

December 31, 2001

Ms. Donna L. Wichers,  
General Manager  
COGEMA Mining, Incorporated  
P.O. Box 730  
Mills, WY 82644

SUBJECT: AMENDMENT 6 FOR SUA-1341, IRIGARAY AND CHRISTENSEN RANCH  
PROJECTS, SURFACE DECOMMISSIONING PLAN

Dear Ms. Wichers:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of your Decommissioning Plan (Plan) for the COGEMA Mining, Inc. (COGEMA) Irigaray and Christensen Ranch In Situ Leach Uranium Projects, dated December 19, 2000. The Plan was revised by submittals dated June 15, June 18, and August 31, 2001. Your correspondence and discussion of December 12, 2001, indicated that SUA-1341 License Conditions 9.3, 9.5, 9.8, and 11.3 should be revised to reflect approval of the Plan and the annual surety up-date submitted August 17 and October 29, 2001. The staff has determined that the Plan and the surety up-date are acceptable.

License SUA-1341, has been revised to include approval of the Plan in License Condition (LC) 9.3, a change to the surety amount in LC 9.5, release of material in LC 9.8, and the decommissioning monitoring program in LC 11.3. The technical evaluation of these changes is presented in Enclosure 1. The staff also took this opportunity to revise LC 9.4 to standard language. The license is being reissued to incorporate these changes and is Enclosure 2.

The NRC staff evaluated the potential impact of implementation of the Plan and prepared an Environmental Assessment (EA) that is provided in Enclosure 3. The EA finding was that there would be no significant impact from this licensing action. A notice to this effect has been submitted for publication in the Federal Register and the notice includes an opportunity for a hearing.

If you have any questions regarding this letter or the enclosures, please contact the NRC Project Manager for your facilities, Ms. Elaine Brummett, at (301) 415-6606 or she can also be reached by e-mail at [esb@nrc.gov](mailto:esb@nrc.gov).

D. Wichers

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Melvyn N. Leach, Chief  
Fuel Cycle Licensing Branch  
Division of Fuel Cycle Safety  
and Safeguards  
Office of Nuclear Material Safety  
and Safeguards

Docket No: 40-8502  
SUA-1341

Enclosures: 1. Technical Evaluation Report  
2. SUA-1341, Amendment 6  
3. Environmental Assessment

cc: G. Mooney, WDEQ - District III  
R. Poyser, COGEMA  
G. Queen, BLM, Buffalo

D. Wichers

-2-

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<b>NAME</b>	EBrummett		JMuszkiewicz		GJanosko		MLeach	
<b>DATE</b>	12/19/01		12/20/01		12/31/01		12/31/01	

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TECHNICAL EVALUATION OF THE DECOMMISSIONING PLAN  
FOR THE IRIGARAY AND CHRISTENSEN RANCH PROJECTS,  
COGEMA MINING INC.

DOCKET NO.: 40-8502      LICENSE NO.: SUA-1341

LICENSEE: COGEMA Mining Inc.

SITE: Irigaray and Christensen Ranch In-Situ Leach Projects, Johnson County, Wyoming

DATE: December 12, 2001

TECHNICAL REVIEWERS: Plan - Elaine Brummett, Health Physicist  
Surety - Dan Rom, Michael Layton, and E. Brummett

PROJECT MANAGER: Elaine Brummett

SUMMARY:

The "Decommissioning Plan for Irigaray and Christensen Ranch Projects" (Plan) was submitted by COGEMA Mining, Inc. (COGEMA) by letter dated May 8, 2000. The Plan is for land and structures since the ground water restoration plan was approved previously. The U. S. Nuclear Regulatory Commission (NRC) staff determined that the provided information was not complete (letter of July 3, 2000), therefore, COGEMA submitted a revised plan by letter dated December 19, 2000. The NRC staff completed review of the document and forwarded a request for additional information to COGEMA on March 8, 2001. COGEMA's response and page changes for the Plan were provided June 15 and June 18, 2001, with additional information provided August 31, 2001. The up-dated surety cost estimate for decommissioning activities was submitted August 17, 2001, and supplemented by data dated October 29, 2001.

The Plan and the estimated cost to implement it (surety amount) were reviewed. The NRC staff recommends amending the license to reflect approval of the Decommissioning Plan in conjunction with approval of the up-dated surety estimate.

BACKGROUND:

The COGEMA letter of September 7, 2000, stated that the last operating wellfield at Christensen Ranch shut-down on June 23, 2000, and that wellfield operations at Irigaray ended in 1994. COGEMA obtained a possession only license in March 2001, and is no longer authorized to use lixiviant to extract uranium. COGEMA is limited by license condition to a maximum recovery of 22,727 kg (50,000 pounds) of yellowcake per year only from restoration fluid (ground water pumped and treated to restore the aquifer). The schedule provided in the Plan indicates that COGEMA will begin surface decommissioning in 2002 and complete the work in 2006, after groundwater restoration is complete.

The areas of review for the decommissioning of land and structures are the nature and extent of the contamination, how and what measurements will be made, quality assurance program, gamma guideline level for soil cleanup, how "as low as is reasonably achievable" (ALARA) will be demonstrated, and verification (final status survey) procedures. The staff already reviewed the land reclamation (recontouring and re-seeding) plan in the license renewal application as

incorporated into License Condition 9.3, and the State approved that plan under the mining permit.

For land, the residual radium (Ra-226) must meet the concentration limits in Part 40, Appendix A, Criterion 6(6), in areas that are not evaluated by the radon flux criterion (i.e., areas other than a disposal cell). For NRC uranium recovery licensees such as COGEMA that did not have a final decommissioning plan approved by June 11, 1999, the radium benchmark dose applies for cleanup of residual radionuclides other than radium (primarily uranium (U-nat) and thorium (Th-230)) in soil and on structures to remain on site.

