

December 20, 2002

Mr. T. W. Hardgrove
Pathfinder Mines Corporation
935 Pendell Boulevard
P.O. Box 730
Mills, Wyoming 82644

SUBJECT: PATHFINDER MINES CORPORATION - AMENDMENT # 63 FOR ALTERNATE
CONCENTRATION LIMITS FOR THE LUCKY MC SITE (L52330)

Dear Mr. Hardgrove:

On December 21, 2000, Pathfinder Mines Corporation (PMC) requested amendment of the Lucky Mc license, SUA-672, to replace the current ground water protection standards with Alternate Concentration Limits (ACLs) for six constituents. In response to comments from the staff of the U.S. Nuclear Regulatory Commission (NRC), you provided revisions to the application dated January 11 and November 4, 2002. The NRC staff has completed its review and has determined that PMC demonstrated that the milling-related hazardous constituents in ground water will not pose a substantial present or potential hazard to human health or the environment as long as the ACLs are not exceeded at the Point of Compliance well. The staff's technical evaluation is provided in Enclosure 1.

Based on the conclusions of this review, the PMC license for the Lucky Mc site has been amended to incorporate wording in License Condition (LC) 60 for implementation of ACLs. Also, LC 61B(2) has been deleted because it stated a target date for completion of the corrective action program that is no longer required. As discussed with you on October 18, 2002, the staff has made administrative changes to the license by correcting the address in LC 2, revising wording in LCs 18, 22, and 47, to refer to guidance documents and to delete reference to the documents as attachments to the license. Also, LC 24 was changed by deleting the words "and telegraph," LC 27 was updated to conform to standard surety condition wording and to include the new name of the bank (PMC submittal dated October 15, 2002), and the LC 62 notification address has been updated. The amended license is provided as Enclosure 2.

The NRC staff evaluated the potential impact of implementation of the proposed ACLs and prepared an Environmental Assessment (EA). A copy of the final EA was sent to you on December 13, 2002. The EA indicates that the staff concluded that there would be no significant environmental impact from the requested licensing action. A notice to this effect has been submitted for publication in the Federal Register.

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

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or 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/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Daniel M. Gillen, Chief
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-2259
License No. SUA-672

Enclosures: Technical Evaluation Report for ACLs
License Amendment #63

cc: D. Wichers, COGEMA
A. Kleinrath, DOE
G. Beach, WDEQ

T. Hardgrove

2

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**OFFICIAL RECORD COPY
TECHNICAL EVALUATION REPORT**

**ALTERNATIVE CONCENTRATION LIMITS APPLICATION
PATHFINDER MINES CORPORATION - LUCKY MC SITE
GAS HILLS REGION OF WYOMING**

DOCKET NO.: 40-2259

LICENSE NO.: SUA-672

DATE: November 25, 2002

FACILITY: Pathfinder - Lucky Mc, Gas Hills Region, Wyoming

TECHNICAL REVIEWER: William von Till

PROJECT MANAGER: Elaine Brummett

SUMMARY AND CONCLUSIONS:

Pathfinder Mines Corporation (PMC) submitted, by letter dated December 21, 2000, a license amendment application requesting alternate concentration limits (ACLs) for six licensed ground water constituents at its Lucky Mc site located in the Gas Hills region of Wyoming. Staff submitted a request for additional information by letter dated October 26, 2001, and PMC responded January 11, 2002, with page changes. The staff determined that PMC has adequately demonstrated that the proposed ACLs will not pose a substantial present or potential hazard to human health or the environment, based on the Wyoming Department of Environmental Quality's (WDEQ) class of use of the aquifer downstream of the site, as long as the ACLs are not exceeded and that ACLs are as low as reasonably achievable (ALARA), after considering practicable corrective actions. Therefore, staff recommends the approval of the proposed ACLs.

With the uncertainty of ground water fate and transport modeling, it is prudent to have a ground water monitoring program in place in order to assure protection of human health and the environment. Therefore, staff recommended that wells AL-7, AL-8, AL-9 and TI-6 be added to the compliance monitoring well network and that monitoring for all licensed constituents be conducted on a quarterly frequency in order to adequately monitor the ground water contaminant plume movement over time and distance. The licensee agreed to these changes as discussed October 4, 2002, and provided the associated page changes for application Section 4.2, by letter dated November 4, 2002.

