur until the licensee has received authorization from the NRC to proceed.

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The licensee is authorized to excavate material from the proposed reclamation borrow areas as designated in the licensee's approved reclamation plan, provided that protection of the cultural resources is managed in accordance with statements and representation contained in the licensee's letter dated March 30, 1992.

[Applicable Amendment: 71]

35. Before engaging in any project-related activity not evaluated by the NRC, the licensee shall prepare and record an environmental evaluation of such activity. When the evaluation indicates such activity may result in a significant adverse environmental impact that was not evaluated, or an impact greater than that evaluated in the environmental statement, the licensee shall provide a written evaluation of such activity and obtain prior approval of the NRC for the activity.

36. DELETED by Amendment No. 49.

37. The licensee is hereby exempted from the requirements of Section 20.203(e)(2) of 10 CFR Part 20, provided that all entrances to the restricted area are conspicuously posted in accordance with Section 20.203(e)(2) and with words, "Any area within this facility may contain radioactive material."

[Applicable Amendment: 49]

38. Mill tailings other than samples for research shall not be transferred from the site without specific prior approval of the NRC obtained through application for amendment of this license. The licensee shall maintain a permanent record of all transfers made under the provisions of this condition.

39. DELETED by Amendment No. 50.

40. DELETED by Amendment No. 49.

41. Release of equipment or packages from the restricted area shall be in accordance with the previously provided guidance entitled, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials," dated September, 1984.

42. The Radiation Safety Officer (RSO) shall perform an annual review of the radiation protection program for content and implementation. A copy of the annual eview report shall be retained at the site and shall be available for NRC review.

[Applicable Amendments: 49, 87]

43. The results of sampling, analysis surveys and monitoring, the calibration of equipment, reports on inspections, and the additional conditions to this license, as well as any subsequent reviews,

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investigations, and corrective actions, shall be documented. Unless otherwise specified in NRC regulations, all such documentation shall be maintained for a period of at least 5 years.

[Applicable Amendment: 49, 87]

44. Written procedures shall be established for site reclamation and monitoring activities to include personnel and environmental monitoring, and survey instrument calibrations. These procedures shall be reviewed and approved in writing by the Radiation Safety Officer (RSO) before implementation and whenever a change in procedure is proposed to ensure that proper radiation protection principles are being applied. In addition, the RSO shall perform a documented review of all existing site procedures at least annually. An up-to-date copy of each written procedure shall be kept at the site facility.

[Applicable Amendments: 49, 56, 87]

45. DELETED by Amendment No. 49.

46. DELETED by Amendment No. 87.

47. DELETED by Amendment No. 49.

48. The Radiation Safety Office (RSO), who is responsible for the radiation safety aspects of the decommissioning , shall possess the minimum qualifications as specified in Section 2.4.1 of Regulatory Guide 8.31, "Information Relevant to Ensuring That Occupational Radiation Exposure at Uranium Mills Will Be As Low As Reasonably Achievable," until license termination.

[Applicable Amendments: 49, 50, 56, 87]

49. DELETED by Amendment No. 49.

50. DELETED by Amendment No. 49.

51. DELETED by Amendment No. 49.

52. DELETED by Amendment No. 49.

53. Radiation detection instruments shall be calibrated after repair and as recommended by the manufacturer or at intervals not to exceed six months, whichever is sooner.

54. DELETED by Amendment No. 49.

55. DELETED by Amendment No. 49.

56. DELETED by Amendment No. 49.

57. DELETED by Amendment No. 33.

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58. DELETED by Amendment No. 37.

59. DELETED by Amendment No. 49.

60. DELETED by Amendment No. 49.

61. DELETED by Amendment No. 49.

62. DELETED by Amendment No. 49.

63. DELETED by Amendment No. 56.

64. The licensee shall control grazing to the N and NNE of the tailings impoundment by maintaining cattle guards at each end of the rock outcrops along the north side of the restricted area fence, as indicated on map A, submitted by letter dated August 18, 1978 from G. Fletcher to J. Linehan.

65. DELETED by Amendment No. 49.

66. DELETED by Amendment No. 33.

67. DELETED by Amendment No. 33.

68. DELETED by Amendment No. 46.

69. DELETED by Amendment No. 46.

70. DELETED by Amendment No. 49.

71. DELETED by Amendment No. 49.

72. DELETED by Amendment No. 49.

73. DELETED by Amendment No. 54.

74. The licensee shall implement a compliance monitoring program containing the following:

A. Sample wells JJ-1R, WN-39B, WN-41B, WN-42A, SWAB-1, SWAB-2, SWAB-4, SWAB-12, SWAB-22, SWAB-29, SWAB-31, and SWAB-32 semi-annually for uranium and sulfate and annually for aluminum, ammonia, antimony, arsenic, beryllium, cadmium, chloride, fluoride, lead, manganese, molybdenum, nickel, nitrate, pH, radium-226 and-228, selenium, sulfate, thallium, thorium-230,TDS, and uranium. Sample wells 1, 4R, 5, and 21 semi-annually for aluminum, ammonia, antimony, arsenic, beryllium, cadmium, chloride, fluoride, lead, manganese, molybdenum, nickel, nitrate, pH, radium-226 and-228, selenium, sulfate, thallium, thorium-230, TDS, and uranium. In addition, water levels shall be collected at all of the above wells for every sampling event.

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B. Comply with the following ground-water protection standards at point of compliance Wells 4 and 21, with background being recognized in Well 15:

beryllium = 0.05 mg/L, cadmium = 0.01 mg/L, chromium = 0.05 mg/L, lead = 0.05 mg/L, nickel = 0.05 mg/L, selenium = 0.013 mg/L, and thorium-230 = 0.95 pCi/L.

C. Comply with the following alternate concentration limits in the northwest valley at point of compliance Well 4, with background being recognized in Well 15:

ammonia = 0.61 mg/L, manganese = 225 mg/L, molybdenum = 0.66 mg/L, nitrate = 317 mg/L, radium-226 and -228 = 7.2 pCi/L, and natural uranium = 4.8 mg/L.

Comply with the following alternate concentration limits in the southwest valley at point of compliance Well 21, with background being recognized in Well 15:

ammonia = 0.84 mg/L, manganese = 35 mg/L, molybdenum = 0.22 mg/L, nitrate = 70.7 mg/L, radium-226 and -228 = 19.9 pCi/L, and natural uranium = 3.4 mg/L.

[Applicable Amendments: 25, 27, 36, 39, 40, 44, 48, 51, 56, 58, 61, 62, 67, 69A, 79, 89, 98, 99]

D. Comply with the following ground water trigger levels at the point of exposure:

Trigger Levels for the Split Rock aquifer: ammonia = 0.5 mg/l, manganese = 0.73 mg/L, molybdenum = 0.18 mg/L, nitrate = 10 mg/L, radium-226 and -228 = 5.0 pCi/L, and natural uranium = 0.03 mg/L or 0.3 for SWAB-32.

Trigger Levels for floodplain aquifer: ammonia = 0.5 mg/L, manganese = 2.39 mg/L, molybdenum = 0.18 mg/L, nitrate = 10 mg/L, radium-226 and -228 = 5.0 pCi/L, and natural uranium = 0.03 mg/L.

E. Comply with the following surface water trigger levels at the point of exposure:

ammonia = 0.5 mg/L, manganese = 0.05 mg/L, molybdenum = 0.18 mg/L, nitrate = 10 mg/L, radium-226 and -228 = 5.0 pCi/L, and natural uranium = 0.03 mg/L.

F. The licensee shall submit by December 15 of each year, a review of the corrective action program and its effect on the aquifer.

[Applicable Amendments: 25, 27, 36, 39, 40, 44, 48, 51, 56, 58, 61, 62, 67, 69A, 79, 99]

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Amendment No. 100

G. The licensee shall reclaim the groundwater corrective action evaporation ponds in accordance with its February 7, 1994, report titled, "Western Nuclear, Inc. Split Rock Mill, Addendum A (February 7, 1994) to Revision 5 to the June 30, 1987, Uranium Tailings Reclamation Plan." The Winter Storage Ponds radon attenuation barrier shall be constructed according to the design in the confirmed reclamation plan dated July 25, 2006.