## The Sites

The two COGEMA sites are approximately 11.2 km (7 miles) apart. Only the Irigaray site has yellowcake drying and packaging facilities. The uranium loaded ion exchange resin from Christensen Ranch is transferred to Irigaray for processing. Both sites have uranium extraction/groundwater restoration plants, small utility buildings, wellfield or shop buildings, wellfields, and evaporation ponds. The area disturbed by licensed activities is approximately 133 acres at Irigaray and 554 acres at Christensen Ranch. The activities began in 1978 and 1989, respectively. COGEMA ended the in-situ leach portion of operation in 1994 at Irigaray and in 2000 at Christensen Ranch. Ground-water restoration activities should be completed at Irigaray by the end of 2001 and at Christensen Ranch in 2005.

## EVALUATION:

### (1) Soil Background Radioactivity

COGEMA determined the background level of U-nat, Ra-226, Th-230, and Pb-210 in surface soil using pre- and post-operational samples. The samples were taken near the plant, at environmental monitoring stations, and in the wellfields. The areas were not affected by site activities and are geologically and chemically similar to the contaminated areas. The number of pre-operational sample locations were 20 at Irigaray and 87 at Christensen Ranch and the post-operational numbers were 34 and 4, respectively. Up to 17 annual samples per location were averaged. The background soil data for the two sites did not represent the same area and depth required for samples that will demonstrate compliance. Also, there is no assurance that appropriate quality assurance and control were achieved in all of the analyses. However, because of the variability of the low levels (1.2-2.5 pCi/g) and the propose conservative gamma guideline, the NRC staff determined that the proposed soil background values are acceptable.

### (2) Site Characterization

The three former research and development sites were included in the site gamma survey. Areas 517 and USMT are on the north edge of the Irigaray facility and the Willow Creek site is now encompassed by Christensen Ranch Unit 5. The Plan stated that some areas require further investigation after gamma sources are removed. The data for these should be provided in the final status survey.

Only a few small areas were indicated as requiring remediation. The methods and equipment used to identify residual radioactivity were discussed in the Plan and appear to be adequate.

### (3) Proposed Criteria for Soil Uranium and Surface Activity

The Plan stated that soil contaminated with Th-230 is not of concern at either site because the extraction and process solutions contained low levels of this radionuclide. Criteria for uranium in soil and for surface activity on structures were derived from the radium benchmark dose, as required by Part 40, Appendix A, Criterion 6(6). Dose modeling was performed by the licensee using the DandD and RESRAD codes. COGEMA assumed that no one would live in the warehouse-type structures but that industrial or ranch workers would occupy the buildings 8 hours a day. Consider the type of buildings and the location of the sites, the staff considers that the model input values are reasonable.

The lowest dose result of 25 mrem/year was used to calculate that a uranium level of 400 pCi/g will provide a dose equivalent to 5 pCi/g Ra-226. According to Criterion 6(6), a higher level could apply to subsurface soil but COGEMA performed a chemical toxicity analysis that indicated a limit of 600 pCi/g was required. Considering the ALARA principle, COGEMA proposed (Sections 7.1 and 7.2.3 of the Plan) uranium cleanup goals of 150 pCi/g for surface (top 6 inches) and 400 pCi/g for subsurface soil. The residual radionuclide mixture possible in the soil was considered and the Plan indicates that the sum of fractions (unity rule) will be applied so that the total potential dose from residual radionuclides will not exceed 25 mrem/yr.

Section 6.1 of the Plan indicates that the surface activity limit for structures to remain on site is based on the maximum dose to workers of 25 mrem/yr according to 10 CFR 20.1402. The licensee should note that the regulation referenced is in Subpart E and does not apply to uranium recovery facilities. Since 25 mrem/yr is also the radium benchmark dose for the sites, the value is acceptable.

### (4) Gamma Guideline Level

The radium-gamma correlation is used to determine a gamma guideline value that represents the Ra-226 cleanup limit. The licensee's process for determining the preliminary correlation was difficult because only a few areas are contaminated and at very low levels. The correlation was developed using a 5-sample composite and the meter at 18 inches above the surface of each sample location. An action level (25,000 cpm) was chosen that approximates the upper value within the range (13,000-30,000 cpm) of soil radium background at these sites, and is acceptable to staff. According to COGEMA, this value corresponds to 20  $\mu$ R/hr on the Ludlum 19 Micro-R meter. The licensee committed to verify the correlation during the final status survey, as recommended in the NRC guidance (NUREG-1620, Section 5.2).

### (5) ALARA

For soil cleanup, the application of ALARA is reflected in a conservative gamma guideline level based on the upper range of background values (see above). On page 55 of the Plan, it states that the subsurface ALARA cleanup level for soil Ra-226 will be 10 pCi/g. Also, on page 43, it states that wellfield piping will be removed if it is less than 2-feet deep, as an ALARA initiative.

Section 5.1 provides the release limits for alpha contamination that are recommended in NRC guidance. COGEMA has not proposed administrative limits but indicates on page 47 that decontamination of surfaces will reduce the contamination as far below the limits as practical and that the building surface activity ALARA goal is 1000 dpm/100 cm<sup>2</sup> for total alpha (based on

measurements of 5 percent removable alpha), which is acceptable.

#### (6) Instruments and Procedures

The instruments and techniques to be used for verification of compliance with Criterion 6(6) are not very similar to those used to assess background values because the licensee relied on environmental monitoring data that requires single samples of the top 5 cm of soil. Because of the low proposed gamma guideline value, and the low background values proposed (2 pCi/g for both Ra-226 and U-nat) the staff considers that, given the risk involved, this is not an issue.

