



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

August 4, 1999

Mr. John E. Trummel
Kennecott Energy Company
505 South Gillette Ave.
Gillette, WY 82717

**SUBJECT: ACCEPTANCE OF SOHIO WESTERN MINING COMPANY MITIGATION
PLAN AND DESIGN FOR SEDIMENTATION AND GULLY FORMATION,
AMENDMENT 32 TO LICENSE SUA-1472**

Dear Mr. Trummel:

By letter dated July 13, 1999, Sohio Western Mining Company (SWMC) provided its final plan and design for mitigating future sedimentation and gully formation at the L-Bar site and requested that the license be amended to incorporate that plan and design as modifications to the site reclamation plan that address the potential for future site degradation. The U. S. Nuclear Regulatory Commission (NRC) staff has completed its review of the July 13, 1999, amendment request and proposed plan and design for mitigating sedimentation and gully formation. The staff review included the supporting information provided in letters dated February 2, 1999, and March 2, 1999.

Based on its review, as documented in the enclosed Technical Evaluation Report (TER, Enclosure 1), the staff concludes that the SWMC plan and design for mitigating sedimentation and gully formation meet the long-term stability requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 40, Appendix A, and, therefore, are acceptable. Accordingly, in response to SWMC's request and consistent with the requirements of 10 CFR Part 40, Source Material License SUA-1472 is amended by modifying License Conditions (LCs) 25, 33, and 34 to incorporate the modifications to the site reclamation plan. Specifically, LC 25 is modified to reflect SWMC's plan to provide a maintenance bond for periodic removal of sediment from the site diversion channels, if needed, to protect the long-term integrity of the tailings impoundment during the later years of site performance. LCs 33 and 34 are modified to incorporate SWMC's plans for construction of an enlarged sediment trap, a new diversion channel, and enhanced erosion control features at the outlets of the diversion channels to mitigate future sedimentation and gully formation at L-Bar. The license is being reissued as Amendment No. 32 to incorporate the above modifications (Enclosure 2). All other conditions of the license shall remain the same.

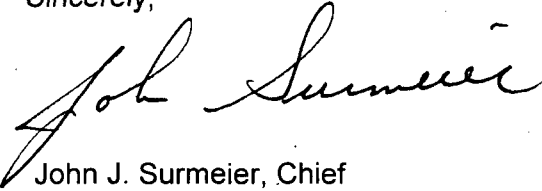
An environmental assessment for this action is not required because this action is categorically excluded under 10 CFR 51.22(c)(10) and (11). An environmental report is not required from the licensee by 10 CFR 51.60(b)(2).

J. Trummel

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If you have any questions regarding this letter or the enclosures, please contact the NRC Project Manager for the L-Bar site, Rick Weller, at (301) 415-7287.

Sincerely,

A handwritten signature in cursive script, appearing to read "John J. Surmeier". The signature is written in black ink and is positioned above the typed name and title.

John J. Surmeier, Chief
Uranium Recovery and
Low-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No.: 40-8904
License No.: SUA-1472
Amendment No. 32

Enclosures: As stated

cc: Russel Edge, DOE, Grand Junction
Katherine Yuhas, NMED, Santa Fe

J. Trummel

-2-

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[Signed by]

John J. Surmeier, Chief
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ENCLOSURE 1

TECHNICAL EVALUATION OF PROPOSED L-BAR TAILINGS IMPOUNDMENT REDESIGN

DOCKET NO. 40-8904

LICENSE NO. SUA-1472

LICENSEE: Sohio Western Mining Company

FACILITY: L-Bar

PROJECT MANAGER: Rick Weller

TECHNICAL REVIEWER: Ted Johnson

SUMMARY AND CONCLUSIONS

During an inspection in 1995 of completed reclamation activities at the Sohio Western Mining Company (SWMC) L-Bar site, the staff observed degradation in the form of sedimentation in the tailings impoundment diversion channels and gully intrusion at the outlets of the channels. This degradation, if not remedied, could potentially impact the long-term performance of the site. Accordingly, in a July 16, 1997 letter, SWMC submitted a proposed mitigation plan and design to address the staff's concerns regarding sedimentation and gully formation. Following staff review of this plan and design and extensive discussions with the licensee, SWMC submitted a revised mitigation plan and design in a February 2, 1999 letter to address the sedimentation and gully formation issues and, correspondingly, provide for the long-term integrity of the site. Lastly, in a letter dated July 13, 1999, SWMC provided its final mitigation plan and design and requested that the license be amended to incorporate planned modifications to site reclamation to address the potential for future site degradation. Based on review of the revised mitigation plan and design, the staff concludes that the plan and design meet the long-term stability requirements of 10 CFR Part 40, Appendix A. Specifically, the staff concludes that the plan and design will provide tailings impoundment stability for a period of 1000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. Consequently, the staff has amended License Conditions 25, 33 and 34 of Source Material License SUA-1472 to include reference to SWMC's planned remedial activities to mitigate sedimentation and gully formation.