[Applicable Amendment: 92, 99, 100]

75. DELETED by Amendment No. 92.

76. Notification to NRC under 10 CFR 20.2202, 10 CFR 40.60, and specific license conditions should be made as follows:

Required written notice to NRC under this license should be given to: Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, Mail Stop T-7E18, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

[Applicable Amendment: 73, 95, 100]

FOR THE NUCLEAR REGULATORY COMMISSION

Date: 10/24/06

Keith I. McConnell, Deputy Director
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

APPENDIX B
RESULTS OF STANDARD PROCTOR MOISTURE/DENSITY TESTS

MOISTURE DENSITY ANALYSIS (PROCTOR)

INBERG - MILLER ENGINEERS

ASTM D698/D1557

CLIENT:	Western Nuclear, Inc.
PROJECT:	Pond Reclamation
JOB NO.:	12936RM
TEST DATE:	3-13-07
TESTED BY:	JPM
TEST METHOD:	D698
SAMPLE NO.:	1
SAMPLED BY:	JPM
SOURCE:	Stockpile Onsite
SAMPLE DESCRIPTION:	Cody Shale
DESCRIPTION CONT.:	

CALCULATIONS

PROCTOR DATA	
Wt. of Soil Sample	(A3) = A2 - A1
4" Mold Wet Density (PSF)	(A4) = A3 * 30
6" Mold Wet Density (PSF)	(A4) = A3 * 13.33
MOISTURE	
Wt. of Water	(B4) = B2 - B3
Wt. of Dry Soil	(B5) = B3 - B1
RESULTS	
Moisture Content	(C1) = (B4/B5) * 100
Dry Density	(C2) = A4/[1 + (B4/B5)]

A **PROCTOR DATA**

Trial Sample Wt. (lbs):	32.00	
Mold Size, Inches (4,6):	4	
No. of Lifts (3,5):	3	
Blows Per Lift (25, 56):	25	
Rock Cor. (NO=0,YES=1):	0	
OVERSIZE BULK S.G.:	#N/A	Note 1
OVERSIZE ABSORBTION (%):	#N/A	Note 1

ROCK DATA

Total Sample Wt. (lbs):	32.00	Note 1
+3/4" Sample Wt. (lbs):	0.0000	Note 1
-3/4" Sample Wt. (lbs):	32.0000	
PERCENT +3/4" ROCK:	0.00	
PERCENT -3/4" ROCK:	100.00	

Note

1. Not applicable for Base Proctor or for Non-Rock Corrected Proctors.

TRIAL INFO.

		TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6	TRIAL 7
	Tub No.:							
	Target % M.C.:							
	Water Added (ml):							
A1	Mold Wt. (lbs):	9.3670	9.3670	9.3670	9.3670	9.3670	9.3670	9.3670
A2	Mold + Soil Wt. (lbs):	13.4970	13.5630	13.4410	13.1705			
A3	SOIL WT. (LBS):	4.13	4.20	4.07	3.80			
A4	WET DENSITY (PCF):	123.90	125.88	122.22	114.11			

B **MOISTURE INFO.**

	Tare (Pan) No.:	utep	622	612	glm			
B1	Tare (Pan) Wt. (#):	32.2100	32.0000	32.6100	31.6400			
B2	Tare + Wet Soil Wt. (#):	670.6100	693.9100	658.3000	593.4700			
B3	Tare + Dry Soil Wt.(#):	548.5400	586.1800	574.8000	532.3700			
B4	WATER WT.(#):	122.0700	107.7300	83.5000	61.1000			
B5	SOIL WT.(#):	516.3300	554.1800	542.1900	500.7300			

C ***PRESS BUTTON TO CALCULATE BASE PROCTOR TEST RESULTS FIRST***

C1	PERCENT MOISTURE:	23.64	19.44	15.40	12.20	#N/A	#N/A	#N/A
C2	DRY DENSITY (PCF):	100.21	105.39	105.91	101.70	#N/A	#N/A	#N/A

D **ROCK COR. PROCTOR TEST RESULTS (ASTM D4718)**

ENTER DESIRED +3/4":	#N/A	BASE PROCTOR OPT. M.C.:	#N/A
OVERSIZE BULK S.G.:	#N/A	BASE PROCTOR MAX DRY DEN.:	#N/A
OVERSIZE ABSORPTION (%):	#N/A	ROCK CORR. OPT. M.C.(%):	#N/A
PERCENT -3/4":	#N/A	ROCK CORR. MAX. DRY DEN.:	#N/A

D1	PERCENT MOISTURE:							
D2	DRY DENSITY (PCF):							

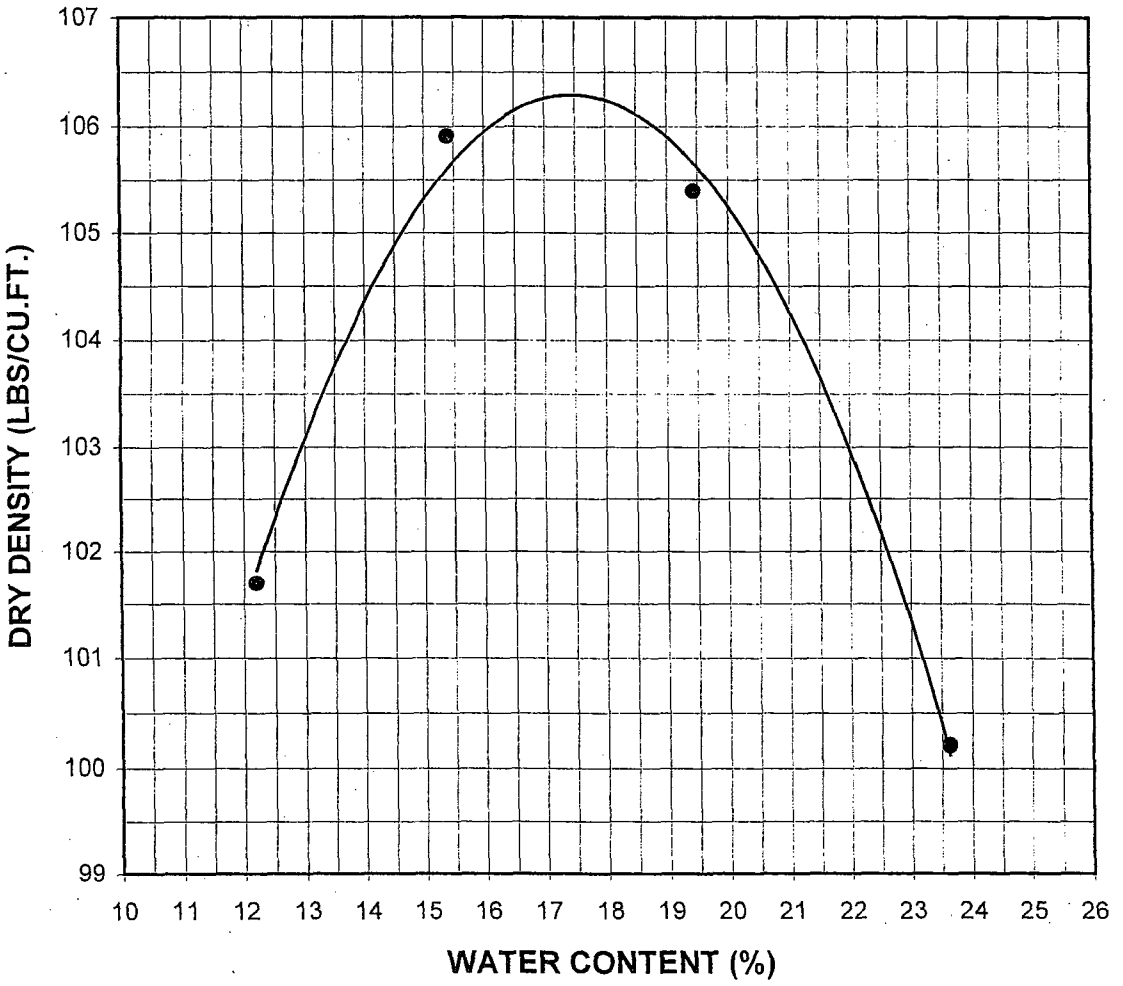
PRESS STANDARD GRAPH BUTTON TO CALCULATE BASE PROCTOR FIRST
THEN PRESS ROCK COR. BUTTON TO CALCULATE ROCK CORRECTED PROCTOR

