UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

FEB 14 1989

URFO:RDS
Docket No. 40-4492
SUA-667

American Nuclear Corporation
814 West Midwest Avenue
p.o. Box 2713
Casper, Wyoming 82602

Gentlemen:

We are enclosing a copy of all attachments to Source Material License SUA-667. We request that you maintain a permanent record of the attachments as future issuances of the license will not include the attachments. They will remain, however, as part of your license.

Should you have any questions, please contact this office at your convenience on (303) 236-2805 or 236-2815.

Sincerely,

for Edward F. Hawkins

R. Dale Smith, Director
Uranium Recovery Field Office
Region IV

Enclosure: Attachments to Source Material License SUA-667

9903180011 XA

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT

PRIOR TO RELEASE FOR UNRESTRICTED USE

OR TERMINATION OF LICENSES FOR

BYPRODUCT OR SOURCE MATERIALS

U. S. Nuclear Regulatory Commission
Uranium Recovery Field Office
Region IV
Denver, Colorado 80225

SEPTEMBER 1984

The instructions in this guide in conjunction with Table I specify the radioactivity and radiation exposure rate limits which should be used in accomplishing the decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use.

1. The licensee shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table I prior to applying the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table I. A copy of the survey report shall be filed with the Uranium Recovery Field Office, Region IV, P.O. Box 25325, Denver, CO 80225. The survey report shall:

   a. Identify the premises.

   b. Show that reasonable effort has been made to eliminate residual contamination.

   c. Describe the scope of the survey and general procedures followed.

   d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey. The licensee shall not release the premises for unrestricted use without the written approval of the USNRC staff.

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b c f]	MAXIMUM[b d f]	REMOVABLE[b e f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm /100 cm^2	15,000 dpm /100 cm^2	1,000 dpm /100 cm^2
Transuranics; Ra-226, Ra-228, Th-230, Th-118, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except SR-90 and others noted above.	5,000 dpm /100 cm^2	15,000 dpm /100 cm^2	1,000 dpm /100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f]The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

TABLE 3[a]

SAMPLE FORMAT FOR REPORTING MONITORING DATA

1. STACK SAMPLES

For each sample analyzed, report the following information:

a. Date sample was collected
b. Location of sample collection
c. Stack flow rate (m^3/sec)

Radionuclide	Concentration (μCi/ml)	Error Estimate[b] (μCi/ml)	Release Rate (Ci/qr)	Error Estimate (Ci/qr)	LLD[c] (μCi/ml)	% MPC[c]
U-nat						
Th-230						
Ra-226						
Pb-210						

2. AIR SAMPLES

For each sample analyzed, report the following information:

a. Date sample was collected
b. Location of sample collection

Radionuclide	Concentration (μCi/ml)	Error Estimate (μCi/ml)	LLD (μCi/ml)	% MPC
U-nat				
Th-230				
Ra-226				
Pb-210				
Rn-222				

[a] This table illustrates format only. It is not a complete list of data to be reported. (See text of guide and Tables 1 and 2.)

[b] Error estimate should be calculated at 95% uncertainty level, based on all sources of random error, not merely counting error. Significant systematic error should be reported separately. See Sections 6.1, 7.1.4, and 7.3.

[c] All calculations of lower limits of detection (LLD) and percentages of maximum permissible concentration (MPC) should be included as supplemental information.

TABLE 3 (Continued)

SAMPLE FORMAT FOR REPORTING MONITORING DATA

3. LIQUID SAMPLES

For each sample analyzed, report the following information:

a. Date sample was collected
b. Location of sample collection
c. Type of sample (for example: surface, ground, drinking, stock, or irrigation)

Radionuclide	Concentration (μCi/ml)	Error Estimate (μCi/ml)	LLD (μCi/ml)
U-nat (dissolved)			
U-nat (suspended)[d]			
Th-230 (dissolved)			
Th-230 (suspended)[d]			
Ra-226 (dissolved)			
Ra-226 (suspended)[d]			
Pb-210 (dissolved)			
Pb-210 (suspended)[d]			
Po-210 (dissolved)			
Po-210 (suspended)[d]			

4. VEGETATION, FOOD, AND FISH SAMPLES

For each sample analyzed, report the following information:

a. Date sample was collected
b. Location of sample collection
c. Type of sample and portion analyzed

Radionuclide	Concentration (μCi/kg wet)	Error Estimate (μCi/kg)	LLD (μCi/kg)
U-nat			
Th-230			
Ra-226			
Pb-210			
Po-210			

[d] Not all samples must be analyzed for suspended radionuclides. See Sections 1.2 and 2.2 of this guide.