BACKGROUND

The reclamation plan for the L-Bar site was approved by the NRC staff in 1989. On June 14, 1995, the Commission issued its decision regarding the review status of previously-approved reclamation plans. In that decision, the Commission determined that previously-approved reclamation plans would not be revisited or receive additional attention, unless: (1) the staff identifies a significant health, safety, or environmental concern; (2) the staff determines that there is a need to reevaluate the seismic aspects of a design; or (3) a licensee requests that the ongoing review proceed. Consistent with that direction, the staff determined that, prior to transfer to the long-term custodian, it would simply confirm that construction was performed in accordance with the approved plan. However, if a site had experienced degradation, licensees

would be required to make repairs to degraded design features and to show that the design meets the requirements of 10 CFR Part 40, Appendix A, in light of the observed degradation.

In 1995, during a routine inspection of completed reclamation activities at the site, the staff identified several areas where degradation had occurred, including sedimentation in the tailings impoundment diversion channels and gully intrusion at the downstream ends of the diversion channels. In a letter to the licensee dated April 11, 1996, the staff discussed the specific degradation concerns and acceptable methods of resolution. In a submittal dated July 16, 1997, "Sediment Evaluation and Riprap Design," the licensee provided a proposed mitigation plan and design to address these concerns. The staff and its consultant, Dr. Pierre Julien from Colorado State University (CSU), reviewed the information and determined that additional analyses and information were needed. Specific issues were discussed with SWMC in a meeting on August 18-19, 1997, and in teleconferences on November 20, 1997, and January 13, 1998. Following those discussions, it was concluded that actual field measurements of the sediment in the channels would be undertaken, and SWMC conducted these investigations in February, 1998. The results of these field investigations and additional information related to sediment modeling were provided by the licensee in a submittal dated March 4, 1998. The staff reviewed this information and provided comments in a letter dated May 1, 1998, indicating that there were insufficient bases to support the licensee's estimates of sediment accumulation, based on measured rates of sediment accumulation.

To further analyze the sediment data and provide additional expertise on L-Bar sedimentation, SWMC employed a new consultant, Dr. Richard Heggen. Dr. Heggen submitted a draft report in August, 1998, and based on this report, another field study was conducted at various locations where sedimentation had been measured. The staff accompanied Dr. Heggen and the licensee in a field study on October 15, 1998. In a letter dated October 21, 1998, Dr. Heggen's findings and conclusions regarding sediment yield at L-Bar were formally provided to the staff. The staff reviewed this information and, by letter dated November 13, 1998, provided SWMC with a minimum acceptable sediment accumulation rate. A meeting was held on December 10, 1998 to discuss a preliminary design developed by the licensee to accommodate this minimum sediment rate. Subsequently, in a submittal dated February 2, 1999, SWMC provided a revised design to resolve staff concerns on sedimentation and gully intrusion. Lastly, following some additional survey work at L-Bar, SWMC submitted a letter dated July 13, 1999 which described final refinements to the mitigation plan and design features for sedimentation control. The July 13, 1999 letter also requested that the license be amended to incorporate the plan and design as modifications to site reclamation that address the potential for future degradation of the tailings impoundment.

DESCRIPTION OF LICENSEE PROPOSAL

SWMC intends to resolve staff concerns by providing a revised plan and design that will mitigate the sediment and erosion problems previously identified. SWMC will:

1. construct revised riprap designs for the North Channel (NC) and South Channel (SC) outlet aprons and side slopes;
2. construct a new East Channel (EC) that will carry flood flows and sediments that have been diverted from the SC;

3. construct an enlarged sediment trap upstream of the new EC with sufficient capacity to store the expected sediment accumulation for a 580-year period; and
4. provide sufficient funds in a maintenance bond to remove sediment in the diversion channels after the initial 580-year period if sedimentation proves to be problematic during actual site performance.