MOISTURE-DENSITY ANALYSIS

INBERG-MILLER ENGINEERS

CLIENT: Western Nuclear, Inc.
PROJECT: Pond Reclamation
JOB NO. 12936RM
TEST DATE: 3-13-07
SOURCE: Stockpile Onsite
DESCRIPTION: Cody Shale

SAMPLE NO.: 1
SAMPLED BY: JPM
TESTED BY : JPM
TEST METHOD: D698



OPTIMUM WATER CONTENT (%): 17.5
MAXIMUM DRY DEN. (LBS/CU. FT): 106.3

MOISTURE DENSITY ANALYSIS (PROCTOR)

INBERG - MILLER ENGINEERS

ASTM D698/D1557

CLIENT:	Western Nuclear, Inc.
PROJECT:	Pond Reclamation
JOB NO.:	12936RM
TEST DATE:	3-13-07
TESTED BY:	JPM
TEST METHOD:	"A"
SAMPLE NO.:	2
SAMPLED BY:	JPM
SOURCE:	Stockpile Onsite
SAMPLE DESCRIPTION:	Cody Shale
DESCRIPTION CONT.:	

CALCULATIONS

PROCTOR DATA

Wt. of Soil Sample	(A3) = A2 - A1
4" Mold Wet Density (PSF)	(A4) = A3 * 30
6" Mold Wet Density (PSF)	(A4) = A3 * 13.33

MOISTURE

Wt. of Water	(B4) = B2 - B3
Wt. of Dry Soil	(B5) = B3 - B1

RESULTS

Moisture Content	(C1) = (B4/B5) * 100
Dry Density	(C2) = A4/[1 + (B4/B5)]

A **PROCTOR DATA**

Trial Sample Wt. (lbs):	34.40	
Mold Size, Inches (4,6):	4	
No. of Lifts (3,5):	3	
Blows Per Lift (25, 56):	25	
Rock Cor. (NO=0,YES=1):	0	
OVERSIZE BULK S.G.:	#N/A	Note 1
OVERSIZE ABSORBTION (%):	#N/A	Note 1

ROCK DATA

Total Sample Wt. (lbs):	34.40	Note 1
+3/4" Sample Wt. (lbs):	0.0000	Note 1
-3/4" Sample Wt. (lbs):	34.4000	
PERCENT +3/4" ROCK:	0.00	
PERCENT -3/4" ROCK:	100.00	

Note

1. Not applicable for Base Proctor or for Non-Rock Corrected Proctors.

TRIAL INFO.

		TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6	TRIAL 7
	Tub No.:							
	Target % M.C.:							
	Water Added (ml):							
A1	Mold Wt. (lbs):	9.3670	9.3670	9.3670	9.3670	9.3670	9.3670	9.3670
A2	Mold + Soil Wt. (lbs):	13.5165	13.4095	13.1990	13.5025			
A3	SOIL WT. (LBS):	4.15	4.04	3.83	4.14			
A4	WET DENSITY (PCF):	124.49	121.28	114.96	124.07			

B **MOISTURE INFO.**

	Tare (Pan) No.:	60	615	616	jch			
B1	Tare (Pan) Wt. (#):	32.2600	32.2000	31.9500	32.5800			
B2	Tare + Wet Soil Wt. (#):	592.2600	678.6400	567.4400	638.5200			
B3	Tare + Dry Soil Wt.(#):	496.3800	588.1400	503.3600	544.7800			
B4	WATER WT.(#):	95.8800	90.5000	64.0800	93.7400			
B5	SOIL WT.(#):	464.1200	555.9400	471.4100	512.2000			

C ***PRESS BUTTON TO CALCULATE BASE PROCTOR TEST RESULTS FIRST***

C1	PERCENT MOISTURE:	20.66	16.28	13.59	18.30	#N/A	#N/A	#N/A
C2	DRY DENSITY (PCF):	103.17	104.30	101.20	104.87	#N/A	#N/A	#N/A

D **ROCK COR. PROCTOR TEST RESULTS (ASTM D4718)**

ENTER DESIRED +3/4":	#N/A	BASE PROCTOR OPT. M.C.:	#N/A
OVERSIZE BULK S.G.:	#N/A	BASE PROCTOR MAX DRY DEN.:	#N/A
OVERSIZE ABSORPTION (%):	#N/A	ROCK CORR. OPT. M.C.(%):	#N/A
PERCENT -3/4":	#N/A	ROCK CORR. MAX. DRY DEN.:	#N/A

D1	PERCENT MOISTURE:							
D2	DRY DENSITY (PCF):							

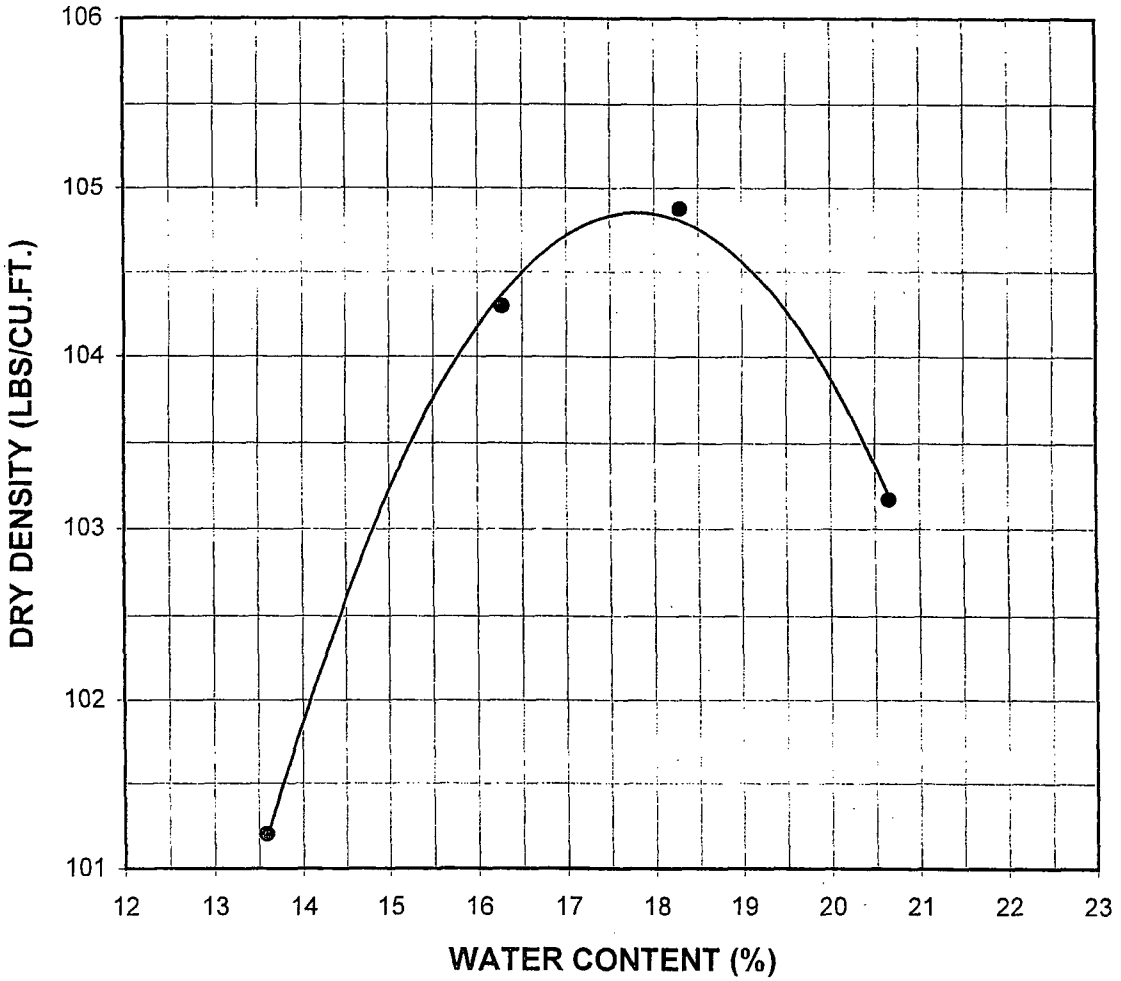
PRESS STANDARD GRAPH BUTTON TO CALCULATE BASE PROCTOR FIRST
THEN PRESS ROCK COR. BUTTON TO CALCULATE ROCK CORRECTED PROCTOR

