

## **APPENDIX C**

# RECOMMENDED OUTLINE FOR SITE-SPECIFIC *IN SITU* LEACH FACILITY RECLAMATION AND STABILIZATION COST ESTIMATES

As required under Criterion 9 of 10 CFR Part 40, Appendix A, the licensee shall supply sufficient information for the U.S. Nuclear Regulatory Commission (NRC) to verify that the amount of coverage provided by the financial assurance will permit the completion of all decontamination, decommissioning, and reclamation of sites, structures, and equipment used in conjunction with facility operation. Cost estimates for the following activities (where applicable) should be submitted to NRC with the initial license application or reclamation plan and should be updated annually; as specified in the license. Cost estimates must be calculated on the basis of completion of all activities by a third party (a third party is an independent contractor or operator who is not financially affiliated with the licensee). Unit costs, calculations, references, assumptions, equipment and operator efficiencies, *et cetera*, must be provided. The annual surety estimate must be prospective of all work to be performed at the site. The licensee must provide estimated costs for all decommissioning, reclamation, and ground-water restoration work remaining to be performed at the site, and not simply deduct the cost of work already performed from the previous surety estimate [see NRC Generic Letter 97-03 (NRC, 1997)].

The detailed cost information necessary to verify the cost estimates for the above categories of closure work is summarized in the following recommended outline. For each area, estimates should include costs for equipment; materials; labor and overhead; licenses, permits and miscellaneous site-specific costs; and any other activity or resource that will require expenditure of funds.

## (I) FACILITY DECOMMISSIONING

This includes decommissioning, free release, or disposal of all structures and equipment. This may be accomplished in two phases. In the first phase, only the equipment not used for ground-water restoration (including the stability monitoring period) might be decontaminated, surveyed and released for unrestricted use. Well plugging and removal of the remaining equipment would be performed in a second phase, after the of ground-water restoration has been completed and approved. The buildings used for the *in situ* leach operations may be decontaminated and released for unrestricted use.

(A) Salvageable building and equipment decontamination (list). For each building or piece of equipment listed, the following cost data should be provided:

- (1) Decontamination
- (2) Refurbishment
- (3) Removal of equipment
- (4) Repairs

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- (B) Nonsalvageable building and equipment disposal:
  - (1) List of major categories of buildings and equipment to be disposed of and their corresponding quantities:
    - (a) Structures (list each major) [tons of material and building volume cubic meters (cubic feet)]
    - (b) Foundation concrete [cubic meters (cubic yards)]
    - (c) Process equipment (tons)
    - (d) Piping and insulation (lump sum)
    - (e) Electrical and instrumentation (lump sum)
  - (2) Disposal of chemical solutions within the facility
- (C) Restoration of contaminated areas (process area, affected ground water, surface impoundment residues, etc.)

Removal and Disposal of 11(e).2 byproduct material—Criterion 2 of 10 CFR Part 40, Appendix A, requires that these materials be transported and disposed of at a licensed tailings area or licensed disposal site. The quantity of material to be removed, the distance to the disposal site, and the fees charged by the receiving facility are important considerations in determining the costs of disposal.

Reclamation—This entails recontouring the well fields and surface impoundments and placing top soil or other materials acceptable to the NRC. This may also include revegetation.

- (1) Removal:
  - (a) Area, depth, and quantity of material to be removed
  - (b) Excavation, loading, transportation, and deposition
- (2) Revegetation:
  - (a) Area to be revegetated (acre)
  - (b) Obtaining fill material, replacing topsoil, and revegetating
  - (c) Erosion protection

## (II) GROUND-WATER RESTORATION AND WELL PLUGGING

In most cases, ground-water restoration consists of ground-water sweeping and water treatment with partial reinjection. The water treatment equipment used during the uranium recovery phase of the operation is generally suitable for the restoration phase. The capital cost of this equipment is usually absorbed during the initial stages of the operation, leaving only the costs of operation, maintenance, and replacement filters for the restoration phase. However, if additional equipment will be required for restoration, associated costs should be detailed here. Replacement costs of some water treatment equipment may need to be included in the surety if the equipment used for restoration is near the end of its serviceable life.