The staff determined that instrument sensitivity should be adequate to reliably identify the proposed guideline levels. The Plan states that meter readings are to be taken over the spot to be soil sampled or the grid is to be scanned with 9 to 12 readings per 100 m<sup>2</sup> grid or a minimum of 7 gamma records per grid via the global positioning system survey. Integrated count rate gamma scan readings will be taken for at least 1 minute within each grid. Appendix C indicates the structure surface and soil scanning speeds will be monitored.

Procedures for measuring alpha or beta-gamma radiation on surfaces are detailed, reflect industry standards, and consider that smears for alpha activity generally have a 10 percent efficiency. Measurement of smears are difficult to interpret quantitatively and will not be used for determining compliance but for determining if further investigation is necessary.

Soil samples will be composites of five per grid and sample handling will follow appropriate procedures. Plan Appendix E indicates that the samples verifying compliance will be returned to COGEMA and be archived until the NRC approves the decommissioning completion (final status survey) report, as staff may want to do confirmatory analysis on selected soil samples. The final disposal of these archived samples will be the same as other contaminated materials.

The extent of contamination (area and volume for soil) above the standards or guidelines has been established from adequate representative sampling or surveying. The Plan proposes to use the subsurface 15 pCi/g Ra-226 standard, but indicates that at least 15 cm (6 inches) of uncontaminated covering material should remain in place for at least 200 years in these areas. If the final status survey results indicate that the subsurface standard was applied to more than a few scattered grids, the NRC staff will perform dose modeling to confirm that the material will not present a potential health hazard.

#### (7) Quality Assurance and Quality Control

The Plan addresses the quality assurance and control of both the laboratory data and field measurements in Section 7 and Appendix E. Ten percent of the verification soil samples will be split and a portion sent to another laboratory for quality assurance.

#### (8) Final Status Survey

The proposed final status survey (radiation survey and soil analyses) should allow the licensee to demonstrate compliance with §40.42(j)(2) and provide enough data of the proper quality after decommissioning to demonstrate compliance with Criterion 6(6) of Appendix A and §40.42(k)(2). For example, the proposed number and pattern of grids to be soil sampled and analyzed for Ra-226 are justified.

Based on the degree of uncertainty (level of error in the measurements, number of measurements), the gamma guideline level, and implementation procedures, the staff considers the proposed soil sampling plan of 10 percent of the grids with the highest average gamma level, adequate. Some verification soil sampling and surveying is planned in areas of suspected contamination and presumably uncontaminated areas. The NRC guidance in NUREG-1620 recommends that data be obtained for a buffer zone (unaffected area) of about 30 meters beyond the excavated areas.

The licensee proposes to use the same instruments and procedures for the verification (final status) survey as were used in determining the soil radium-gamma correlation. The correlation will be confirmed with the verification (final survey) data. Also, additional cleanup will be performed if a verification soil sample exceeds the Ra-226 standard, additional grids will be sampled, and a statistical test conducted (Plan Appendix E, SOP D-3).

Since some buildings are to remain on site after license termination, measurements of the surface activity are proposed. Measurements will also be performed to substantiate that release for unrestricted use guidelines (Table 1 of Regulatory Guide 1.86, or as provided in Policy and Guidance Directive FC 83-23, NRC, 1983) are met for equipment and materials that will be release from the site, but not transferred to another licensee.

#### (9) Records and Health and Safety

The plan addresses the NRC requirements concerning protection of workers, the public, and the environment (Plan Section 8). The licensee stated that most licensed activities are not significantly different for decommissioning, and that current procedures for training and supervision are adequate. The licensee did commit to develop a standard operating procedure for dismantling the dryer furnace. The proposed measures should keep exposures ALARA and in compliance with the requirements of Part 20. Components of the safety program address hazards unique to the decommissioning work environment.

Some monitoring changes were proposed and justified (Tables 8-1 and 9-1, Sections 9.8, 9.4, 9.6, and 9.7). Also, Section 2.3 identifies a location to keep the records of information important to the decommissioning (the Radiation Safety Officer's office).

Section 12 of the Plan contains a commitment to provide the decommissioning completion (final status survey) report within 6 months of completion of surface decommissioning.

#### (10) Non-Radiological Hazardous Constituents

The Plan addressed the non-radiological hazardous constituents of the byproduct material in Section 9.8.

#### (11) Surety and Schedule

Section 11 of the Plan indicates that the cost estimate for decommissioning is dated August 18, 2000 (actually dated August 17, 2000), but the NRC staff requested more detailed information and deferred evaluation until the Plan had been reviewed (NRC letter of October 6, 2000, and NRC comment 17 of March 8, 2001). A revised cost estimate was provided by COGEMA on August 17, 2001, as part of the annual surety up-date. Additional information concerning the

estimated decommissioning costs was requested by NRC staff September 28, 2001, and provided by COGEMA October 29, 2001. The licensee proposes to reduce the surety amount by \$525,942 because of work completed (e.g., well-plugging) and less land to be excavated. The licensee indicated that wage and utility costs were based on current charges and all activities proposed in the Plan were reflected in the estimate. The staff reviewed this information and determined that the proposed surety amount is adequate to meet Part 40, Criterion 9.

The estimated decommissioning completion date of 2006, is justified because soil and building decommissioning depends on completion of ground water corrective action in all wellfields. Therefore, decommissioning will be completed as soon as practicable.

#### CONCLUSIONS:

The staff has completed its review of the Decommissioning Plan for soil and structures at COGEMA's Irigaray and Christensen Ranch uranium in situ leach facilities. This review included an evaluation using the review procedures and acceptance criteria in the Title I SRP (draft NUREG-1569) Sections 6.3 and 6.4. The staff concludes that the Plan information is acceptable and should result in compliance with 10 CFR Part 40, Appendix A, Criterion 6(6), for radium and other residual radionuclides in soil and residual surface activity on structures to remain on site, including a demonstration of ALARA and application of the unity rule where applicable.