TABLE 3 (Continued)

SAMPLE FORMAT FOR REPORTING MONITORING DATA

5. SOIL AND SEDIMENT SAMPLES

For each sample analyzed, report the following information:

a. Date sample was collected
b. Location of sample collection
c. Type of sample and portion analyzed

Radionuclide	Concentration (μCi/g)	Error Estimate (μCi/g)	LLD (μCi/g)
U-nat			
Th-230			
Ra-226			
Pb-210			
Po-210			

6. DIRECT RADIATION MEASUREMENTS

For each measurement, report the dates covered by the measurement and the following information:

Location	Exposure Rate (mR/qr)	Error Estimate (mR/qr)

7. RADON FLUX MEASUREMENTS

For each measurement, report the dates covered by the measurement and the following information:

Location	Flux (pCi/m^2-sec)	Error Estimate (pCi/m^2-sec)

RECOMMENDED OUTLINE FOR SITE SPECIFIC RECLAMATION
AND STABILIZATION COST ESTIMATES

As required under Criteria 9 and 10 of 10 CFR Part 40, Appendix A, the licensee shall supply sufficient information for NRC to verify that the amount of coverage provided by the financial assurance accounts for all necessary activities required under the license to allow the license to be terminated. Cost estimates for the following activities (where applicable) should be submitted to NRC with the initial license application or reclamation plan and updated annually as specified in the license. Cost estimates must be calculated on the basis of completion of all activities by a third party. Unit costs, calculations, references, assumptions on equipment and operator efficiencies, etc., must be provided.

Detailed Cost Information Breakdown for Mills and In-Situ Facilities

The detailed cost information necessary to verify the cost estimates for the above categories of closure work is described in the following outline.

I. FACILITY DECOMMISSIONING

Mill Site Decommissioning. - Dismantling, decontamination and/or disposal of all structures and equipment. - Excavation and burial of contaminated earth (in vicinity of mill site, ore storage area, access roads around the perimeter of the tailings disposal site, evaporation pond residues, etc.) - Reclamation of disturbed areas from the above clean up activities.

In-Situ Facility Decommissioning - This includes dismantling, decontamination and 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 is removed. The remaining equipment would be removed in a second phase, when ground-water restoration and well plugging is complete. The buildings used for the in-situ operations may be decontaminated and released for unrestricted use.

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

1. Labor for dismantling and decontamination:

a. Person-hours and categories of labor;

b. Average hourly wage for each category;

c. Total labor cost (benefits, insurance, etc., and all labor overhead must be included here or calculated on the basis of total project labor).

2. Equipment and material for dismantling and decontamination:

a. Itemization of equipment and material to be used for decontamination;

b. Itemized cost for material and equipment cost per hour listed in (a) above (equipment costs must include hourly operating, ownership and overhead expenses);

c. Operating hours for each piece of equipment;

d. Total equipment and material cost.

B. Non-salvageable building and equipment disposal

1. List of major categories of building and equipment to be disposed of and their corresponding quantities:

a. Structures (list each major) (tons of material and building volume cubic feet);

b. Foundation concrete (cubic yards);

c. Process Equipment (tons);

d. Piping & Insulation (lump sum);

e. Electrical & Instrumentation (lump sum).

2. Unit cost of disposal for each item above (include equipment, labor, material, transportation, and disposal costs).

3. List and state how each chemical solution within the mill area will be disposed of along with the associated cost of disposal.

4. Total cost.

C. Restoration of contaminated areas (ore storage pad, access roads, process area, affected ground water, evaporation pond residues, etc.)

Removal and Disposal of Evaporation Pond and Residues - These materials should be transported to a licensed tailings area or licensed disposal site. The quantity of material to be removed and 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 evaporation ponds and placing top soil or other materials acceptable to NRC. This may also include revegetation.

1. Removal:

   a. Area, depth and quantity of material to be removed (area, feet and cubic yard--or size of liner if appropriate);

   b. Unit cost (include excavation, loading, transportation and deposition);

   c. Total cost (equipment and labor).

2. Revegetation:

   a. Area to be revegetated (acre);

   b. Unit cost (include fill material replacing topsoil, and revegetation cost);

   c. Total cost (equipment, labor and materials).

II. GROUND-WATER RESTORATION AND WELL PLUGGING

Mill Site Ground-Water Restoration - A major concern in the termination of a mill license is the restoration of aquifers that have been contaminated by the operation of a tailings impoundment. As this concern is added to the site-specific reclamation plans, the licensee should include these costs in their surety until the licensee is released from further ground water restoration activities.

In-Situ Site Ground-Water Restoration - 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.

A. Method of restoration

B. Volume of aquifer required to be restored - area and thickness of aquifer -- number of required pumping cycles -- cycling time

C. Equipment associated with aquifer restoration (e.g., RO unit)

D. Verification sample analysis

1. number of samples;

2. unit cost for sample collection and analysis (per sample);

3. total cost for verification sample analysis.

E. Well plugging

1. number of drill holes to be plugged;

2. depth and size of each drill hole;

3. material to be used for plugging--include acquisition, transportation, and plugging;

4. Total cost for well plugging.

F. Total cost for ground-water restoration

III. INTERIM STABILIZATION OF TAILINGS DURING THE DRYING OUT PHASE

Interim Stabilization of the Tailings During Drying - Placement of soil, chemical spraying, snow fences or other control measures over dry tailings to minimize dusting or dispersal of particulates.