TECHNICAL EVALUATION

1. Sediment Analyses

Sediment deposition is a problem in the diversion channels at the L- Bar site, primarily because the slopes of the diversion channels are less than the slope of the natural ground where flows enter the channels. For this site, a considerable amount of sediment from the upland drainage areas can be expected to enter the diversion channels, for the following reasons:

- a. The upland drainage areas have relatively steep slopes, whereas the diversion channels have been designed with relatively flat slopes. Flow velocities in the channels are not as high as those occurring on the natural ground. Therefore, sediments are transported to the channels and are not easily flushed by the lower velocities in the channels.
- b. The potential for gully development (and resulting high flow velocities) in the upland drainage area and subsequent transport of sediment into the diversion channels is high. Gullies, rills, and areas of flow concentration are evident on upstream hillslopes and on the side slopes of the diversion channels. Flows moving toward the diversion channels will tend to concentrate in these areas, increasing the potential for further gully incision and transport of large quantities of sediment.

If sediment accumulates in the channels, the capacity of the channels is diminished to the extent that the berm separating the channel from the tailings area could be overtopped. Such overtopping could cause flood runoff to be transported directly over the reclaimed tailings pile. Overland flow across the tailings pile could cause erosion and offsite transport of contaminated tailings.

The field studies performed in 1998 indicated that approximately 11,000 tons of sediment had accumulated in a 9-year period, since completion of construction at the site. Using these data, the total amount of sediment accumulation in the channels over a 1000-year period was estimated by the licensee, based on the use of the EASI sediment model (Hydrologic Systems, 1990) that was calibrated using actual measured sediment quantities. The licensee's analyses of the data indicated that a majority of the sediment had been deposited during a large storm that occurred several years ago. Taking significant credit for this single storm occurrence, SWMC indicated that this storm was a very rare storm event, based on analysis of on-site rainfall data. The licensee estimated that the long-term sediment accumulation rate for the site would be about 85 tons per year (or about 0.25 tons/acre/year for the 360-acre drainage area). The staff did not agree with this estimate, citing greater historic accumulation rates in nearby reservoirs with sediment data from other time periods (USDA, 1978) before 1990. In addition, average sediment production rates for this area of the United States were presented by Schumm (1977), indicating an average rate of about 1.0 tons/acre/year. Further, the staff and

its consultant questioned the sediment model calibration and indicated that the model did not realistically portray the sediment accumulations to be expected.

Following the on-site field study in 1998, consideration of regional sedimentation in various reservoirs, and evaluation of the opinions of sediment experts, the staff considered several approaches to determine the expected sediment accumulation at the site. Based on comparison of the on-site measurements with reservoir sedimentation in the area, analysis of the regional rates provided by Schumm (1977), analysis of the historic rainfall and floods at the site, expert opinions, and other analyses of the many factors affecting sediment production, the staff concluded that the long-term sediment rate would be approximately 500 tons per year (1.4 tons/acre/yr). The staff determined that some credit should be allowed for the fact that a single large storm could have produced significant amounts of sediment, but also determined that long-term measured rates in nearby reservoirs are important indicators of the variability of sediment production. This estimate also takes into consideration the opinions of SWMC's expert, who predicts a rate of 400-500 tons/year. SWMC's expert developed this estimate by using several different methods (October 21, 1998 submittal) and averaging the resulting sediment yields. Finally, the staff estimate considers the ability of the design to function effectively for longer than the minimum required period of 200 years, even if the estimated sediment rate is exceeded. The ability of the design to function if the sediment production estimates are exceeded is discussed in Section 5.

2. Determination of Flood Magnitudes

One of the most disruptive phenomena affecting long-term site stability is surface water erosion. SWMC recognized that it is very important to select an appropriately conservative rainfall event on which to base the flood protection designs. SWMC utilized the Probable Maximum Precipitation (PMP), which is computed by deterministic methods (rather than statistical methods), and is based on site-specific hydrometeorological characteristics.

Prior to determining the runoff from the drainage basin, the flooding analysis requires the determination of PMP amounts for the specific site location. Techniques for determining the PMP have been developed for the entire United States primarily by the National Oceanic and Atmospheric Administration (NOAA) in the form of hydrometeorological reports for specific regions. These techniques are widely used and provide straightforward procedures with minimal variability. The staff, therefore, concludes that use of these reports to derive PMP estimates is acceptable.

Rainfall Infiltration Losses. Determination of the peak runoff rate is dependent on the amount of precipitation that infiltrates into the ground during the occurrence of the rainfall. If the ground is saturated from previous rains, very little of the rainfall will infiltrate, and most of it will become surface runoff. The loss rate is highly variable, depending on the vegetation and soil characteristics of the watershed. Typically, most runoff models incorporate a variable runoff coefficient or variable runoff rates. The ACE HEC-1 model used by SWMC separately computes infiltration losses within a certain period of time to arrive at a runoff amount during that time period. The staff reviewed the estimates of infiltration losses and concludes that the estimates are acceptable.