BACKGROUND:

The Lucky Mc site is located in west central Wyoming in the Gas Hills region. There are currently no downstream or downgradient residences within 32 km (20 miles) of the facility. The nearest residence is a ranch located approximately 6 km (4 miles) northwest of the site and is located in the Muskrat drainage to the west of Fraser draw. This area is mainly used for mining/milling and for livestock and is sparsely populated. Uranium milling began at this site in 1958 and continued through 1988 with a total of 12 million tons of ore processed. The mill utilized a conventional acid leach process.

Enclosure 1

Ground water pumping operations at the facility have been ongoing since 1980. The corrective action consists of ground water pumping to evaporation ponds and the injection of fresh water to remove contamination and impede the flow of contaminated ground water in the aquifer. A total of 197 million gallons of contaminated water has been collected from the Wind River Channel and 193 million gallons of fresh water injected as part of the remedial effort and approximately 217 million gallons of water have been pumped from the tailings by the end of 2001.

The climate in this region is arid. Fraser and Reid Draws are surface water drainages adjacent to the site. Flow in these draws only occurs during higher precipitation events or snowmelt. The main surface water body in the vicinity of the site is the Area 5 mine reclamation reservoir which is approximately 1.6 km (1 mile) to the east of the tailings. The ground water surface is below the surface water level, therefore no contaminated ground water is expected to seep into Fraser Draw or Reid Draw. The first surface water use in Fraser Draw is approximately 11.3 km (7 miles) downgradient of the site. The first ground water use is more than 17.7 km (11 miles) from the site where a windmill provides water for livestock.

Regulatory Framework:

Ground water protection programs for NRC licensed uranium mill and tailings sites per 10 CFR Part 40, Appendix A, Criterion 5, must include the following four elements:

- A list of site-specific hazardous constituents per criterion 5B(2);
- Ground water concentration limits (or standards) for these constituents;
- A compliance location where the concentration limits must be met; and
- A time period during which compliance is required.

Criterion 5B(5) requires that the concentration limits for individual constituents must not exceed:

- 1) The commission-approved background concentration of a constituent in the ground water;
- 2) The respective value given in Table 5C of Appendix A if the constituent is listed in that table, and if the background level of the constituent is below the value listed (which correspond to EPA's maximum concentration limits (MCL) for drinking water); or
- 3) An ACL limit established by the Commission.

Criterion 5B(6) of Appendix A states that ACLs can be established on a site-specific basis, provided it is demonstrated that:

- 1) The constituents will not pose a substantial present or potential hazard to human health or the environment, as long as the ACLs are not exceeded; and

2) The ACLs are ALARA, after considering practicable corrective actions.

LICENSEE'S REQUEST:

PMC submitted, by letter dated December 21, 2000, a license amendment application requesting ACLs at its Lucky Mc site located in the Gas Hills region of Wyoming.

The current ground water standards in License Condition 60.B are as follows:

arsenic = 0.05 mg/L
beryllium = 0.05 mg/L
cadmium = 0.01 mg/L
chromium = 0.05 mg/L
nickel = 0.09 mg/L
combined radium-226 and 228 = 5 pCi/L
selenium = 0.01 mg/L
thorium-230 = 13.2 pCi/L
uranium = 0.11 mg/L

PMC has concluded that NRC site standards for uranium, selenium, nickel, radium (Ra-226 + Ra-228), beryllium, and cadmium will be exceeded at the Point of Compliance (POC) even with 20 years of remediation efforts. PMC proposes the following ACLs:

beryllium = 0.07 mg/L
cadmium = 0.02 mg/L
nickel = 0.85 mg/L
Ra-226 + Ra-228 = 7.50 pCi/L
selenium = 1.10 mg/L
uranium = 1.70 mg/L

With these ACL concentrations, PMC predicts that concentrations at the Point of Exposure (POE) will not exceed the following levels within 1000 years:

beryllium = 0.05 mg/L
cadmium = 0.01 mg/L
nickel = 0.15 mg/L
Ra-226 + Ra-228 = 5.60 pCi/L
selenium = 0.26 mg/L
uranium = 0.98 mg/L

TECHNICAL EVALUATION:

The NRC staff reviewed the request in accordance with Draft NUREG-1620, Rev.1, "Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act," January 2002. The staff submitted a request for additional information by letter dated October 26, 2001, that PMC responded to January 11, 2002. One of the staff's comments was that the ground water contamination was not adequately characterized. In response to this comment, PMC installed three additional ground

water monitoring wells in the Fraser Draw area. With the addition of these wells, PMC has adequately defined the ground water contamination. The submittal of January 11, 2002, also addressed the other staff concerns.

