

## APPENDIX A

### URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT ON-SITE CONSTRUCTION REVIEW PROCEDURES

#### A. OBJECTIVES

The objectives of the on-site review of remedial action construction are as follows:

1. To determine by direct observation if remedial actions are being accomplished in accordance with specifications and procedures.
2. To determine whether the system for preparing and maintaining records is functioning properly.
3. To determine whether records reflect work accomplishment consistent with specifications and procedures.
4. To determine if the records and/or work activities indicate any generic problems, inadequacies, or other weaknesses that could impact the acceptability of remedial action.

#### B. PREPARATION

Applicable portions of the Remedial Action Plan, the final design, and the Nuclear Regulatory Commission/the Department of Energy comments and responses should be reviewed to determine construction requirements and DOE's Inspection Plan before performing the on-site review. The reviewer should then utilize these documents in a detailed review of the construction specifications, drawings, and Remedial Action Inspection Plan.

#### C. WORK OBSERVATION

By direct observation of earthwork and other activities in progress, the reviewer should ascertain whether applicable activities are being controlled and accomplished in accordance with the requirements of the documents reviewed. Reviews will generally be conducted by a geotechnical engineer, surface water hydrologist, hydrogeologist, or health physicist as appropriate, depending on the nature of the review item. Key construction milestones (listed in Table 1) should be observed as directed in Section 05.12 of this Chapter. During construction reviews, the reviewer should also determine the locations of ground-water monitoring wells and observe their condition. If ground-water sampling is in progress, the procedures should also be observed. Specific procedures applicable to particular construction and monitoring activities that may be viewed on a site-specific basis are as follows:

1. Test Fill Construction
  - a. Observe placement and compaction operations to ensure that procedural and equipment requirements are being followed.
  - b. Visually check the barrier test zone to ensure proper thickness and material type.
  - c. Observe gradation, bentonite amendment operations (if applicable), plasticity index, and moisture/density testing, and compare results of tests with specifications.
  - d. Observe installation of instrumentation/testing/monitoring equipment, including infiltrometers where applicable.
  - e. Review quality control plan and infiltration test results.
2. Foundation and Subgrade Preparation
  - a. Check to ensure that the subgrade is cleared of all vegetation and topsoil, shows no deterioration due to frost action or erosion, and exhibits no rutting from construction vehicles.
  - b. Check to ensure that the subgrade exhibits no areas of subsidence, extreme surface drying, or localized ponding (overly wet areas).
  - c. Observe proof rolling operations or density testing; if density testing is performed, compare results of tests observed in the field with specifications.
3. Placement of Capillary Break
  - a. Observe placement and compaction operations to ensure that procedural and equipment requirements are being followed.
  - b. Observe the capillary break zone to verify proper thickness and material type, and to ensure that segregation of materials has not occurred.
  - c. Observe gradation and/or moisture/density testing and compare results of tests observed with specifications.
4. Placement of Seepage Barrier/Liner

- a. Observe placement and compaction operations to ensure that procedural and equipment requirements are being followed.
- b. Visually check the liner zone to ensure proper thickness and material type.
- c. Observe gradation, plasticity index, and/or moisture/density testing and compare results of tests observed with specifications.

5. Placement of Contaminated Materials

- a. Observe placement and compaction operations to ensure that procedural and equipment requirements are being followed. This includes checking the loose-lift thickness (during placement) against the specifications.
- b. Visually check the quantity, maximum size, and distribution of foreign material, and the distribution of organics against the allowable criteria of the specifications. Also, note if large areas of slimes and/or non-homogeneous areas exist.
- c. Observe moisture/density testing and compare results of tests observed with specifications. Note any ponding, runoff, or dust conditions.
- d. Observe radiological monitoring (health and safety, as well as radionuclide concentration measurement).

6. Placement of Soil Cover (Radon Cover)

- a. Observe placement and compaction operations to ensure that procedural and equipment requirements are being followed. This includes checking required loose-lift thickness and proper blending of any additives, and if method specifications for density have been established by test fill, verification of number of equipment passes.
- b. Visually check cover layer(s) to ensure proper material type and final thickness for each layer.
- c. Observe gradation, plasticity index, and/or moisture/density testing and compare results of tests observed with specifications.

7. Placement of Frost Protection Layer

- a. Observe placement and compaction operations to ensure that procedural and equipment requirements are being followed. Check

required loose-lift thickness, and if method specifications for density have been established, verify number of equipment passes.

- b. Visually check the frost protection cover layer to ensure proper thickness and material type.
- c. Observe gradation, plasticity index, and moisture/density testing and compare results of tests with specifications.

#### 8. Placement of Bedding Layer(s) and Rock Cover (Riprap)

- a. Observe placement and compaction operations to ensure that procedural and equipment requirements are being followed. For the rock cover and other riprap layers, this includes checking that placement techniques are conducted in a manner that prevents material degradation, assures uniform distribution and minimizes voids.
- b. Visually check the bedding zones and riprap layers to ensure proper thickness and material type for each zone, measuring as necessary. If possible, excavate by hand to a sufficient depth to verify thickness by measurement.
- c. Visually check riprap for approximate size (maximum, average). If possible, excavate by hand to verify size of underlying rocks, measuring as necessary.
- d. Observe gradation testing to assure that representative samples are being tested.
- e. Observe gradation testing of filter and rock layers and compare results of gradation and durability tests observed with specifications and RAP requirements.