Times of Concentration and Lag Times. The time of concentration is the amount of time required for runoff to reach the outlet of a drainage basin from the most remote point in that basin. The lag time is defined as the time from the center of mass of the excess rainfall hydrograph to the peak discharge and is equal to six tenths of the time of concentration. The peak runoff for a given drainage basin is inversely proportional to the time of concentration and the lag time. If the time of concentration or lag time is computed to be small, the peak discharge will be conservatively large.

Lag times were estimated by SWMC using the Soil Conservation Service (SCS) Method (SCS, 1973). This method is considered by the staff to be acceptable for estimating lag times and times of concentration. Based on analysis of the information provided, the staff concludes that the lag times and times of concentration have been acceptably derived. The staff further concludes that the procedures used for computing the lag times and times of concentration are acceptable for the small, steep drainage areas present at the site.

Rainfall Estimates. A PMP rainfall depth of approximately 11 inches in 1 hour was used by SWMC to compute the Probable Maximum Flood (PMF) discharges for the small drainage areas at the disposal site. This rainfall estimate was developed by SWMC using Hydrometeorological Report (HMR) 55A (Hansen, et al, 1988). The staff performed an independent check of the PMP value based on the procedures given in HMR 55A. Based on this check of the rainfall computations, the staff concludes that the PMP was acceptably derived for this site.

PMF Estimates. SWMC performed flood analyses to determine the magnitude of the PMF that could potentially erode the diversion channels. In the PMF analyses, HEC-1 was used to compute peak flow rates at different locations in the channels. The PMFs for the channel outlets were checked by the staff to determine their reasonableness. The PMF for the outlet of the SC was estimated by SWMC to be about 800 cubic feet per second (cfs), for a drainage area of 53 acres. The PMF for the outlet of the EC was estimated to be about 5000 cfs, for a drainage area of 316 acres. Each of these estimates exceeds 10000 cfs per square mile, representing very conservative runoff values. The staff compared these estimates to historic flood peaks in the United States and checked the calculations of drainage area, time of concentration, and rainfall intensity. Based on these analyses, the staff concludes that the PMF estimates are acceptable.

3. Water Surface Profiles, Channel Velocities, and Erosion Protection Design

Following the determination of the peak flood discharge, it is necessary to determine the resulting water levels, velocities, and shear stresses associated with that discharge. These parameters then provide the basis for the determination of the required riprap size and layer thickness needed to ensure stability during the occurrence of the design event.

The ACE HEC-RAS model (ACE, 1995) was used to estimate water surface profiles, flow depths, and velocities under the estimated discharge conditions in the channels. This model is commonly accepted as a state-of-the-art calculation method. Based on staff review of the model input parameters, the analyses are acceptable.

4. Erosion Protection Determinations

Riprap designs are proposed for several aspects of the design, depending on the purpose and location.

Sediment Trap Groin. The enlarged sediment trap will be excavated near the area where mill debris is buried. To prevent erosion in this area, riprap will be provided in the northeast corner of the trap where flows will concentrate in the "groin" located there. The drainage area at this location is very small, and the riprap was designed using the CSU Method (Abt and Johnson, 1991), with a flow concentration factor of three. Staff review of the calculations indicates that the riprap design with a minimum average rock size of 4 inches is acceptable.

Hillslopes and Upland Channel Side Slopes. SWMC intends to provide rock armor to prevent excessive sediment accumulations at locations where existing gullies and areas of flow concentration are present on the upland side slopes of the diversion channels. SWMC will place riprap to limit sediment delivery to the channels at several locations along the SC, including Basins S13 and S15. The riprap was designed using the CSU Method (Abt and Johnson, 1991). Peak flows were estimated using the ACE HEC-1 model and included a flow concentration factor of three. The riprap will have average size of 7 inches. Staff review of the calculations indicates that the riprap size is acceptable.

Diversion Channels. For flows in the channels, the Corps of Engineers Method (ACE, 1991) was used to determine the rock sizes. The design flow velocities were estimated using HEC-RAS, as discussed above. The licensee intends to place riprap at those locations where the velocity exceeds five feet per second, representing previously-approved design criteria for channel erosion. Based on a review of the calculations, the proposed riprap sizes are considered to be adequate.

Diversion Channel Outlets. The outlets for the SC, NC, and EC will not be constructed in competent rock. In these areas, it is necessary to provide rock aprons with large rock sizes to form the outlet of the channels where discharge to natural ground occurs. Erosion has already occurred at the outlets of the SC and NC, and a riprap apron is proposed by the licensee to mitigate this erosion.