PMC has demonstrated that the proposed ACLs at the POC will be protective at the POE. This has been demonstrated through the use of ground water fate and transport modeling and site characterization. PMC utilized MODFLOW for the ground water transport modeling and MT3D for the transport modeling. The parameters for uranium, selenium, nickel, Ra-226 + Ra-228, beryllium, and cadmium were modeled.

Exposure and Hazard Assessment:

The results of the modeling indicate that concentrations at the POE would not be a risk to human health or the environment based on the use of the aquifer. The NRC sent a letter to the WDEQ on April 12, 2002, asking for a classification of the aquifer downgradient from the proposed long-term care boundary for the site. WDEQ responded by letter dated June 14, 2002, stating that this aquifer in Fraser Draw, adjacent to the site, is "defined as Class III ground water, suitable for livestock use." Background water quality has elevated levels of constituents such as uranium. Average background water quality for uranium is 0.3 mg/L which is ten times higher than the U.S. Environmental Protection Agency (EPA) safe drinking water standard of 0.03 mg/L. The first ground water use is more than 17.7 km (11 miles) from the site and supplies, via a windmill, water for livestock. PMC has performed a risk analysis based on the use of ground water and analyzed chemical and radiological risk through food pathways (i.e., cows to humans). The analysis includes cows drinking ground water at the POE then humans ingesting that beef. Under this potential exposure pathway, the risk assessment demonstrated that the chemical and radiological risks associated with eating beef from cattle watered at the POE are within acceptable limits. Based on the analysis, the levels at the POE would be protective under this water use scenario.

The first surface water use in Fraser Draw is approximately 11.3 km (7 miles) downgradient of the site. The ground water surface is below the surface water level, therefore no contaminated ground water is expected to seep into Fraser Draw or Reid Draw, and no exposure or environmental impact from contaminated ground water is expected to occur via surface water.

Corrective Action Assessment:

PMC has performed active corrective action for over 20 years that has resulted in a reduction of ground water contamination associated with milling activities. PMC has demonstrated that further active corrective action measures would not produce an incremental gain in protection and is not warranted based on risk and natural degradation of the contamination over time and distance. Due to the isolated nature of this site and the current and future ground water use, additional active corrective action is not deemed necessary and the proposed ACLs would be protective at the POE.

PMC has demonstrated that the proposed ACLs are ALARA. By active ground water pumping, PMC has reduced contaminant concentrations as low as possible within the technical constraints of ground water pump and treat. Any additional pumping would not produce an incremental amount of protection to human health or the environment. With implementation of

the ACLs, the corrective action program will no longer be required.

Compliance Monitoring:

With the uncertainty of ground water fate and transport modeling, it is prudent to have a ground water monitoring program in place in order to assure protection of human health and the environment. PMC proposed (November 4, 2002) to conduct quarterly monitoring of the POC well (T1-12), AL-1, POE well (AL-6), AL-7, AL-8, AL-9, and the background well (TL-6). Samples will be analyzed for Total Dissolved Solids (TDS), sulfate, chloride, nitrate plus nitrite, arsenic, beryllium, cadmium, chromium, nickel, selenium, Ra-226 + Ra-228, thorium-230, and uranium. In addition, the pH, conductivity, and water level of each well will be measured.

The purpose of this monitoring is to assure that PMC remains in compliance with the ground water standards in the license, to monitor any movement of the plume, and to assure that ground water contamination does not present an unacceptable risk to human health or the environment. If the monitoring indicates that a licensed constituent may have exceeded its ground water standard, the licensee will be required to do additional monitoring and possibly corrective action. This monitoring will continue until 2005, when the license should be terminated and the site deeded to the Department of Energy (DOE). The DOE would then perform monitoring and surveillance.