MOISTURE-DENSITY ANALYSIS

INBERG-MILLER ENGINEERS

CLIENT: Western Nuclear, Inc.
PROJECT: Pond Reclamation
JOB NO. 12936RM
TEST DATE: 3-13-07
SOURCE: Stockpile Onsite
DESCRIPTION: Cody Shale

SAMPLE NO.: 2
SAMPLED BY: JPM
TESTED BY : JPM
TEST METHOD: "A"



OPTIMUM WATER CONTENT (%): 17.8
MAXIMUM DRY DEN. (LBS/CU. FT): 104.8

APPENDIX C
RESULTS OF FIELD MOISTURE/DENSITY TESTS

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

FIELD REPORT OF IN-PLACE DENSITY OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (ASTM D2922)

xx 124 E. Main Street, Riverton, WY 82501, (307) 856-8136 (ph), (307) 856-3851 (fax)
☐ 1120 E. "C" Street, Casper, WY 82601, (307) 577-0806 (ph), (307) 472-4402 (fax)
☐ 350 Parsley Boulevard, Cheyenne, WY 82007, (307) 635-6827 (ph), (307) 635-2713 (fax)
☐ 428 Alan Road, Powell, WY 82435, (307) 754-7170 (ph), (307) 754-7088 (fax)
☐ 520 Wilkes, Suite 13, Green River, WY 82935, (307) 875-4394 (ph), (307) 875-4395 (fax)

Client: Western Nuclear
Address: PO 630
City, State, Zip: Jeffrey City WY 82310

Project No.: 12936RM
Project Name: Pond Reclamation
Project Location: Jeffrey City, Wy.

Date Reported: 4/5/07
Test Date: 3-16-07
Technician: JPM

Test Instrument Data:

Manufacturer: Troxler
Model No.: 3411B
Serial No.: 9470
Standard Density Count: 1897
Standard Moisture Count: 577

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-5380, E-6230	@ grade	6"	126.7	106.1	19.5	1	100
	moisture corellation; 18.7%							
2	N-5360, E-6270	"	6"	126.4	107.0	18.2	1	101
	moisture corellation; 19.1%							
3	N-5400, E-6320	"	6"	128.7	110.2	16.9	1	104
	moisture correlation; 17.2%							
4	N-5610, E-6530	"	6"	128.8	109.2	17.9	1	103
	sandcone corellation; 17.5, 108.6							
5	N-5740, E-6670	"	6"	124.1	105.9	17.2	1	100
	moisture corelation; 17.0%							
6	N-5420, E-6510	"	6"	126.2	106.9	18.0	1	101
	moisture correlation; 18.6%							
7	N-5680, E-6720	"	6"	124.2	104.1	19.3	1	98
	moisture correlation; 19.1%							
8	N-5610, E-6760	"	6"	123.8	104.3	18.7	1	98
	moisture corellation;							

Field Test Results Provided To _____ Project Manager [signature] Page 1 of 1

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

FIELD REPORT OF IN-PLACE DENSITY OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (ASTM D2922)

xx 124 E. Main Street, Riverton, WY 82501, (307) 856-8136 (ph), (307) 856-3851 (fax)
☐ 1120 E. "C" Street, Casper, WY 82601, (307) 577-0806 (ph), (307) 472-4402 (fax)
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☐ 520 Wilkes, Suite 13, Green River, WY 82935, (307) 875-4394 (ph), (307) 875-4395 (fax)

Client Western Nuclear
Address PO 630
City, State, Zip Jeffrey City WY 82310

Project No. 12936RM
Project Name Pond Reclamation
Project Location Jeffrey City, Wy.

Date Reported 4/5/07
Test Date 3-20-07
Technician JPM

Test Instrument Data:

Manufacturer Troxler
Standard Density Count 1880
Model No. 3411B
Standard Moisture Count 561
Serial No. 9470

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-5380, E-6600 moisture correlation: 17.3	@ grade	6"	124.2	105.8	17.4	1	100
10	N-5370, E-6630 moisture correlation: 17.3	"	6"	125.3	106.3	17.9	1	100
11	N-5430, E-6720	"	6"	123.9	104.2	18.9	1	98
12	N-5570, E-6840	"	6"	122.4	102.9	18.9	1	97
13	N-5540, E-6840	"	6"	125.6	104.8	19.8	1	99
14	N-5590, E-6970 sandcone cor.; 17.8, 101.9	"	6"	122.8	103.7	18.4	1	98

Field Test Results Provided To _____ Project Manager [signature] Page 1 of 1

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

FIELD REPORT OF IN-PLACE DENSITY OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (ASTM D2922)

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☐ 520 Wilkes, Suite 13, Green River, WY 82935, (307) 875-4394 (ph), (307) 875-4395 (fax)

Client Western Nuclear
Address PO 630
City, State, Zip Jeffrey City WY 82310

Project No. 12936RM
Project Name Pond Reclamation
Project Location Jeffrey City, Wy.

Date Reported 4/5/07
Test Date 3-22-07
Technician JPM

Test Instrument Data:

Manufacturer Troxler
Model No. 3411B
Serial No. 9470
Standard Density Count _____
Standard Moisture Count _____

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-5210, E-6570	@ grade	6"	128.4	106.9	20.1 ~~18.5~~	1	100
16	N-5190, E-6580	"	6"	124.2	104.8	18.5	2	100
17	N-5170, E-6600	"	6"	123.2	103.6	18.9	2	99

Field Test Results Provided To _____ Project Manager [signature] Page 1 of 1

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

FIELD REPORT OF IN-PLACE DENSITY OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (ASTM D2922)

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☐ 520 Wilkes, Suite 13, Green River, WY 82935, (307) 875-4394 (ph), (307) 875-4395 (fax)

Client Western Nuclear
Address PO 630
City, State, Zip Jeffrey City WY 82310

Project No. 12936RM
Project Name Pond Reclamation
Project Location Jeffrey City, Wy.

Date Reported 4/5/07
Test Date 3-22-07
Technician JPM

Test Instrument Data:

Manufacturer Troxler
Model No. 3411B
Serial No. 9470
Standard Density Count 1889
Standard Moisture Count 564

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-5120, E-6700	@ grade	6"	124.2	105.9	17.3	2	101
19	N-5240, E-6890	"	6"	122.9	104.7	17.4	2	100
20	N-5330, E-7000	"	6"	122.4	103.8	17.9	2	99

Field Test Results Provided To _____ Project Manager [signature] Page 1 of 1

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

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Client Western Nuclear
Address PO 630
City, State, Zip Jeffrey City WY 82310

Project No. 12936RM
Project Name Pond Reclamation
Project Location Jeffrey City, Wy.

Date Reported 4/5/07
Test Date 3-27-07
Technician JAM

Test Instrument Data:

Manufacturer Troxler
Model No. 3411B
Serial No. 9470
Standard Density Count 1889
Standard Moisture Count 575

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-5000, E-6470	@ grade	6"	123.4	104.0	18.6	2	99
22	N-5100, 7030-E	"	6"	121.6	102.7	18.4	2	98

Field Test Results Provided To _____ Project Manager [signature] Page 1 of 1

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

FIELD REPORT OF IN-PLACE DENSITY OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (ASTM D2922)

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☐ 520 Wilkes, Suite 13, Green River, WY 82935, (307) 875-4394 (ph), (307) 875-4395 (fax)

Client Western Nuclear
Address PO 630
City, State, Zip Jeffrey City, WY 82310

Project No. 12936RM
Project Name Pond Reclamation
Project Location Jeffrey City, Wy.