The design of the apron is based on the peak PMF flow occurring at the outlet. The riprap for the channel outlets will consist of a pre-formed rock blanket that will extend to the expected level of gully incision. The expected scour depth downstream of the aprons (caused by flows in the channel) was determined using methods provided by U. S. Department of Transportation (USDOT, 1983). The expected depth of headward gully incision (caused by gully headcutting) was estimated by extending the existing surveyed gully profile upstream to the apron location. The more conservative of the two calculations was then used to determine the depth of the apron. The staff reviewed the calculations and the input parameters to the models and concludes that the estimates for the depth of the apron are acceptable.

The riprap sizes for the channel outlets were determined using the Stephenson Method (Stephenson, 1979). Design calculations are as follows:

Channel	Riprap Size (Inches)	Apron Width (feet)	Apron Depth (Feet)
South	10	300	19
North	13	350	24
East	18	150	14

Based on direct site observations, review of the design analyses, and review of the construction drawings, the staff concludes that flows discharging from the diversion channels will be safely discharged from the site. SWMC has acceptably protected the outlets of the diversion channels and has provided acceptable designs to prevent erosion into the reclaimed tailings.

5. Sediment Trap Design

To mitigate the sediment problem, SWMC will excavate an enlarged sediment trap that will store the expected sediment volume over an estimated 580-year period. For a sediment production rate of 1.4 tons/acre/yr (as discussed above) and drainage area of 243 acres, the sediment trap is designed with a capacity of 142000 cubic yards, or about 190000 tons (the sediment is assumed to weigh 100 pounds per cubic foot or 2700 pounds per cubic yard). A berm will be provided to prevent flows from entering the SC, and the trap will be constructed just upstream of the new EC. The drainage area of the SC is reduced dramatically from over 300 acres to about 50 acres (at the downstream end). This corresponds to a sediment buildup rate in the SC of roughly 75 tons per year. Sediment can accumulate in the 2500-foot long and 100-foot wide SC to a height of 6 feet while maintaining a one-foot freeboard above the PMF level for the berms of the SC. Given this sediment storage capacity, the lifetime of the SC is estimated to be roughly 1000 years. Thus, sediment entering the SC is not expected to be a problem.

The new EC will be much wider than the old SC, providing additional room for sediment storage. Until the sediment trap becomes filled, the drainage area to the EC is approximately 75 acres. This corresponds to a sediment buildup rate in the EC of roughly 100 tons per year. The licensee estimated that the one-foot freeboard (above the PMF level) for the berms of the EC would not be exceeded until over 4 feet of sediment had accumulated in the EC. For an accumulation of 4 feet in the 2000-foot length of the 150-foot-wide EC, an additional sediment volume of approximately 44,000 cubic yards (60000 tons) can be stored. Given this sediment storage capacity, the lifetime of the EC is estimated to be roughly 590 years which is about the same as the lifetime of the sediment trap. Thus, with the proposed SWMC L-Bar tailings impoundment redesign, sedimentation is not anticipated to be potentially problematic for close to 600 years. This design well exceeds the minimum design requirement of 200 years in 10 CFR Part 40, Appendix A for the effectiveness of long-term controls of radiological hazards. The staff considers this design to have some additional conservatism, because overtopping of the berms will occur only if a PMF occurs at the same time that sediment buildup reaches a level of 5 feet in the EC. Even if sediment buildup occurs, it is unlikely that a very rare event such as the PMF will occur during the remaining years of regulatory concern. Moreover, as a component of the sedimentation mitigation plan, the licensee has committed to provide sufficient funds in a

maintenance bond to periodically remove sediment in the diversion channels after the initial 600 year period in the event that sedimentation poses potential problems during actual site performance.

CONCLUSIONS

Staff review of the licensee's proposed modifications to the site reclamation plan to mitigate sedimentation and gully formation are acceptable. The revised riprap designs for the outlets of the existing diversion channels and the construction of the sediment trap and re-routing of flows into a new and larger diversion channel represent a considerable improvement over the original design. Provision for a maintenance bond will ensure that sedimentation does not become potentially problematic during the later years of site performance. In light of the enhanced erosion control features, the increased volume of storage available in the new EC and the enlarged sediment trap, and the insurance provided by the maintenance bond for future sediment removal, the staff concludes that the overall mitigation plan and design meet the long-term stability requirements of 10 CFR Part 40 Appendix A. Accordingly, the staff approves SWMC's request to amend Source Material License SUA-1472 to incorporate that mitigation plan and design as modifications to the existing site reclamation plan.