RECOMMENDED LICENSE CHANGES:

As discussed above, the ACLs application should be approved. The current License Condition 60 requires compliance monitoring in part A and specifies ground water standards in part B that should be replaced with the monitoring and standards proposed in the ACLs application. Part C requires a corrective action program that is no longer needed so this condition should be deleted. Part D requires a statistical test or threshold values when more than half the data points are less than detection limits. This part should be replaced by wording that reflects the action required when an ACL exceedance is likely. In addition, License Condition 61.B(2) should be deleted because it states a target date for the corrective action program that is no longer required.

The recommended wording for License Condition 60 is:

60. Based on the application for Alternate Concentration Limits dated December 21, 2000, as revised January 11 and November 4, 2002, the licensee shall implement a compliance monitoring program containing the following:
 - A. Sample wells T1-12 (POC), AL-1, AL-6 (POE), AL-7, AL-8, AL-9, and T1-6 (background) on a quarterly frequency for chloride, nitrate + nitrite, TDS, sulfate, pH, conductivity, water level, arsenic, beryllium, cadmium, chromium, nickel, selenium, combined radium-226 and 228, thorium-230, and uranium.
 - B. Comply with the following ground water protection standards at point of compliance well T1-12 with background being recognized in well T1-6:

arsenic = 0.05 mg/l, beryllium = 0.07 mg/l, cadmium = 0.02 mg/l, chromium =

0.05 mg/l, nickel = 0.85 mg/l, selenium = 1.10 mg/l, combined radium-226 and 228 = 7.5 pCi/l, thorium-230 = 13.2 pCi/l, and uranium = 1.70 mg/l.

Submit a semiannual ground water monitoring report, on or before January 30, and July 30 of each year. This report must include ground water contour maps; iso-concentration maps for selenium, uranium, combined radium-226 and 228, sulfate, chloride, and TDS; and time versus concentration graphs for selenium, uranium, combined radium-226 and 228, sulfate, chloride, and TDS.

- C. Deleted by Amendment No. 63.
- D. If a ground water protection standard (as stated in Condition 60.B) at the point of compliance is exceeded, the licensee shall notify the NRC within 30 days and shall increase the sampling frequency to monthly, until it is determined by the NRC staff, that a true exceedance has occurred. If it is determined that a true exceedance has occurred, the licensee shall comply with the requirements per 10 CFR Part 40, Appendix A, Criterion 5D. If NRC staff determines that it is not a true exceedance, the licensee will revert back to quarterly monitoring as indicated in License Condition 60.A.

REFERENCES:

Pathfinder Mines Corporation, License Amendment Application for Alternate Concentration Limits in Groundwater for the Lucky Mc Mill Site, letter from T.W. Hardgrove, to Philip Ting, of NRC, December 21, 2000.

Pathfinder Mines Corporation, Request for Alternate Concentration Limits for the Lucky Mc Mill Site" Response to NRC's Request for Additional Information (October 26, 2001 letter), letter from T.W. Hardgrove, to Melvyn Leach, of NRC, January 11, 2002.

U.S. Nuclear Regulatory Commission (NRC), Draft NUREG-1620 Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act," January, 2002.

NRC, "Request for Groundwater Use Classification Pathfinder Lucky Mc Site, Source Material License SUA-672," letter from Daniel Gillen, of NRC to Gary Beach, of WDEQ, April 12, 2002.

NRC, "Request for Alternate Concentration Limits for Pathfinder Lucky Mc Uranium Mill, Material License SUA-672," Request for Additional Information, letter from Melvyn Leach, of NRC, to T.W. Hardgrove, of Pathfinder, October 26, 2001.

Wyoming Department of Environmental Quality, "Response for Groundwater Classification, Lucky Mc Mine Site," letter from Gary Beach, to Daniel Gillen, of NRC, June 14, 2002.

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, 51, 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. Pathfinder Mines Corporation Lucky Mc Uranium Mill	3. License Number SUA-672 Amendment 63
2. P.O. Box 730 Mills, Wyoming 82644	4. Expiration Date Until Terminated
	5. Docket No. 40-2259 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 |
| Natural Uranium | Any | Unlimited |
9. Authorized place of use: The licensee's Lucky Mc Mill site located in Fremont County, Wyoming.
[Applicable Amendments: 29, 36]
10. The licensee is hereby authorized to possess byproduct material in the form of uranium waste tailings generated by the licensee's milling operations authorized by this license.
11. For use in accordance with statements, representations and conditions contained in Sections 5.3, 5.4, 5.5, 6.4, and 7.6, and Figures 2-3 and 5-2 of the license renewal application dated December 1982, except where superseded by license conditions below. Whenever the word "will" is used in the above referenced sections, it shall denote a requirement.