The Plan contents meet the criteria of §40.42(g)(4). The Plan mentions the location of records of information important to the decommissioning required by 10 CFR 40.36(f) and sufficiently demonstrates that the proposed decommissioning activities will result in compliance with §40.42(j) requirements to conduct a radiation survey (but do not have to meet Part 20 subpart E criteria). The Plan addresses the §40.42(k)(1) and (2) requirements that source material be properly disposed of and reasonable effort be made to eliminate residual radioactive contamination, and for §40.42(g)(5), that decommissioning will be completed as soon as practicable and will protect the health and safety of workers and the public. The decommissioning cost estimate meets the requirements of §40.42(g)(4)(v) and Appendix A, Criterion 9.

The staff has also completed its review of the radiation safety controls and monitoring for site worker, public, and environmental protection during decommissioning at the Irigaray and Christensen Ranch uranium recovery facilities. This review included an evaluation using the review procedures in the Title II SRP (NUREG-1620), Section 5.3.2 and the acceptance criteria outlined in SRP Section 5.3.3. Based on the information provided in the Plan and the detailed review conducted of the radiation safety controls and monitoring for worker, public, and environmental protection during decommissioning of the Irigaray and Christensen Ranch uranium recovery facilities, the staff has concluded that the radiation controls and monitoring programs are acceptable and are in compliance with 10 CFR 20.1101. This regulation requires development, documentation, and implementation of a radiation protection program ensuring compliance with Part 20 requirements and the use of procedures and engineering controls to achieve occupational and public doses that are ALARA. The requirements in §40.42(g)(4)(iii) to describe methods that ensure protection of workers and the environment against radiation hazards during decommissioning have been met.

## ENVIRONMENTAL ASSESSMENT:

The NRC staff evaluated of the potential impact of implementing the proposed Decommissioning Plan and prepared an environmental assessment. The finding of the review was that no significant impact from implementation of the Plan, and a notice to this effect was submitted to the Federal Register for publication.

## RECOMMENDED LICENSE CONDITION CHANGES:

Revise License Condition (LC) 9.3 to insert a sentence (new paragraph) between the first and second paragraphs:

The land and structures will be decommissioned according to the Decommissioning Plan submitted December 19, 2000, as revised by submittals dated June 15, June 18, and August 31, 2001.

Replace LC 9.4 with the standard language developed by the Fuel Cycle Licensing Branch to reflect the recent changes to 10 CFR 50.59.

### 9.4 Performance Based License Condition

- a) The licensee may, without obtaining a license amendment pursuant to §40.44, and subject to conditions specified in Part b of this condition:
  - (i) make changes in the facility as described in the license application (as updated),
  - (ii) make changes in the procedures as described in the license application (as updated), and
  - (iii) conduct test or experiments not described in the license application (as updated).
  
- b) The licensee shall obtain a license amendment pursuant to §40.44 prior to implementing a proposed change, test or experiment if the change, test, or experiment would:
  - (i) Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
  - (ii) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated);
  - (iii) Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
  - (iv) Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the

- license application (as updated);
- (v) Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated);
  - (vi) Create a possibility for a malfunction of an SSC important to safety with a different result than previously evaluated in the license application (as updated);
  - (vii) Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER), or the environmental assessment (EA), or technical evaluation reports (TERs), or other analysis and evaluations for license amendments.
  - (viii) The change, test, or experiment is consistent with the NRC conclusions, or the basis of, or analysis leading to the conclusions of, actions, designs, or design configurations analyzed and selected in the site or facility Safety Evaluation Report, Technical Evaluation Report (TER), and Environmental Impact Statement (EIS), or Environmental Assessment (EA), including all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.
- c) The licensee's determinations concerning Part b of this condition, shall be made by a Safety and Environmental Review Panel (SERP). The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management (e.g., Plant Manager) and shall be responsible for financial approval for changes; one member shall have expertise in operations and/or construction and shall have responsibility for implementing any operational changes; and, one member shall be the radiation safety officer (RSO) or equivalent, with the responsibility of assuring changes conform to radiation safety and environmental requirements. Additional members may be included in the SERP as appropriate, to address technical aspects such as ground water, hydrology, surface water hydrology, specific earth sciences, and other technical disciplines. Temporary members or permanent members, other than the three above-specified individuals, may be consultants.
- d) The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations made by the SERP, that provide the basis for determining changes are in compliance with Part b of this condition. The licensee shall furnish, in an annual report to the NRC, a description of such changes, test, or experiments, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit to the NRC changed pages, which shall include both a change indicator for the area changed, e.g. a bold line vertically drawn in the margin adjacent to the portion actually changed, and a page change identification (date of change or change number or both), to the operations plan and reclamation plan of the approved license application (as updated) to reflect changes made under this

condition.

Replace the surety amount in the last paragraph of LC 9.5 with:

\$13,575,224.

Revise LC 9.8 to add at the end:

or in accordance with Section 5.1 of the approved Decommissioning Plan.

Revise LC 11.3 to read:

The licensee shall conduct effluent, personnel, and environmental monitoring programs in accordance with Tables 8-1 and 9-1 of the approved Decommissioning Plan.

**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, 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. Cogema Mining, Inc.	3. License Number SUA-1341, Amendment No. 6
2. P.O. Box 730 Mills, Wyoming 82644	4. Expiration Date Until terminated
	5. Docket No. 40-8502 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
Uranium and 11e.(2) byproduct	Unspecified	Unlimited

**SECTION 9: Administrative Conditions**

- 9.1 The authorized place of use shall be the licensee's Irigaray and Christensen Ranch Satellite facilities in Johnson and Campbell Counties, Wyoming.
- 9.2 All written notices and reports to the NRC required under this license, shall be addressed to the Chief, Fuel Cycle Licensing Branch, c/o of Documents Control Desk, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, U. S. Nuclear Regulatory Commission, 11545 Rockville Pike, Two White Flint North, (Mail Stop T-8-A-33) Rockville, MD 20852-2738.