Date Reported 4/5/07
Test Date 4-2-07
Technician JPM

Test Instrument Data:

Manufacturer Troxler
Model No. 3411B
Serial No. 9470
Standard Density Count 1873
Standard Moisture Count 569

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-5140, 6350-E	@grade	6"	123.6	104.7	18.0	2	100
24	N-5200, 6370-E	"	6"	123.2	104.3	18.1	2	100

Field Test Results Provided To _____ Project Manager [signature] Page 1 of 1

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

FIELD REPORT OF IN-PLACE DENSITY OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (ASTM D2922)

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☐ 1120 E. "C" Street, Casper, WY 82601, (307) 577-0806 (ph), (307) 472-4402 (fax)
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☐ 520 Wilkes, Suite 13, Green River, WY 82935, (307) 875-4394 (ph), (307) 875-4395 (fax)

Client: Western Nuclear
Address: PO 630
City, State, Zip: Jeffrey City, WY 82310

Project No.: 12936RM
Project Name: Pond Reclamation
Project Location: Jeffrey City, Wy.

Date Reported: 4/5/07
Test Date: 4-3-07
Technician: JPM

Test Instrument Data:

Manufacturer: Troxler
Model No.: 3411B
Serial No.: 9470
Standard Density Count: 1872
Standard Moisture Count: 573

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-4890, E-6770	@grade	6"	122.1	102.9	18.7	2	98
26	N-4970, E-6780	"	6"	121.8	101.5	20.0	2	97
27	N-5030, E-6790	"	6"	123.6	105.6	17.0	2	101

Field Test Results Provided To: _____ Project Manager: [signature] Page 1 of 1

INBERG-MILLER ENGINEERS
QUALITY SOLUTIONS THROUGH TEAMWORK

FIELD REPORT OF IN-PLACE DENSITY OF SOIL AND SOIL-AGGREGATE BY NUCLEAR METHODS (ASTM D2922)

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☐ 520 Wilkes, Suite 13, Green River, WY 82935, (307) 875-4394 (ph), (307) 875-4395 (fax)

Client Western Nuclear
Address PO 630
City, State, Zip Jeffrey City WY 82310

Project No. 12936RM
Project Name Pond Reclamation
Project Location Jeffrey City, Wy.

Date Reported 4/5/07
Test Date 4-4-07
Technician JPM

Test Instrument Data:

Manufacturer Troxler
Model No. 3411B
Serial No. 9470
Standard Density Count 1886
Standard Moisture Count 567

Laboratory Soil Data:

Moisture-Density Sample No.	Maximum Density	Opt. Moisture	Sample Description
1	106.3	17.5	Cody Shale
2	104.8	17.8	Cody Shale

Test No.	Test Location	Test Elevation	Probe Depth	Wet Density	Dry Density	Percent Moisture	Moist/Den Sample No.	% Comp
	N-5000 E-6640	@ grade	6"	123.9	104.6	18.4	2	100
	Sandcone Cor.; 18.7, 104.4							
29	N-5130 E-6830	"	6"	124.2	105.2	18.1	2	100
30	N-5170 E-6850	"	6"	121.9	103.9	17.3	2	99

Field Test Results Provided To _____ Project Manager [signature] Page 1 of 1

Date 3-[illegible]07

UNIT WEIGHT [illegible] SAND CONE METHOD
ASTM D1556
INBERG-MILLER ENGINEERS

Technicia[illegible] JPM

Client Western Duke

Contractor High Country

Job No. 12936RM

Sand Density 91.29 P.C.F.

Date Calibrated 3-10-07

Project Split Rock Reclamation

	FUNNEL CALIBRATION			WEIGHT OF WET SOIL			VOLUME OF HOLE						MOISTURE CONTENT						DENSITY	
TEST NO.	WT. JUG FULL	WT JUG EMPTY	WT. SAND IN FUNNEL	WT. WET SOIL W/ TARE	WT. TARE	WT. SOIL	WT. JUG FULL	WT. JUG EMPTY	WT. SAND USED	WT. SAND IN FUNNEL	WT. SAND TO FILL HOLE	HOLE VOL.	WT. WET SOIL W/ TARE	WT. DRY SOIL W/ TARE	WT. WATER	WT. TARE	WT. DRY SOIL	% MOIST.	WET P.C.F.	DRY P.C.F.
1	I 6023.1	4284.6	1738.5	2935.5	34.1	6.3963 2901.4	E 6104.2	1926.5	4177.7	1738.5	5.377 2439.2	.0589	827.2	708.8	118.4	3A 32.8	676.0	17.5	127.6	108.6
2	5948.3	4185.8	1762.5	2975.7	32.6	6.4883 2943.1	5872.1	1870.6	4001.5	1762.5	4.93607 2239	.05407	921.7	787.0	134.7	6G1 32.3	754.7	17.8	120.0	101.9
3	E 5999.2	4291.6	1707.6	3499.9	25.9	7.6587 3474.0	I 6075.4	1869.1	4266.3	1707.6	5.6409 2558.7	.0618	3800.3	3252.6	547.7	B 327.0	2925.6	18.7	123.9	104.2

REPORT DATA

TEST NO.	LOCATION	TEST ELEVATION	MATERIAL DESCRIPTION	STD. PROCTOR NO.	% MOISTURE	DRY DENSITY	OPT. MOISTURE CONTENT	MAX. DRY DENSITY	% COMP.
1 (4)	N-5610, E-6530	@ grade	Cody Shale	1	17.5	108.6	(4) 17.9	109.2	99.5%
2 (14)	N-5590, E-6970	"	"	1	17.8	101.9	(14) 18.4	103.7	
3 (28)	N-5000, E-6640	"	"	2	18.7	104.4	(28) 18.4	104.6	

MOISTURE CONTENT ANALYSIS

INBERG-MILLER ENGINEERS

ASTM D2216

CLIENT:	Western Nuclear
PROJECT:	Evaporation Pond
JOB NO.:	12936RM
TEST DATE:	3/15/07-
TESTED BY:	JPM

MOISTURE CONTENT INFORMATION

	Sample No.:	1	2	3	4	5
	Tare (Pan) No.:	SB	60	Utcp	3A	SB
A1	Tare (Pan) Wt.(g):	122.12	32.24	32.23	32.8	122.12
A2	Tare + Wet Soil Wt. (g):	863.07	703.28	656.33	827.2	792.64
A3	Tare + Dry Soil Wt. (g):	746.55	595.67	564.73	708.8	695.21
A4	WATER WT.(g):	116.52	107.61	91.6	118.4	97.43
A5	SOIL WT.(g):	624.43	563.43	532.5	676.0	573.09
A6	PERCENT MOISTURE:	18.7	19.1	17.2	17.5	17.0

	Sample No.:	6	7	8	9	10
	Tare (Pan) No.:	Utcp	60067	44	60	SB
A1	Tare (Pan) Wt.(g):	32.23	32.85	32.34	32.24	122.12
A2	Tare + Wet Soil Wt. (g):	812.8	729.72	693.15	770.42	772.16
A3	Tare + Dry Soil Wt. (g):	690.38	617.87	587.5	678.6	676.29
A4	WATER WT.(g):	122.42	111.85	105.65	111.82	95.87
A5	SOIL WT.(g):	658.15	585.02	555.16	646.36	554.17
A6	PERCENT MOISTURE:	18.6	19.1	19.0	17.3	17.3

	Sample No.:					
	Tare (Pan) No.:					
A1	Tare (Pan) Wt.:					
A2	Tare + Wet Soil Wt.(g):					
A3	Tare + Dry Soil Wt. (g):					
A4	WATER WT.(g):					
A5	SOIL WT.(g):					
A6	PERCENT MOISTURE:					

	Sample No.:					
	Tare (Pan) No.:					
A1	Tare (Pan) Wt.(g):					
A2	Tare + Wet Soil Wt. (g):					
A3	Tare + Dry Soil Wt. (g):					
A4	WATER WT.(g):					
A5	SOIL WT.(g):					
A6	PERCENT MOISTURE:					