AMENDMENTS TO LICENSE

License Condition 25 is amended as follows:

25. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for reclamation of any tailings or waste disposal area, groundwater restoration as warranted, the long-term surveillance fee, and future maintenance as described in its submittals dated March 2, and July 13, 1999.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to the NRC at least 3 months prior to the anniversary date which is designated as December 30 of each year. If the NRC has not approved a proposed revision to the surety coverage 30-days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing surety arrangement for 1 year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency fee, changes in engineering plans, activities performed, and any other conditions affecting estimated costs for site closure. The basis for the cost estimate is the NRC-approved reclamation plan or NRC-approved revisions to the plan. The report, "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates," outlines the minimum considerations used by the NRC in the review of site closure cost estimates. Reclamation plans and annual updates should follow this outline.

The licensee's currently approved financial surety shall be continuously maintained in an amount not less than \$3,424,795 for the purpose of complying with 10 CFR 40, Appendix A, Criteria 9 and 10, until a replacement is authorized by the NRC.

[Applicable Amendments: 14, 16, 20, 23, 24, 25, 26, 27, 30, 32]

License Condition 33 is amended as follows:

33. The licensee shall reclaim the tailings impoundment as stated in its submittals dated February 27, and April 20, 1989, March 5, and August 11, 1998, and February 2, and July 13, 1999, subject to the following:

Upon completion of settlement monitoring, a final report containing the settlement monitoring results and detailing the cover's performance must be submitted.

[Applicable Amendments: 11, 15, 16, 29, 32]

License Condition 34 is amended as follows:

34. The licensee shall complete site reclamation in accordance with the approved reclamation plan, groundwater corrective action plan, and submittals of March 5, April 8, and August 11, 1998, and February 2, and July 13, 1999, as authorized by License Conditions 31 and 33, in accordance with the following schedules.

- A. To ensure timely compliance with target completion dates established in the Memorandum of Understanding with the Environmental Protection Agency (56 FR 55432, October 25, 1991), the licensee shall complete reclamation to control radon emissions as expeditiously as practicable, considering technological feasibility, in accordance with the following schedule:

- (1) Windblown tailings retrieval and placement on the pile - complete.
- (2) Placement of the interim cover to decrease the potential for tailings dispersal and erosion - complete.
- (3) Placement of final radon barrier designed and constructed to limit radon emissions to an average flux of no more than 20 pCi/m²/s above background - Complete by conditioned date; final approval pending completion of work to address degradation as outlined in submittals of April 8, and August 11, 1998.

- B. Reclamation, to ensure required longevity of the covered tailings and groundwater protection, shall be complete as expeditiously as is reasonably achievable, in accordance with the following target dates for completion:

- (1) Placement of erosion protection as part of reclamation to comply with Criterion 6 of Appendix A of 10 CFR Part 40 - Completed by conditioned date; final approval pending acceptable repairs to degradation:

- (2) Projected completion of groundwater corrective actions to meet performance objectives specified in the groundwater corrective action plan - December 31, 2016.
- C. Any license amendment request to revise the completion dates specified in Section A must demonstrate that compliance was not technologically feasible (including inclement weather, litigation which compels delay to reclamation, or other factors beyond the control of the licensee).
- D. Any license amendment request to change the target dates in Section B above, must address added risk to the public health and safety and the environment, with due consideration to the economic costs involved and other factors justifying the request such as delays caused by inclement weather, regulatory delays, litigation, and other factors beyond the control of the licensee.

[Applicable Amendments: 29, 32]

ENVIRONMENTAL IMPACT EVALUATION

An environmental assessment for this action is not required because this action is categorically excluded under 10 CFR 51.22(c)(10) and (11). An environmental report is not required from the licensee by 10 CFR 51.60(b)(2) because this action does not meet the criteria which mandates an environmental report.

REFERENCES

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ENCLOSURE 2

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, 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.

<p>1. Licensee Sohio Western Mining Company [Applicable Amendments: 4, 16]</p> <p>2. c/o Kennecott Energy 505 South Gillette Avenue Caller Box 3009 Gillette, WY 82717-3009 [Applicable Amendments: 4, 5, 16, 28]</p>	<p>3. License Number SUA-1472, Amendment No. 32</p> <p>4. Expiration Date Until NRC determines site Reclamation is adequate</p> <p>5. Docket or Reference No. 40-8904</p>
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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
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Uranium byproducts

Any

Unlimited

9. Authorized place of use: The licensee's uranium milling facilities located in Cibola County, New Mexico

10. The licensee is hereby authorized to possess byproduct material in the form of uranium waste tailings and other byproduct wastes generated by the licensee's past milling operations. The licensee is not authorized to produce uranium concentrate without a license amendment approved by the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555. [Applicable Amendments: 24]

11. Release of equipment or packages from the restricted area shall be in accordance with the report, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials," dated September, 1984. [Applicable Amendments: 24]