Required telephone notification shall be made to the NRC Operations Center at (301) 816-5100, unless otherwise specified in license conditions.

[Applicable Amendment: 4]

- 9.3 The licensee shall conduct operations in accordance with the commitments, representations, and statements contained in the January 5, 1996, license renewal application submittal as revised by the September 3, 1997 "Responses to NRC Comments on the License Renewal Application for Source Material License SUA-1341," and as supplemented by the December 13, 1996, submittal requesting a performance based license condition for approval of the startup of new well fields, including standard operating procedures, and hereinafter referred to as the "approved license application." The approved license application is hereby incorporated by reference except where superseded by license conditions below.

The land and structures will be decommissioned according to the Decommissioning Plan submitted December 19, 2000, as revised by submittals dated June 15, June 18, and August 31, 2001.

Whenever the word "will" is used in the above referenced documents, it shall denote a requirement.

[Applicable Amendments: 4, 6]

**MATERIALS LICENSE  
SUPPLEMENTARY SHEET**License Number  
SUA-1341Docket or Reference Number  
40-8502

Amendment No. 6

## 9.4 Performance Based License Condition

- b) The licensee may, without obtaining a license amendment pursuant to §40.44, and subject to conditions specified in Part b of this condition:
- (i) make changes in the facility as described in the license application (as updated),
  - (ii) make changes in the procedures as described in the license application (as updated), and
  - (iii) conduct test or experiments not described in the license application (as updated).
- b) The licensee shall obtain a license amendment pursuant to §40.44 prior to implementing a proposed change, test or experiment if the change, test, or experiment would:
- (i) Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
  - (ii) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated);
  - (iii) Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
  - (iv) Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the license application (as updated);
  - (v) Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated);
  - (vi) Create a possibility for a malfunction of an SSC important to safety with a different result than previously evaluated in the license application (as updated);
  - (vii) Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER), or the environmental assessment (EA), or technical evaluation reports (TERs), or other analysis and evaluations for license amendments.
  - (viii) The change, test, or experiment is consistent with the NRC conclusions, or the basis of, or analysis leading to the conclusions of, actions, designs, or design configurations analyzed and selected in the site or facility Safety Evaluation Report, Technical Evaluation Report (TER), and Environmental Impact Statement (EIS), or Environmental Assessment (EA), including all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

**MATERIALS LICENSE  
SUPPLEMENTARY SHEET**

License Number

SUA-1341

Docket or Reference Number

40-8502

Amendment No. 6

- c) The licensee's determinations concerning Part b of this condition, shall be made by a Safety and Environmental Review Panel (SERP). The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management (e.g., Plant Manager) and shall be responsible for financial approval for changes; one member shall have expertise in operations and/or construction and shall have responsibility for implementing any operational changes; and, one member shall be the radiation safety officer (RSO) or equivalent, with the responsibility of assuring changes conform to radiation safety and environmental requirements. Additional members may be included in the SERP as appropriate, to address technical aspects such as ground water, hydrology, surface water hydrology, specific earth sciences, and other technical disciplines. Temporary members or permanent members, other than the three above-specified individuals, may be consultants.
- d) The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations made by the SERP, that provide the basis for determining changes are in compliance with Part b of this condition. The licensee shall furnish, in an annual report to the NRC, a description of such changes, test, or experiments, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit to the NRC changed pages, which shall include both a change indicator for the area changed, e.g. a bold line vertically drawn in the margin adjacent to the portion actually changed, and a page change identification (date of change or change number or both), to the operations plan and reclamation plan of the approved license application (as updated) to reflect changes made under this condition.

[Applicable Amendments: 4, 6]

- 9.5 The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criterion 9, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination, offsite disposal of radioactive solid process or evaporation pond residues, and ground-water restoration as warranted. The surety shall also include the costs associated with all soil and water sampling analyses necessary to confirm the accomplishment of decontamination.

Within 3 months of NRC approval of a revised decommissioning plan and its cost estimate, the licensee shall submit for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs in the newly approved decommissioning plan exceed the amount covered in the existing financial surety. The revised surety shall then be in effect within 3 months of written NRC approval.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criterion 9, shall be provided to NRC by August 18 of each year. Financial surety coverage for the full amount of the NRC-approved decommissioning cost estimate shall not lapse for any time period prior to license termination. If NRC has not approved a proposed revision 30 days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing arrangement, prior to expiration, 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, changes in engineer in plans, activities performed, and any other conditions affecting estimated costs for site closure.

At least 90 days prior to beginning construction associated with any planned expansion or operational change which was not included in the annual surety update, the licensee shall provide for NRC approval an updated surety to cover the expansion or change.

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The licensee shall also provide NRC with copies of surety-related correspondence submitted to the State of Wyoming, a copy of the State's surety review, and the final approved surety arrangement. The licensee must also ensure that the surety, where authorized to be held by the State, expressly identifies the NRC-related portion of the surety and covers the cost of above-ground decommissioning and decontamination, offsite disposal, soil and water sample analyses, and ground-water restoration associated with the site. The basis for the cost estimate is the NRC-approved site closure plan or the NRC-approved revisions to the plan. The reclamation/ decommissioning plan, cost estimates, and annual updates should follow the outline in the Appendix E to NUREG-1569 (NRC, 1997), entitled, "Recommended Outline for Site Specific *In Situ* Leach Facility Reclamation and Stabilization Cost Estimates."