CALCULATIONS

Wt. of Water	A4 = A2 - A3
Wt. of Dry Soil	A5 = A3 - A1
Percent Moisture	A6 = (A4/A5) * 100

APPENDIX D
COVER THICKNESS MEASUREMENT LOGS

Western Nuclear, Inc.
Split Rock Mill Site

Quality Compliance Report
Radon Barrier Thickness Measurement Log

CAP Pond: 6 inches (0.5 ft.) required
Inspector: C Spurlock report date: May 1, 2007

Date & Initial	Northing	Easting	Thickness	note:
			(ft.)	
	4800	6800	No clay req't	
	4800	7000	No clay req't	
3/21/2007	5000	6600	0.2	potholed, 0.5' clay thickness confirmed B. DeWaard
3/21/2007	5000	6800	0.5	
	5000	7000	No clay req't	
	5000	7200	No clay req't	
	5200	6200	No clay req't	
4/19/2007	5200	6400	0.6	
4/19/2007	5200	6600	0.5	
4/9/2007	5200	6800	0.7	
4/5/2007	5200	7000	0.6	
	5200	7200	No clay req't	
	5200	7400	No clay req't	
	5400	6200	No clay req't	
4/19/2007	5400	6400	0.6	
4/9/2007	5400	6600	0.8	
4/5/2007	5400	6800	0.8	
4/5/2007	5400	7000	1.1	
	5400	7200	No clay req't	
	5400	7400	No clay req't	
	5600	6400	No clay req't	
4/5/2007	5600	6600	1.0	
4/5/2007	5600	6800	0.8	
	5600	7000	No clay req't	
	5600	7200	No clay req't	
	5800	6400	No clay req't	
	5800	6600	No clay req't	
	5800	6800	No clay req't	
	5800	7000	No clay req't	

Thickness calculated from difference of top of clay layer and most recent subgrade elevation

Western Nuclear, Inc.
Split Rock Mill Site

Quality Compliance Report
Borrow Soil Thickness Measurement Log

CAP Pond: 12 inches (1.0 ft.) required
Inspector: C Spurlock report date: May 1, 2007

Date & Initial	Northing	Easting	Thickness	note:
			(ft.)	
	4800	6800		
	4800	7000		
4/9/2007	5000	6600	1.1	
4/19/2007	5000	6800	1.0	measured from top of clay layer
	5000	7000		
	5000	7200		
	5200	6200		
4/9/2007	5200	6400	1.1	
4/11/2007	5200	6600	1.0	
4/11/2007	5200	6800	1.2	
4/11/2007	5200	7000	1.0	
	5200	7200		
	5200	7400		
	5400	6200		
4/11/2007	5400	6400	1.1	
4/11/2007	5400	6600	1.3	1.2
4/11/2007	5400	6800	1.3	
4/11/2007	5400	7000	1.2	
	5400	7200		
	5400	7400		
	5600	6400		
4/11/2007	5600	6600	1.6	
4/11/2007	5600	6800	1.0	
	5600	7000		
	5600	7200		
	5800	6400		
	5800	6600		
	5800	6800		
	5800	7000		

Thickness includes that portion of clay layer in excess of 0.5 ft where applicable

Western Nuclear, Inc.
Split Rock Mill Site

Quality Compliance Report
Rock Mulch Thickness Measurement Log

CAP Pond: 4 inches (.33 ft.) required
Inspector: C Spurlock report date: May 1, 2007

Date & Initial	Northing	Easting	Thickness*	note:
			(ft.)	
	4800	6800		
	4800	7000		
4/19/2007	5000	6600	0.33	
4/19/2007	5000	6800	0.50	
	5000	7000		
	5000	7200		
	5200	6200		
4/19/2007	5200	6400	0.39	
4/19/2007	5200	6600	0.36	
4/19/2007	5200	6800	0.35	
4/19/2007	5200	7000	0.40	
	5200	7200		
	5200	7400		
	5400	6200		
4/19/2007	5400	6400	0.35	
4/19/2007	5400	6600	0.34	
4/19/2007	5400	6800	0.36	
4/19/2007	5400	7000	0.40	
	5400	7200		
	5400	7400		
	5600	6400		
4/19/2007	5600	6600	0.38	
4/19/2007	5600	6800	0.38	
	5600	7000		
	5600	7200		
	5800	6400		
	5800	6600		
	5800	6800		
	5800	7000		

*Indicates top of grade stake distance above borrow soil layer.

Exact rock elevation measurement impractical due to surface irregularities

APPENDIX E
REVEGETATION SEED MIXTURE, MULCH, AND FERTILIZATION DOCUMENTATION

BIG HORN CO-OP
MARKETING ASSN

1157 NORTH FEDERAL BLVD
RIVERTON, WY 82501

INVOICE NO.

DATE
SOLD BY
SOLD TO 012401
[illegible]
3HA
[illegible] PAYER
WARCHANT RECLAMATION
PO BOX 265
[illegible]

ITEM NO.		DESCRIPTION	QUANTITY	UNIT PRICE	EXT. PRICE
4309CH	68	46-0-0	760	.270	[illegible]
4306CH	68	11-52-0	375	.2678	[illegible]
4308CH	68	0-0-62	315	.1956	[illegible]

CHEMICAL OR FUELS EMERGENC
SPILL, LEAK, FIRE OR ACCIDEN
CALL 1-800-535-5053 ANYTIME

Cart 65 day 52

THANK YOU FOR YOUR PATRONAGE PLEASE COME AGAIN!

X

MERCHANDISE RECEIVED BY

A FINANCE CHARGE of 1½% per month (ANNUAL PERCENTAGE RATE 18%) is charged on past due accounts and purchaser agrees to pay collection and/or attorney fees if necessary for collection.

SUBTOTAL	
DISCOUNT	367.24
SALES TAX	
INVOICE TOTAL	367.24

PATRONS COPY

TRANSIT CERTIFICATE

WYOMING
NAFCS/WDA-70.01

No. – 6356

Date issued: 5/10/07 **Certificate shall terminate on:** 5/18/07
*(Certificate is not transferrable after issuance)

Park County Weed and Pest Control District. 307-754-8884

Commodity is in Transit to (specify): Jeffery City 548
Transporter _____ Vehicle Lic. 9-157 Phone (307)-899-6464
Quantity (tons/bales): 17 Package Type: bgld Valid for No. Of Trips: 1 (Not to exceed 10)
End User or Consignee: _____ Phone ( )-____-_____
Address: City_____ State_____ Zip_____

Enforcing Agency: _____ *Initials:* _____ *Date:* __/__/__

Forage in Transit has been inspected according to North American Forage Certification Standards. For smaller loads, an approved NAFCS marking system such as special twine or tags may be used in place of this form (NAFCS/WDA-70). Transporters carrying over 12 tons of forage must possess a Transit Certificate. D.O.T. projects also require a Transit Certificate.

(NAFCS/WDA-69 No. WY/PA/06163 **Date:** 12/31/07 **Producer:** Kelly)

Forage Product Grass Straw **Cutting: (circle 1) First, Second, or Third**

A. X EXCEEDS requirements of the North American Forage Certification Standards and contains only the specified forage plant material. No other plants or weeds noted.

B.___ MEETS requirements of the North American Forage Certification Standards. This forage contains variable amounts of annual weeds and/or other weeds not listed as prohibited or noxious.
(Weeds noted): _____

C.___ COMPLIES with MINIMUM requirements of the North American Forage Certification Standards. This forage contains variable amounts of prohibited or noxious weed species which were immature, (no viable seed) when harvested, or were treated to prevent seed formation. These plant parts, although not usually desirable in the forage product, are not considered able to begin new infestations.
(Weeds noted): _____

Additional comments: _____

Issued by: Amy B. Seaman Title: Manager

* White copy shall be delivered to the End User or Consignee upon completion of delivery. Using this certificate to represent forage other than the lot specified shall constitute a violation of the Wyoming Weed and Pest Act and prosecution charges may be filed with the proper County Attorney. **Photo copy** or Transit Certificate **will not be** accepted by Law Enforcing Agencies or Port of Entry Authority. End User shall only accept the original white copy. For additional information call the district in your area or the Wyoming Department of Agriculture at 307-777-6585.