#### 9. Other Potential Construction Observations

- a. Check operations at borrow areas and quarries; verify that any procedures for moisture control are properly conducted; and visually check that material type(s) are consistent with specifications and are representative of materials actually being placed.
- b. Check layout of diversion ditches. Check for conformance to design configuration and riprap requirements.

- c. Check overlap and integrity of geotextile separators, if they are used.
- d. If an approved vegetative cover is used in place of rock cover, check to ensure uniform seeding, use of specified seed type, seed density, etc.
- e. Check overall site grading to assure that cut and fill procedures will not result in grading which would be susceptible to future surface erosion.
- f. Observe verification soil sampling and Opposed Crystal System (OCS) analysis.
- g. Observe gamma surveying at processing site and, if possible, alpha surveying of any structures to remain.

#### 10. Monitoring Well Observations

- a. Check locations of existing wells. Verify that the field locations correspond to the location depicted on site drawings. Verify that the well is properly and permanently labeled.
- b. Verify that existing well locations are adequately marked with flagging or some other identification placard to avoid inadvertent destruction by heavy equipment.
- c. Verify that the outer protective casing, padlock, concrete pad, and other surface expressions are in good repair. Verify that well caps are secure to minimize inadvertent dust invasion inside the well casing. Note any irregularities, such as bent or damaged casing, animal burrows or erosion around the well, and proximity of equipment tracks.
- d. Check the locations of previously abandoned monitoring wells. Verify the field locations with respect to the site drawings. Verify that the surface expression has been completed in accordance with the Monitoring Well Abandonment Specification. Note any irregularities, such as concrete shrinkage, surface depressions, or exposed well pipe.

#### 11. Ground-Water Sampling Observations

- a. Observe any monitoring well sampling or well measurements that may be occurring. Verify that the equipment is handled in

accordance with the project specifications. Verify that equipment use and decontamination procedures have been followed in accordance with appropriate standard operating procedures of the Albuquerque Operations Manual for the Uranium Mill Tailings Radiation Action (UMTRA) Project.

- b. Verify that calibrations have been performed and documented on equipment used to make field measurements.
- c. Verify that accurate and legible records are maintained during the field sampling, including chain-of-custody documentation. Sampling information should be recorded on the DOE or contractor forms identified in the Quality Control (QC) project documents and in sufficient detail to support later quality assurance reviews. Verify that samples are collected, handled, and stored in accordance with procedures identified in the QC plan.
- d. Verify that potentially contaminated ground water removed during well purging and sampling is handled in accordance with procedures identified in the Albuquerque Operations Manual for the UMTRA Project.

The reviewer may not be able to directly observe all facets of the activities identified above. However, direct observation of activities should be made in accordance with the particular On-Site Construction Review Plan (OCRP) prepared prior to the review. Activities which should be observed include the Key Construction Milestones identified in the attached Table I, as well as major construction activities which are unique to the site. Such unique activities may include slurry wall construction, bentonite amendments to radon barriers, ground modification, monitoring well activities, or other phases of work identified in the OCRP. Observation of some field testing should be made at all site reviews. In some cases, it will be necessary to observe a completed activity rather than work in progress. The intent of the review is to determine whether the activities and/or the end product meet the requirements of the RAP.

Additionally, during work observation, informal interviews with DOE and contractor inspection personnel should be randomly conducted to determine how well employees know their work activity. The reviewer should ascertain whether a sufficient number of adequately qualified inspection personnel are at the site, commensurate with the work in progress, and whether they are adequately performing their assigned duties through the established organizational structure. A determination of contractor personnel qualifications should be based on the contractor's published position description/job standards which is available at the project office.

#### D. RECORDS REVIEW

The reviewer should examine selected documentation maintained on site to ascertain the following:

1. Records confirm that required material characteristics and other specification requirements were met.
2. Records confirm that specified materials were installed in accordance with specifications.
3. Records indicate that adequate corrective action is being taken following non-conformance/deviation occurrences.
4. Records confirm that the required inspections and testing were performed adequately and at required frequencies.
5. Records establish that DOE inspection personnel are adequately qualified for their assigned duties and responsibilities.
6. Records confirm that any field measurements of parameters for radon barrier analysis that deviate from those presented in the RAP are incorporated into a new analysis before the radon barrier is completed.

#### E. DOCUMENTATION

All aspects of the construction observed in accordance with the above-recommended review activities should be documented in the On-Site Construction Review Report (OCRR), an example of which is attached as Appendix C. The report should address each identified aspect as being satisfactory, being unresolved and requiring resolution, or being in conflict with the RAP, construction specification, or RAIP requirements and needing correction. The Review Team Leader identified in the OCRR will have the responsibility of following up the corrective action and shall prepare written documentation to that effect. The Review Team Leader's supervisor shall concur with the report and follow-up documentation.

KEY CONSTRUCTION MILESTONES

- a. Early Stages of Remedial Action:
  - 1. Test Fill Construction \*
  - 2. Foundation and Subgrade Preparation \*
  - 3. Placement of Capillary Break \*
  - 4. Placement of Seepage Barrier/Liner \*
  - 5. Placement of Contaminated Materials \*\*
- b. Soil Cover:
  - 1. Placement of Radon Barrier \*\*
  - 2. Placement of Frost Protection Layer \*
- c. Placement of Bedding Layer(s) and Rock Cover \*\*\*
- d. Completion of Remedial Action (Closeout) \*\*\*

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\* May or may not apply to a particular site depending on site-specific design.

\*\* Will apply to all remedial action sites.

\*\*\* Will apply to nearly all sites (vegetative cover may be proposed for 1 or 2 sites).