The licensee's currently approved surety, Irrevocable Standby Letter of Credit issued by the HSBC Bank USA in favor of the State of Wyoming, Department of Environmental Quality shall be continuously maintained in an amount no less than \$13,575,224 for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Wyoming and the NRC.

[Applicable Amendments: 1, 2, 4, 6]

- 9.6 Written standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, stored, or transported by the licensee at or between the Irigaray and Christensen Ranch sites. SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed in accordance with 10 CFR Part 20. Additionally, written procedures shall be established and followed for non-operational activities to include in-plant and environmental monitoring, bioassay analyses and instrument calibrations. An approved, up-to-date copy of each written procedure shall be kept in specified locations in the process area to which it applies.

All written procedures for both operational and non-operational activities shall be reviewed and approved in writing by the Radiation Safety Officer (RSO) before implementation and whenever a change in a procedure is proposed to ensure that proper radiation protection principles are being applied. Additionally, the RSO shall perform a documented review of all operating procedures at least annually.

- 9.7 The licensee shall dispose of 11e.(2) byproduct material, including evaporation pond residues, from the Irigaray and Christensen Ranch Satellite facilities at a site licensed by NRC or an NRC Agreement State to receive 11e.(2) byproduct material. The licensee shall identify the disposal facility to NRC in writing. The licensee's approved waste disposal agreement must be maintained onsite. In the event the agreement expires or is terminated, the licensee shall notify NRC in writing, in accordance with License Condition 9.2, within 7 days after the date of expiration or termination. A new agreement shall be submitted for NRC approval within 90 days after expiration or termination. If the licensee is not able to secure this agreement, then the licensee must increase the surety to include disposal at a commercial 11e.(2) disposal facility.

[Applicable Amendment: 4]

- 9.8 Release of equipment, materials, or packages from the restricted area shall be in accordance with the NRC guidance document entitled, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated August 1987, or suitable alternative procedures approved by NRC prior to any such release or in accordance with Section 5.1 of the approved Decommissioning Plan.

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[Applicable Amendment: 4, 6]

- 9.9 Before engaging in any developmental activity not previously assessed by NRC, the licensee shall administer a cultural resource inventory. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act of 1966 (as amended) and its implementing regulations (36 CFR Part 800), and the Archaeological Resources Protection Act of 1979 (as amended) and its implementing regulations (43 CFR Part 7).

To ensure that no unapproved disturbance of cultural resources occurs, any work resulting in the discovery of previously unknown cultural artifacts shall cease. The artifacts shall be inventoried and evaluated in accordance with 36 CFR Part 800, and no disturbance shall occur until the licensee has received authorization from NRC to proceed.

[Applicable Amendment: 4]

- 9.10 The licensee shall maintain restricted area boundaries at the Irigaray and Christensen Ranch facilities as described in Section 5.8.1 of the approved license application. Additionally, the Irigaray and Christensen Ranch well field buildings shall be restricted, if required, based on the results of radiological surveys.
- 9.11 The licensee is hereby exempted from the requirements of Section 20.1902(e) of 10 CFR 20 for areas within the Irigaray and Christensen Ranch facilities, provided that all entrances to the facility are conspicuously posted in accordance with Section 20.1902(e) and with the words, **"ANY AREA WITHIN THIS FACILITY MAY CONTAIN RADIOACTIVE MATERIAL."**
- 9.12 The RSO shall have the health physics authorities, responsibilities, and technical qualifications identified in Regulatory Guide 8.31.
- 9.13 DELETED BY Amendment No. 4.

**SECTION 10: Operations, Controls, Limits, and Restrictions**

- 10.1 The licensee is not authorized to inject lixiviant.

[Applicable Amendment: 4]

- 10.2 The licensee shall construct all wells in accordance with methods described in Section 3.3.2 of the approved license application.

Any failed well casing that cannot be repaired to pass the integrity test shall be appropriately plugged and abandoned, using procedures set out in Section 3.3.2 of the approved license application.

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10.3 The licensee shall establish pre-operational baseline water quality data for all production units. Baseline water quality sampling shall provide representative pre-mining groundwater quality data and restoration criteria as described in the approved license application. The data shall be from wells established in the mining zone, the mining zone perimeter, the upper aquifer and the lower aquifer where present, with spacing and locations as specified in the approved license application. The data shall, at a minimum, consist of the sample analyses shown in Table 5.25 of Section 5.8.2.2 of the approved license application.

The wells used for obtaining baseline groundwater quality in current and future production areas shall be established at the following minimal density:

<u>Monitored Unit</u>	<u>Density</u>
Ore Zone Monitors	All
Ore Zone Baseline (restoration)	1 well per 4 acres of pattern area
Shallow Zone Monitors	1 well per 3.5 acres of pattern area
Deep Zone Monitors (where zone present)	1 well per 3.5 acres of pattern area

Wells utilized to establish baseline groundwater quality for past Irigaray production areas were as follows:

<u>Monitored Unit</u>	<u>Wells per Monitored Unit</u>
Irigaray Unit 1 Sandstone	2
Irigaray deep monitor zone	2
Irigaray perimeter and trend monitor wells (Units 1-9)	70 percent of installed wells

Baseline groundwater quality in previously approved production areas shall be the mean data values (well field average) from the following submittals:

<u>Irigaray</u>	
Units 1-5	April 16, 1990 (refers to WDEQ permit 478)
Unit 6	April 4, 1988
Unit 7	November 2, 1987 (Table 4)
Units 8-9	January 28, 1988
<u>Christensen Ranch</u>	
Unit 3 and Module 2 expansion	December 1, 1988 (Table 2)
Unit 3 expansion and Module 4A expansion	August 8, 1991 (Table 6)

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Unit 2 south portion  
Unit 2 north portion  
Unit 4  
Unit 5

November 27, 1992 (Table 2)  
April 16, 1992 (Table 2)  
April 1, 1994 (Table 6)  
February 28, 1995 (Table 7)

[Applicable Amendment: 4]

- 10.4 Prior to mining in each production unit, the licensee shall collect groundwater samples and establish Upper Control Limits (UCLs) in accordance with Section 5.8 of the approved license application. UCLs for monitor wells established prior to the issuance of the Performance Based License Condition (PBLC) in December 1996, are provided in Table 5.26 for the Irigaray site and Table 5.27 for the Christensen Ranch site in Section 5.8 of the approved license application. UCLs shall be applied to all monitor wells in conformance with the approved license application and appropriate SOPs. The UCL parameters shall be chloride, conductivity, and total alkalinity.