White copy - End User or Consignee; **Yellow copy** - Intrastate district; **Pink copy** - District

Wind River Seed
3075 Lane 51 1/2
Manderson, WY 82432
(307) 568-3361

Order Date: 05/10/07
Order Number: 19492
Project Name: Jeffery City Rangeland
Project Number:
Blend Name: Rangeland Mix

Sold To: MARCHANT RECLAMATION

Species & Variety	Pure Seed %	Total Viable	Tested	Origin
Thickspike Wheatgrass Bannock CT	16.44	93	09/05/06	ID
Slender Wheatgrass Revenue	27.84	93	04/11/07	CN
Bluebunch Wheatgrass Whitmar CT	19.65	87	11/20/06	WA
Indian Ricegrass Rimrock CT	11.74	99	09/07/06	MT
Green Needlegrass Lodorm	21.04	97	01/30/07	MT

Bulk Lbs: 15.91 PLS Lbs: 14.37

Other Crop: 0.20 Hard Seed: 0.00
Weed Seed: 0.04 Dormant: 20.88
Inert Matter: 3.04

Restricted:

WRS F[illegible]T-168

CERTIFICATE OF MATERIALS

Project Number:

The Wind River Seed company of 3075 Lane 51 1/2 Manderson, WY 82432

Project Location: Jeffery City Rangeland

Has furnished to: MARCHANT RECLAMATION

Blend Name: Rangeland Mix

the following materials for use in the above referenced project.

Acres: 13.00

Bid Item Number	Description or Use	PLS Pounds	Bulk Pounds		PLS Lbs per Acre	Lot Number
	Thickspike Wheatgrass Bannock CT	33.02	38.51		2.54	37-11-6(X)
	Slender Wheatgrass Revenue	55.90	62.94		4.30	06525
	Bluebunch Wheatgrass Whitmar CT	36.92	43.61		2.84	NBS-KF6-WHI-1
	Indian Ricegrass Rimrock CT	25.09	25.35		1.93	IRG-1P
	Green Needlegrass Lodorm	44.07	45.50		3.39	05-4-49(X)
	Totals:	**195.00**	**215.91**		**15.00**	

Order Number: 19492 - 1

PLS % of Mix: 90.31%

Seeding Rates

PLS	BULK
15.00	16.61

Pounds per Acre

Statement of Certification

I hereby certify that the above listed items of material do meet the requirements as set forth in the plans and/or specifications.

By: Kathy Paxton
Name

Signature

Title: Office Manager

Date: 05/10/07

Note: This Certification and attachments must be furnished in triplicate to the contractor who, in turn, must furnish two copies to the engineer before the materials can be incorporated into the project.

Distribution:
White: Materials Labratory Pink: Contractor
Yellow: Resident Engineer Gold: Supplier

Idaho State Seed Lab

2240 Kellogg Lane
Boise, ID 83712

James E. Risch
Governor

Patrick A. Takasugi
Director

Laboratory Report of Analysis

Account No.	Date Received	Date Completed	Lab Number
2400	08/09/06	09/05/06	S07-0383

WIND RIVER SEED
3075 Lane 51 1/2
Manderson, WY 82432

Sender's Information*

Variety	Bannock
Kind	Wheatgrass, thickspike
Genus/Species	Elymus lanceolatus
Lot Number	37-11-6
Class	Certified

*The information provided here is that of the sender and not of the laboratory.

Purity Analysis

Pure Seed Components

In 7.1436 grams.

		Purity
Wheatgrass, thickspike	*Elymus lanceolatus*	92.19%

Purity Grams Required	Weed Seed	0.15%
Noxious Grams Required	Crop Seed	0.26%
Grams Submitted	Inert Matter	7.40%

Viability Analysis

Germ Date	Germination %	Dormant %	Hard %	Total Viable
09/01/06	93	-N-	-N-	93

Other Crop Seeds

Wheatgrass, Intermediate	*Elytrigia intermedia subsp. intermedia*	127	per lb
Barley	*Hordeum vulgare subsp. vulgare*	63	per lb
Wheatgrass, crested	*Agropyron sp.*	63	per lb

Noxious Weed Seeds: None Found
States: ID
In 70.1834 Grams

Weed Seeds

Chess, japanese	*Bromus japonicus*	127	per lb
Bluegrass, bulbous	*Poa bulbosa*	63	per lb

Other Determinations

Wheatgrass, thickspike TZ test 94 %
Weedy Bromus species = .0067 grams, .09% in 7.1434 grams examined
Based on 70.1834 grams examined for Certification requirements. No other crop or weed seed found.

Status: None. - Test results indicate this sample qualifies as Certified. ICIA will determine final class on all certified samples.

Remarks

Inert Matter: Sterile florets, chaff, plant debris.

Tests Requested Germination, Purity, TZ test. No other tests requested.

Services Requested Rush.

WARRANTY: We warrant that the purity and germination test results reported on this form have been carried out in accordance with AOSA rules unless otherwise specified. Test results reflect the condition of the submitted sample and may not reflect the condition of the seed lot from which the sample was taken.

DISCLAIMER OF WARRANTIES: WE MAKE NO OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Signature:

Bureau Chief

MONTANA STATE UNIVERSITY

Montana State Seed Testing Laboratory
Department of Plant Sciences
Room 40 Marsh Lab • P.O. Box 173145 Tel (406) 994-2141
Bozeman, MT 59717-3145 Fax (406) 994-3786

Account No.	Date Received	Date Completed	Lab Number
1047	01/08/07	01/30/07	07-2676

WIND RIVER SEED
3075 Lane 51 1/2
Manderson, WY 82432

Sender's Information*

Product	Lodorm
Kind	Needlegrass, green
Genus/Species	Nassella viridula
Lot Number	05-4-49
Class	Service

*The information provided here is that of the sender and not of the laboratory.

		Viability Analysis					
		Germ Date	Germination %	Dormant %	Hard %	Total Viable	PLS%
Needlegrass, green	*Nassella viridula*	01/30/07	44	53	-N-	97	-N-

Status: None.

Tests Requested Dormant seed, Germination. No other tests requested.

Services Requested *Fax results.*

WARRANTY: We warrant that the purity and germination test results reported on this form have been carried out in accordance with AOSA rules unless otherwise specified. Test results reflect the condition of the submitted sample and may not reflect the condition of the seed lot from which the sample was taken.

DISCLAIMER OF WARRANTIES: WE MAKE NO OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Signature: _____

Harold Armstrong, Manager

 Printed: 01-30-07 14:34:39

Green Needlegrass Lodorm GT
LOT 05-4-49

Montana State Seed Laboratory/Department of Plant Sciences

Telephone (406) 994-2141
Fax (406) 994-3786

mailing
MSU – Bozeman
P.O. Box 173145
Bozeman, MT 59717-3145

shipping
MSU – Bozeman
Room 40 Marsh Lab
Bozeman, MT 59717

SAMPLE NUMBER: 07-432

Account Number:

Customer: WIND RIVER SEED
3075 Lane 51 1/2
Manderson, WY 82432

Date Received: 08/07/2006
Date Completed: 09/05/2006
Date of Report: 09/07/2006
Certification No: 0621054
Origin: MT
Customer ID: Rimrock /RG-1P
Customer Remarks:

Tests: RUSH - Germination, Pure Live Seed, Purity, Tetrazolium Test, Dormancy, MT Noxious

Tests conducted according to AOSA rules. Varietal purity guaranteed by labeler. The analysis report shown below is accurate only for the sample received at the laboratory. Whoever makes use of this information for labeling purposes is guaranteeing that the sample is representative of the seed lot from which it was drawn. The letter 'X' means the test is not completed or was not requested.