12. The results of all effluent and environmental monitoring required by this license, including groundwater monitoring results as specified in License Condition 31 of this license, shall be reported in accordance with 10 CFR 40, Section 40.65, with copies of the report sent to the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

[Applicable Amendments 12, 24, 28]

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13. Before engaging in any activity not previously assessed by the NRC, the licensee shall prepare and record an environmental evaluation of such activity. When the evaluation indicates that such activity may result in a significant adverse environmental impact that was not previously assessed or that is greater than that previously assessed, the licensee shall provide a written evaluation of such activities and obtain prior approval of the NRC in the form of a license amendment.
14. Prior to termination of this license, the licensee shall provide for transfer of title to byproduct material and land, including any interests therein (other than land owned by the United States or the State of New Mexico), which is used for the disposal of such byproduct material or is essential to ensure the long term stability of such disposal site to the United States or the State of New Mexico, at the State's option.
15. DELETED by Amendment No. 7.
16. DELETED by Amendment No. 16.
17. Deleted by Amendment 28.
18. The results of sampling, analyses, surveys and monitoring, the results of calibration of equipment, 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 years.
19. The Radiation Safety Officer (RSO), who is responsible for radiation safety aspects of the mill site decommissioning, shall possess the minimum qualifications as specified in Section 2.4.1 of Regulatory Guide 8.31, "Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Mills will be As Low As is Reasonably Achievable." For the purposes of this license condition, reference to "uranium mill" or "milling" in Regulatory Guide 8.31 shall mean "uranium mill site reclamation."
[Applicable Amendments: 8]
20. Written procedures shall be established for site reclamation activities to include personnel and environmental monitoring, and survey instrument calibrations. These procedures shall be reviewed and approved in writing by the RSO before implementation, and whenever a change in procedure is proposed, to ensure that proper radiation protection principles are being applied. In addition, the RSO shall perform a documented review of all existing site procedures at least annually. Construction and inspection records may be transferred to the Duke Engineering & Services, Inc. offices in Austin, Texas.

[Applicable Amendments-7, 16, 28]
21. The licensee shall be required to use a Radiation Work Permit (RWP) for all site work activities where the potential for significant exposure to radioactive material exists and for which no standard written procedure already exists. The RWP shall be issued by the RSO or his designate, qualified by way of specialized radiation protection training, and shall at least describe the following:

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- A. The scope of the work to be performed.
- B. Any precautions necessary to reduce exposure to uranium and its daughters.
- C. The supplemental radiological monitoring and sampling necessary prior to, during, and following completion of the work.

[Applicable Amendments: 7]

- 22. Occupational Exposure calculations shall be performed and documented within one (1) week of the end of each regulatory compliance period as specified in 10 CFR 20.103(a)(2) and 10 CFR 20.103(b)(2). [Applicable Amendments: 7, 16]
- 23. DELETED by Amendment No. 16.
- 24. All liquid effluents from site reclamation activities, with the exception of sanitary wastes, shall be discharged to the tailings impoundment.
[Applicable Amendments: 7]
- 25. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for reclamation of any tailings or waste disposal area, groundwater restoration as warranted, the long-term surveillance fee, and future maintenance as stated in its submittals dated March 2, and July 13, 1999.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to the NRC at least 3 months prior to the anniversary date which is designated as December 30 of each year. If the NRC has not approved a proposed revision to the surety coverage 30 days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing surety arrangement for 1 year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency fee, changes in engineering plans, activities performed, and any other conditions affecting estimated costs for site closure. The basis for the cost estimate is the NRC-approved reclamation plan or NRC-approved revisions to the plan. The report, "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates," outlines the minimum considerations used by the NRC in the review of site closure cost estimates. Reclamation plans and annual updates should follow this outline.

The licensee's currently approved financial surety shall be continuously maintained in an amount not less than \$3,424,795 for the purpose of complying with 10 CFR 40, Appendix A, Criteria 9 and 10, until a replacement is authorized by the NRC.

[Applicable Amendments: 14, 16, 20, 23, 24, 25, 26, 27, 30, 32]

- 26. DELETED by Amendment No. 6.
- 27. The licensee shall provide management oversight and control of site reclamation activities required under this license in accordance with the following organization structure throughout reclamation:
 - L-Bar Project Manager - Sohio Western Mining Company
 - Site Contractor - Duke Engineering & Services, Inc.