[Applicable Amendment: 4]

- 10.5 The licensee is authorized to produce yellowcake only from restoration fluid. Annual yellowcake production shall not exceed 50,000 pounds.

[Applicable Amendment: 5]

- 10.6 Solution evaporation ponds A, B, C, D and E, and the 517 ponds shall have at least 2 feet of freeboard. Ponds RA and RB shall have at least 8 feet of freeboard. The 8-foot freeboard may be temporarily changed to a 2 foot in either RA or RB as long as sufficient reserve capacity is available in the overall pond system to accept the contents of one of the ponds in case of leakage. The Christensen Ranch permeate storage pond, brine ponds and filter backwash pond (if constructed) shall have at least 2 feet of freeboard.

Additionally, the licensee shall, at all times, maintain sufficient reserve capacity in the evaporation pond system to enable the transfer of the contents of a pond to other ponds. In the event of a leak and subsequent transfer of liquid, the freeboard requirements shall be suspended during the repair period.

[Applicable Amendment: 4]

- 10.7 All liquid effluents from process buildings and other process waste streams, with the exception of sanitary wastes, shall be returned to the process circuit, discharged to the solution evaporation ponds, or disposed of as allowed by NRC regulations.

Additionally, the licensee is authorized to dispose of process solutions, injection bleed, and restoration brine in the following wells:

COGEMA DW No. 1  
Christensen 18-3  
DW-1  
DW-2

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The licensee shall maintain a record of the volumes of solution disposed in these wells and submit this information in the annual monitoring report.

[Applicable Amendment: 4]

10.8 The licensee shall maintain effluent control systems as specified in Section 4.0 of the approved license application, with the following additions:

- A. Operations shall be suspended within 1 hour in the dry/pack area of the plant if any of the emission control equipment for the yellowcake drying or packaging areas is not operating within the ranges permitted by WDEQ Air Quality Permit No. OP-254.
- B. The licensee shall, during all periods of yellowcake drying operations, assure that the scrubber is operating within the recommended ranges for water flow and air pressure differential. This shall be accomplished by use of continuous monitoring equipment which will record the scrubber flow rate and differential pressure, and signal an audible alarm if they fall below the recommended ranges in the permit. Manual readings and alarm checks will be documented once per 12-hour shift.
- C. The furnace draft pressure shall be read and documented once per 12-hour shift, and maintained within the design specification of -0.1 to -0.5 inches of water.

[Applicable Amendment: 4]

10.9 The licensee shall use a Radiation Work Permit (RWP) for all work or non-routine maintenance jobs where the potential for significant exposure to radioactive material exists and for which no standard written operating procedure exists. All RWPs shall be accompanied by a breathing zone air sample or applicable area air sample. The RWP shall be issued by the RSO or designee qualified by way of specialized radiation protection training, and RWPs shall include, as a minimum, the information described in Section 2.2 of Regulatory Guide 8.31.

10.10 The licensee shall sample particulates and radon progeny on a monthly frequency at the Irigaray and Christensen Ranch Satellite locations shown on Figures 5.2 and 5.3 of the approved license application. Additional sampling locations can be added by the licensee through the SERP.

[Applicable Amendment: 4]

10.11 If employees do not shower prior to leaving the restricted area, they shall monitor themselves with an alpha survey instrument prior to exiting in conformance with Regulatory Guide 8.30.

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10.12 The licensee shall implement the bioassay program discussed in Regulatory Guide 8.22. Exceedance of the administrative or actions levels and corrective actions performed will be documented in the ALARA Audit Report.

[Applicable Amendment: 4]

10.13 All radiation monitoring, sampling, and detection equipment shall be recalibrated after each repair and as recommended by the manufacturer or at least annually, whichever is more frequent. In addition, all radiation survey instruments shall be operationally checked with a radiation source each day when in use.

10.14 DELETED BY Amendment 4.

10.15 The licensee shall incorporate the restoration data for the 517 and USMT sites into the Irigaray completion report.

[Applicable Amendment: 4]

10.16 The licensee shall conduct groundwater restoration and post-restoration monitoring as described in Section 6.1 of the approved license application. The primary goal of restoration shall be to return the groundwater quality, on a production-unit average, to baseline concentrations on a parameter-by-parameter basis. If the primary goal cannot be achieved, the groundwater will, at a minimum, be returned to the pre-mining use category.

Changes to groundwater restoration or post-restoration monitoring plans shall be submitted to NRC for review and approval at least 2 months prior to groundwater restoration in a mining unit.

10.17 The licensee shall include the following as part of the groundwater monitoring program:  
Annual sampling and analysis for chloride and conductivity from 517 and USMT Wells M-1, NM-3, M-4, SM-1, M-219, M-220, and M-221.