- (A) Method of restoration
- (B) Volume of aquifer required to be restored, area and thickness of aquifer, number of required pumping cycles, and cycling time. The aquifer volume should include the volume of the exploited ore zone, the flow factor, and any contaminated ground water outside the well field (vertical and horizontal excursions)
- (C) Equipment associated with aquifer restoration (e.g., reverse osmosis unit)
- (D) Verification sample analysis
- (E) Well plugging:
  - (1) Number of wells to be plugged
  - (2) Depth and size of each well
  - (3) Material to be used for plugging including acquisition, transportation, and plugging

## (III) RADIOLOGICAL SURVEY AND ENVIRONMENTAL MONITORING

Radiological Survey—Surveys and soil samples for radium are required in areas to be released for restricted use. Soils around the well fields, surface impoundments, and process buildings should be analyzed for radium content. A gamma survey of all areas should be made before release for unrestricted use. All equipment released for unrestricted use should be surveyed and the records should be maintained.

- (A) Soil samples
- (B) Decommissioning equipment and building smear samples
- (C) Gamma survey
- (D) Environmental monitoring

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### (IV) PROJECT MANAGEMENT COSTS AND MISCELLANEOUS

Itemize estimated costs associated with project management; engineering design, review, and change; mobilization; power during reclamation; quality control; radiological safety; and any other costs not included in other estimation categories.

### (V) LABOR AND EQUIPMENT OVERHEAD, CONTRACTOR PROFIT

Overhead costs for labor and equipment and contractor profit may be calculated as separate items or loaded into hourly rates. If included in hourly rates, the unit costs must identify the percentages applied for each area.

### (VI) CONTINGENCY

The licensee should include a contingency amount to the total cost estimate for the final site closure. The staff considers a 15-percent contingency to be an acceptable minimum amount.

### (VIII) ADJUSTMENTS TO SURETY AMOUNTS

The licensee is required by 10 CFR Part 40, Appendix A, Criterion 9 to adjust cost estimates annually to account for inflation and changes in reclamation plans. The submission should be in the form of a request for amendment to the license.

#### (A) Adjustments for inflation:

The licensee should submit a revised surety incorporating adjustments to the cost estimates for inflation 90 days before each anniversary of the date on which the first reclamation plan and cost estimate were approved. The adjustment should be made using the inflation rule indicated by the change in the Urban Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics (<http://stats.bls.gov>).

#### (B) Changes in Plans:

- (1) Changes in the process such as size or method of operation
- (2) Licensee initiated changes in reclamation plans or reclamation/ decommissioning activities performed
- (3) Adjustments to reclamation plans required by NRC
- (4) Proposed revisions to reclamation plans with cost estimates and the basis for cost estimates detailed for NRC review and approval.

To avoid unnecessary duplication and expense, NRC shall take into account surety arrangements required by other federal agencies, state agencies, or other local governing

bodies. However, the Commission is not required to accept such sureties if they are not sufficient. Similarly, no reduction to surety amounts established with other agencies shall be effected without NRC approval. Copies of all correspondence relating to the surety between the licensee and the state should be provided to NRC. If authorized by NRC to maintain a surety with a state as the beneficiary, it is the responsibility of the licensee to provide NRC with verification of same and ensure that the agreement with the state specifically identifies the financial surety's application, *in situ* leach facility, and decommissioning/reclamation requirements.

All costs (unit and total) are to be estimated on the basis of third party, independent contractor costs (include overhead and profit in unit costs or as a percentage of the total). Equipment owned by the licensee and the availability of licensee staff should not be considered in the estimate, to reduce cost calculations. All costs should be based on current-year dollars. Credit for salvage value is generally not acceptable in the estimated costs.

NRC staff review may include a comparison of unit cost estimates with standard construction cost guides (e.g., Dodge Guide, Data Quest) and discussions with appropriate state or local authorities (e.g., highway cost construction). The licensee should provide supporting information or the basis for selection of the unit cost figures used in estimates. The staff may elect to use a publicly available computer code such as RACER™ (Talisman Partners, Ltd., 2000) or spreadsheet to assess these costs.

### **References**

NRC. "Annual Financial Surety Update Requirements for Uranium Recovery Licensees." Generic Letter 97-03. Washington, DC: NRC. July 1997.

Talisman Partners, Ltd. "Introduction to RACER 2000™ (Version 2.1.0)—A Quick Reference." Englewood, Colorado: Talisman Partners, Ltd. 2000.