A. Drying time

B. Area of dry exposed tailings for each year during the drying period (acres for ____ years)

C. Unit cost for placement of soil, chemical spraying or other methods (Price per acre) (Include material, labor, and equipment)

D. Cost for an enhanced evaporation system, where included in the reclamation and stabilization plan. - Capital costs, labor and operating costs

E. Total cost of interim tailings stabilization

IV. TAILINGS IMPOUNDMENT AREA RECLAMATION

Tailings Impoundment Area Reclamation - Earthwork necessary to recontour the tailings in order to prepare for cover placement. - Placement of cover materials - Revegetation and/or placement of riprap. - Construction of diversion channels or other measures required for long-term stability.

A. Area and quantity of cover material (acres, cubic yards)

B. Location and size of borrow area that serves as a source of cover material. (Include distance from borrow area to tailings impoundment, grade and quantity of material from each borrow area)

C. Labor and equipment unit cost for each type of material (include excavation, loading, transportation, depositing, spreading, and compacting; detailing costs and equipment types and calculations for each function)

D Estimated costs for revegetation of tailings pile, if applicable, and borrow areas (labor, equipment and materials)

E. Estimated costs for riprap/rock armor, if applicable (labor, materials, transportation and equipment)

F. Estimated costs for special engineered features - diversion channels, spillways, etc. (in unit costs) (labor, materials and equipment)

G. Estimated costs for a quality assurance program including field and laboratory testing to assure that the "as built" system conforms to design specifications. Indicate number and type of tests, labor and equipment costs.

H. Fencing costs (unit costs for labor and materials) total length and type of material

I. Additional control measures, if necessary (guard service, etc.)

J. Total cost

If the reclamation plan calls for different layers of soil, such as clay, etc., Items IVA. through IVF. above should be provided for each layer. Reclamation estimates may not always have to include the entire project area (i.e., operations which involve phased reclamation need only include coverage for the maximum area impacted during the period of the license.).

V. RADIOLOGICAL SURVEY AND ENVIRONMENTAL MONITORING

Radiological Survey - Gamma surveys and soil samples for radium in areas to be released for unrestricted use. Soils around the mill building, tailings piles, well field, evaporation ponds and process buildings should be analyzed for radium content. A gamma survey of all areas should be made prior to release for unrestricted use. All equipment released for unrestricted use should be surveyed and records maintained.

A. Soil samples for radium

B. Decommissioning equipment and building smear samples

C. Gamma survey

D. Environmental monitoring

Costs of labor, materials and analysis for continuation of environmental monitoring program throughout reclamation.

E. Total cost

1. Number of each kind sample listed above;

2. Unit cost for sample and analysis (price per sample);

3. Total cost for radiological survey.

VI. PROJECT MANAGEMENT COSTS AND MISCELLANEOUS

Itemize estimated costs associated with project management, engineering changes, mobilization costs, legal expenses, power costs during reclamation, quality control radiological safety costs, etc.

VII. 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.

VIII. LONG-TERM SURVEILLANCE AND CONTROL (FOR MILLS ONLY) CRITERION 10 SPECIFIES A MINIMUM OF $250,000 IN 1978 DOLLARS ($407,960 IN DECEMBER 1986 DOLLARS).

Long-term surveillance and control fund to cover the cost of federal government agency site inspection, monitoring, and control measures, if necessary.

IX. CONTINGENCY.

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

X. ADJUSTMENTS TO SURETY AMOUNTS.

The licensee is required by 10 CFR 40, Appendix A, Criteria 9 and 10 to adjust their 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 ninety (90) days prior to each anniversary of the date on which the first reclamation plan and cost estimate was approved. The adjustment should be made using the inflation rate indicated by the change in the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

B. Changes in Plans

- Changes in the process such as size or method of operation.
- Licensee initiated changes in reclamation plans or reclamation/decommissioning activities performed.
- Adjustments to reclamation plans required by the NRC.
- Proposed revisions to reclamation plans must be thoroughly documented and cost estimates and the basis for cost estimates detailed for NRC review and approval. Where a licensee is authorized by the NRC to secure a surety arrangement with the state, no reduction to the surety amount shall be initiated without prior NRC approval. Copies of all correspondence relating to the surety between the licensee and the State shall

be provided to the NRC. If authorized by the NRC to maintain a surety with the State as the beneficiary, it is the responsibility of the licensee to provide the NRC with verification of same, ensure that the agreement with the State specifically identifies the financial surety's application to the mill facility, ISL facility, tailings and related area decommissioning/reclamation and transfer of the long-term surveillance and control fee to the U.S. Department of the Treasury prior to license termination.

All costs (unit and total) are to be estimated on the basis of independent contractor costs (include overhead and profit in unit costs or as a percentage of 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 on the estimated costs.

The 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 (highway cost construction). The licensee should provide supporting information or the basis for their selection of the unit cost figures used in their estimates.

40-4492/attachments to license

DISTRIBUTION

Docket File 40-4492
LFMB
PDR/DCS
RBangart, RIV
RHeyer
WDEQ (2)
RCPD, WY
LLO Branch, LLWM
URFO r/f

CONCURRENCE:

RDSmith/URFO

RHeyer/URFO
lmv

DATE:

2/14/89

2-13-89