Purity Analysis	Percent	Germination	Hard Seed	Dormant Seed	Total Viable	Abnormal Seedlings	Dead Seed	Days Tested	No. of Seeds	Percentage TZ Viable
		Percentage								
Pure Seed Indian Ricegrass (Achnatherum hymenoides)	99.97	0	0	81	81	0	19	28	400	99.00
Other Crop Seed	0.00									
Inert Matter	0.03									
Ergot Percent										
Weed Seed	0.00									
Purity Weight = 7.54 GR										

Minimum Grams Required for Noxious Test: 70.00
Grams Submitted for Noxious Test: 70.00
Total Sample Weight: 685.70

No. Found — Seeds per Pound

Noxious Weeds per 70.00 grams
...none found...

Common Weeds per 7.54 grams
...none found...

Other Crop Seeds per 7.54 grams
...none found...

Other Tests:
PLS: 80.98

Remarks:
OTHER CROPS OBSERVED: ALFALFA

MONTANA SEED GROWERS ASSOCIATION 406) 994-5121
Grade: **REGISTERED** RAL
Remarks

Fee: $120.00

Seed Laboratory Manager: HAA RST, Harold Armstrong, RST

No liability shall attach to Montana State Seed Lab or to any employee thereof with respect to this process or report.

Montana State Seed Laboratory/Department of Plant Sciences

Telephone (406) 994-2141
Fax (406) 994-3786

mailing
MSU – Bozeman
P.O. Box 173145
Bozeman, MT 59717-3145

shipping
MSU – Bozeman
Room 40 Marsh Lab
Bozeman, MT 59717

SAMPLE NUMBER: 07-1084

Date Received: 09/20/2006
Date Completed: 10/16/2006
Date of Report: 10/16/2006
Certification No:
Origin: XX
Customer ID: Revenue /06525
Customer Remarks:

Customer: WIND RIVER SEED
3075 Lane 51 1/2
Manderson, WY 82432

Tests: FAX - Germination, Pure Live Seed, Purity, Western States Noxious, WUSA Noxious

Tests conducted according to AOSA rules. Varietal purity guaranteed by labeler. The analysis report shown below is accurate only for the sample received at the laboratory. Whoever makes use of this information for labeling purposes is guaranteeing that the sample is representative of the seed lot from which it was drawn. The letter 'X' means the test is not completed or was not requested.

Purity Analysis	Percent	Percentage Germination	Hard Seed	Dormant Seed	Total Viable	Abnormal Seedlings	Dead Seed	Days Tested	No. of Seeds	Percentage TZ Viable
Pure Seed Slender Wheatgrass (Elymus trachycaulus subsp. tr)	95.50	92	0	0	92	1	7	22	400	X
Other Crop Seed	0.54									
Inert Matter	3.90									
Ergot Percent										
Weed Seed	0.06									
Purity Weight = 7.04 GR										

Minimum Grams Required for Noxious Test:	70.00
Grams Submitted for Noxious Test:	70.00
Total Sample Weight:	415.00

No. Found		Seeds per Pound
	Noxious Weeds per 70.00 grams ...none found:..	
	Common Weeds per 7.04 grams	
4	Barley, Foxtail (Hordeum jubatum)	258
	Other Crop Seeds per 7.04 grams	
4	Altai Wildrye (Leymus angustus)	258
1	Fowl Bluegrass (Poa palustris)	64

Other Tests:
PLS:

Remarks:
Fax copy to Bruce Seed Farm

Fee: $47.00

Seed Laboratory Manager: RST, Harold Armstrong, RST

No liability shall attach to Montana State Seed Lab or to any employee thereof with respect to this process or report.

Washington State Department of Agriculture
Seed Program
21 North 1st Avenue, Suite 203
Yakima, WA 98902

Toll-Free: (866) 865-6137
Telephone: (509) 225-2630
Facsimile: (509) 454-4395
E-mail: seed@agr.wa.gov

Laboratory Report of Analysis

Account No.	Date Received	Date Completed	Lab Number
2174	10/26/06	11/20/06	6-3394

WIND RIVER SEED
3075 Lane 51 1/2
Manderson, WY 82432

Sender's Information*

Product/Variety	Whitmar
Kind	Wheatgrass, beardless
Genus/Species	Pseudoroegneria spicata
Lot Number	NBS-KF6-WHI-1
Class	Certified

*The information provided here is that of the sender and not of the laboratory.

Purity Analysis

Pure Seed Components

In 8.004 grams.

		Purity
Wheatgrass, beardless	*Pseudoroegneria spicata*	97.31%

Purity Grams Required	8	Weed Seed	0.09%
Noxious Grams Required	80	Crop Seed	0.00%
Grams Submitted	213	Inert Matter	2.60%

Viability Analysis

Germ Date	Germination %	Dormant %	Hard %	Total Viable
11/20/06	87	-N-	-N-	87

Other Crop Seeds None Found

Noxious Weed Seeds:
States: All States
In 80.10 Grams.

Downy brome	*Bromus tectorum*	119	Per lb
Barnyardgrass	*Echinochloa crus-galli*	62	Per lb

(P)Prohibited Noxious in WA (R)Restricted Noxious in WA

Weed Seeds:

Wild barley	*Hordeum spp.*	57	Per lb

Other Determinations

Wheatgrass, beardless TZ test 88 %
Inert matter: Empty florets, staminate seed, stems, ergot sclerotia and similar matter, smut

Status: Passed. - Meets the viability standards for the certified class. Meets purity standards for the certified class.

Additional Sender's Information*

Remarks

Actual seeds found: 11 Barnyardgrass (Echinochloa crus-galli) seeds in the noxious portion.
Actual seeds found: 21 Downy brome (Bromus tectorum) seeds in the noxious portion.
Analyzed using AOSA rules as a guideline.
All States Noxious Weeds except HI. "All States Noxious Examination excludes species declared Undesirable Grass Seed by DE, MD, NJ, PA, VA and WV."

Tests Requested Noxious exam - all states, Purity, Germination, TZ test. No other tests requested.
Services Requested Rush. Fax results.

WARRANTY: We warrant that the test results reported on this form have been carried out with AOSA rules used as a guideline unless otherwise specified. Test results reflect the condition of a submitted sample and may not reflect the condition of the seed lot from which the sample was taken. Officially drawn samples represent the condition of the lot at the time of sampling.

DISCLAIMER OF WARRANTIES: WE MAKE NO OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Signature:

AGR 661-4710a (R/5/04)

UNIVERSITY OF WYOMING

Wyoming Seed Analysis Laboratory
749 Road 9 • Powell, WY 82435-9135
Ph. 307.754.4750 • Fax 307.754.4932

REPORT OF SEED SAMPLE ANALYSIS

Account No.	Date Received	Date Completed	Lab Number
182	10/27/06	10/30/06	06-0843

WIND RIVER SEED
3075 Lane 51 1/2
Manderson, WY 82432

Sender's Information*

Product	Lodorm
Kind	Needlegrass, green
Genus/Species	Nassella viridula
Lot Number	05-4-49(X)
Class	Service

*The information provided here is that of the sender and not of the laboratory.

Purity Analysis

Pure Seed Components
In 7.0085 grams.

		Purity
Needlegrass, green	*Nassella viridula*	99.72%

Purity Grams Required	7	Weed Seed	0.00%
Noxious Grams Required	70	Crop Seed	0.03%
Grams Submitted	546.1	Inert Matter	0.25%

Viability Analysis

Germ Date	Germination %	Dormant %	Hard %	Total Viable	PLS%
-N-	-N-	-N-	-N-	-N-	-N-

Other Crop Seeds

Wheatgrass, standard crested — *Agropyron desertorum* — 65 per lb

Noxious Weed Seeds: None Found
States: MT, WY
In 70 Grams.
(P)Prohibited Noxious (R)Restricted Noxious

Weed Seeds: None Found

Other Determinations
Needlegrass, green TZ test 97 %

Status: None.

Remarks
Inert Matter: Floral parts.

Tests Requested: Purity, Noxious exam, TZ test. No other tests requested.
Services Requested: Rush.

WARRANTY: We warrant that the purity and germination test results reported on this form have been carried out in accordance with AOSA rules unless otherwise specified. Test results reflect the condition of the submitted sample and may not reflect the condition of the seed lot from which the sample was taken.

DISCLAIMER OF WARRANTIES: WE MAKE NO OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Signature: Gil Waibel
Registered Seed Technologist Seal #45