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[Applicable Amendments: 3, 4, 16, 28]

- 28. DELETED by Amendment No. 19.
- 29. DELETED by Amendment No. 16.
- 30. DELETED by Amendment No. 9.
- 31. The licensee shall implement a groundwater compliance monitoring program containing the following: *[The changes to 31.B and C below, and the addition of 31.D, reflecting approval of alternate concentration limits, are effective only upon licensee acquisition of the property noted on page ii of its August 28, 1998, letter.]*
 - A. Sample wells 29A, 17B, 1A, 69, and 81 on a semiannual frequency for nickel, selenium, uranium, combined radium-226 and -228, thorium-230, nitrate, chloride, sulfate, pH, electrical conductivity, and water level.

Sample wells 2A, 3A, 14, 50, 57, 58, 61, 72, 76, 77, 78, and 79 on a semiannual frequency for chloride, sulfate, pH, electrical conductivity, and water level.

On a semiannual frequency, sample well 2A for nitrates and well 50 for nitrates, selenium, and nickel.

Sample wells 12A, 17, 51, 52, 53, 55, 60, 68, 73, 74, and 75 on an annual frequency for chloride, sulfate, pH, electrical conductivity, and water level.
 - B. Comply with the following groundwater protection standards in mg/l (unless otherwise noted) at point of compliance wells 17B, 1A, 69, and 81, with background being recognized in well 29A:

nickel = 0.05, selenium = 2.0, combined radium-226 and -228 = 11.01 pCi/l, thorium-230 = 3.12 pCi/l, and uranium = 13.0.
 - C. DELETED By Amendment No. 31.
 - D. In the event the limits for the constituents in Subsection B are exceeded, the licensee shall propose a new corrective program with the objective of returning concentrations of those constituents to the limits specified in Subsection B.

[Applicable Amendments: 6, 9, 12, 13, 17, 18, 22, 28, 31]

- 32. The licensee shall forward to the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, copies of all correspondence with the State of New Mexico's Environment Department.

[Applicable Amendments: 9, 24, 28]

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33. The licensee shall reclaim the tailings impoundment as stated in its submittals dated February 27, and April 20, 1989, March 5, August 11, 1998, and February 2, and July 13, 1999, subject to the following:

Upon completion of settlement monitoring, a final report containing the settlement monitoring results and detailing the cover's performance must be submitted.

[Applicable Amendments: 11, 15, 16, 29, 32]

34. The licensee shall complete site reclamation in accordance with the approved reclamation plan, groundwater corrective action plan, and submittals of March 5, April 8, and August 11, 1998, and February 2, and July 13, 1999, as authorized by License Conditions 31 and 33, in accordance with the following schedules.

- A. To ensure timely compliance with target completion dates established in the Memorandum of Understanding with the Environmental Protection Agency (56 FR 55432, October 25, 1991), the licensee shall complete reclamation to control radon emissions as expeditiously as practicable, considering technological feasibility, in accordance with the following schedule:
- (1) Windblown tailings retrieval and placement on the pile - complete.
 - (2) Placement of the interim cover to decrease the potential for tailings dispersal and erosion - complete.
 - (3) Placement of final radon barrier designed and constructed to limit radon emissions to an average flux of no more than 20 pCi/m²/s above background - Complete by conditioned date; final approval pending completion of work to address degradation as outlined in submittals of April 8 and August 11, 1998.
- B. Reclamation, to ensure required longevity of the covered tailings and groundwater protection, shall be complete as expeditiously as is reasonably achievable, in accordance with the following target dates for completion:
- (1) Placement of erosion protection as part of reclamation to comply with Criterion 6 of Appendix A of 10 CFR Part 40 - Completed by conditioned date; final approval pending acceptable repairs to degradation.
 - (2) Projected completion of groundwater corrective actions to meet performance objectives specified in the groundwater corrective action plan - December 31, 2016.
- C. Any license amendment request to revise the completion dates specified in Section A must demonstrate that compliance was not technologically feasible (including inclement weather, litigation which compels delay to reclamation, or other factors beyond the control of the licensee).

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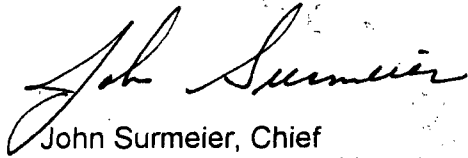
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- D. Any license amendment request to change the target dates in Section B above, must address added risk to the public health and safety and the environment, with due consideration to the economic costs involved and other factors justifying the request such as delays caused by inclement weather, regulatory delays, litigation, and other factors beyond the control of the licensee.

[Applicable Amendments: 29, 32]

FOR THE NUCLEAR REGULATORY COMMISSION

Date 8/2/99



John Surmeier, Chief
Uranium Recovery and Low Level
Waste Branch
Division of Waste Management
Office of Nuclear Material Safety and
Safeguards