10.18 The licensee shall implement the respiratory protection program as described in the approved license application.

10.19 DELETED BY Amendment No. 4.

10.20 DELETED BY Amendment No. 4.

10.21 DELETED BY Amendment No. 4.

10.22 DELETED BY Amendment No. 4.

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**SECTION 11: Monitoring, Recording, and Bookkeeping Requirements**

- 11.1 Injection manifold pressures and flow rates shall be measured and recorded daily. During well-field operations, injection pressures shall not exceed 120 psi at the Irigaray site, and 140 psi at the Christensen Ranch site. Also, during maintenance tasks, injection pressures shall not exceed the integrity test pressures.
- 11.2 All designated monitor wells shall be sampled and tested for the UCLs established in accordance with Condition 10.4. Sampling shall be performed on the routine sampling schedule in the approved license application.

If the routine sampling results indicate an exceedance of at least two UCLs, a second sample shall be collected from that well within 48 hours and analyzed for chloride, conductivity, and total alkalinity. The well shall be placed on excursion status if the results from the second sample also exceed at least two of the established UCLs.

If the results from the second sample do not confirm the initial exceedance, a third sample shall be collected within 48 hours of receiving the results from the second sampling, and analyzed. The routine sampling shall be considered in error if the second and third samples do not confirm the initial exceedance. The well shall be placed on excursion status if the results from the second or third samples exceed at least two of the established UCLs.

Upon confirming an excursion, the licensee shall implement corrective actions, and increase the sampling frequency for the excursion indicators to weekly. Written progress reports of the excursion status shall be submitted to the NRC, in accordance with Condition 9.2, on a quarterly basis until the excursion has been mitigated. An excursion is considered mitigated when the concentrations of at least two excursion indicators remain below the established UCLs for three consecutive samples.

[Applicable Amendment: 4]

- 11.3 The licensee shall conduct effluent, personnel, and environmental monitoring programs in accordance with Tables 8-1 and 9-1 of the approved Decommissioning Plan.

[Applicable Amendment: 6]

- 11.4 The licensee shall perform and document weekly visual inspections of the Irigaray and Christensen Ranch Satellite evaporation pond embankments, fences and liners, as well as measurements of pond freeboard and checks of the leak detection system.

Anytime 6 vertical inches or more of fluid is detected in the leak detection system standpipes, it shall be analyzed for chloride, conductivity, pH and uranium. If analyses indicate that the pond is leaking, the licensee shall lower the pond fluid level by transferring its contents to an alternate cell, and undertake repairs, as needed. If standpipe water exists, quality samples shall be analyzed for the above parameters weekly during the leak period and for at least 2 weeks following repairs.

[Applicable Amendment: 4]

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- 11.5 The licensee shall conduct the weekly in-plant inspection and audit programs described in Section 5.3 of the approved license application. In addition, the RSO or designee shall document a daily walk-through (during operation of the yellowcake dryer) of the Irigaray facility to determine that radiation control practices are being implemented appropriately.

[Applicable Amendment: 4]

- 11.6 The results of the following activities, operations, or actions shall be documented: sampling, analyses, surveys and monitoring, survey/monitoring equipment calibration results of reports on audits and inspections, all meetings and training courses required by this license; and any subsequent reviews, investigations and corrective actions, shall be documented. Unless otherwise specified in the NRC regulations, all such documentation shall be maintained for a period of at least five (5) years.
- 11.7 The licensee shall monitor for external exposure in accordance with 10 CFR 20.1502(a)(1), Section 5.7.2 of the approved license application. The licensee shall monitor for internal exposure in accordance with 10 CFR 20.1502(b)(1) and Section 5.7.3 of the approved license application.

**SECTION 12. Reporting Requirements**

- 12.1 Effluent and environmental monitoring program results shall be provided in the annual report in the format shown in Table 3 of Regulatory Guide 4.14, (Rev. 1) entitled, "Sample Format for Reporting Monitoring Data." The report shall also include injection rates, recovery rates and injection manifold pressures.

[Applicable Amendment: 4]

**12.2 Spill, Leak, Excursion, and Incident/Event Reporting**

Until license termination, the licensee shall maintain documentation of unplanned releases of source or 11e.(2) byproduct materials (including extraction solutions) and process chemicals. Documented information shall include, but not be limited to: date, volume, total activity of each radionuclide released, radiological survey results, soil sample results (if taken), corrective actions, results of post remediation surveys (if taken), and a map showing the spill/event location and the impacted area.

The licensee shall have procedures which will evaluate the consequences of the spill or incident/event against 10 CFR 20, Subpart "M," and 10 CFR 40.60 reporting criteria. If the criteria are met, the licensee must report this information to the NRC Operations Center as required.

If the licensee is required to report any spills, leaks, or excursions of source, 11e.(2) byproduct material, or process chemicals because of impact on the environment, or to report any other incidents/events to State or Federal Agencies, a report shall be made to the Region IV Branch Chief for Uranium Recovery Inspection and the NRC Project Manager by telephone or electronic mail within 48 hours. This notification shall be followed, within 30 days of the notification, by submittal of a written report according to Condition 9.2 detailing the conditions leading to the release or incident/event, corrective actions taken, and results achieved.

[Applicable Amendment: 4]

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12.3 DELETED BY Amendment No. 4.

12.4 DELETED BY Amendment No. 4.

12.5 DELETED BY Amendment No. 4.

12.6 An annual report will be submitted to the NRC in accordance with Condition 9.2, that includes the ALARA audit report, land use survey, monitoring data, and the SERP information required under License Condition 9.4(d). The report shall include a summary of the daily (during operation of the yellowcake dryer) walk-through inspections.

[Applicable Amendment: 4]

12.7 DELETED BY Amendment No. 4.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Dated: December 31, 2001

Melvyn N. Leach, Chief  
Fuel Cycle Licensing Branch  
Division of Fuel Cycle Safety and Safeguards  
and Safeguards  
Office of Nuclear Material Safety and Safeguards  
and Safeguards