The site organizational structure and position responsibilities shall be in accordance with the submittal dated September 25, 1991. Site security shall be provided by site personnel during regular business hours, but shall consist of limiting access by means of locked gates at times when site personnel are not present. Radiation survey requirements shall be as specified in Table 2 of the submittal dated February 27, 1995. No change room facility on a routine basis shall be required.

[Applicable Amendments: 7, 29, 45]

12. DELETED by Amendment No. 29.
13. DELETED by Amendment No. 29.
14. DELETED by Amendment No. 45.
15. 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

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subsequent reviews, investigations, and corrective actions, shall be documented. Unless otherwise specified in NRC regulations, all such documentation shall be maintained for a period of at least 5 years.

16. DELETED by Amendment No. 29.

17. DELETED by Amendment No. 45.

18. Release of equipment or packages from the restricted area shall be in accordance with guidance entitled, "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 Amendment: 63]

19. Mill tailings other than samples for research shall not be transferred from the site without specific prior approval of the NRC in the form of a license amendment. The licensee shall maintain a permanent record of all transfers made under the provisions of this condition.

20. In order to ensure that no disturbance of cultural resources occurs in the future, the licensee shall have an archeological and historical artifact survey of areas of its property, not previously surveyed, performed prior to their disturbance, including borrow areas to be used for reclamation cover. These surveys must be submitted to the NRC and no such disturbance shall occur until the licensee has received authorization from the NRC to proceed.

In addition, all work in the immediate vicinity of any buried cultural deposits unearthed during the disturbance of land shall cease until approval to proceed has been granted by the NRC.

21. The licensee shall conduct an annual survey of land use (private residences, grazing areas, private and public potable water and agricultural wells, and non-residential structures and uses) in the area within 5 miles (8 km) of any portion of the restricted area boundary and submit a report of this survey to NRC. This report shall indicate any differences in land use from that described in the last report.

[Applicable Amendments: 42, 44]

22. The results of all effluent and environmental monitoring shall be reported in accordance with 10 CFR 40.65 with copies of the report sent to NRC. Monitoring data shall be reported in the format shown in guidance entitled, "Sample Format for Reporting Monitoring Data."

[Applicable Amendments: 11, 12, 19, 42, 44, 63]

23. DELETED by Amendment No. 29.

24. The licensee shall immediately notify the NRC Operations Center at (301)951-0550, by telephone, of any failure to the tailings dam or tailings discharge and solution return system which results in a release of radioactive material and/or of any unusual conditions which if not corrected could lead to such a failure. This requirement is in addition to the requirements of 10 CFR 20.

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[Applicable Amendments: 42, 63]

25. 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 assessed or that is greater than that 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.
26. DELETED by Amendment No. 55
27. 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 decommissioning and decontamination of the mill and mill site, reclamation of any tailings or waste disposal areas, ground water restoration as warranted, and the long-term surveillance fee. With submittal of a revised reclamation/decommissioning plan, the licensee shall submit, for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs in the newly approved 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, Criteria 9 and 10, shall be submitted to the NRC at least 3 months prior to the anniversary date which is designated as December 15 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/decommissioning plan or NRC approved revisions to the plan.

Pathfinder Lucky Mc's currently approved surety, Irrevocable Letter of Credit issued by Credit Industriel et Commercial, in favor of the NRC, shall be continuously maintained in an amount not less than \$12,363,362 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, 21, 24, 26, 30, 33, 40, 42, 43, 47, 49, 54, 61, 63]

28. 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 Wyoming), 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 Wyoming, at the State's option.

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29. The licensee shall decommission the Lucky Mc Uranium Mill in accordance with the proposed plan submitted by letter dated March 30, 1992, as modified by letters dated December 23, 1992; July 20 and 23, 1993; and January 12, March 21, May 9, and May 13, 1996. Standard Operating Procedures included in the March 30, 1992, submittal shall be reviewed and revised in accordance with Condition No. 33 of this license.

All decommissioning activities shall be documented. Within 90 days following the completion of mill demolition and disposal activities, the licensee shall submit to the NRC a report documenting the activities and providing summaries of all data generated as part of the radiation safety program for mill decommissioning. In addition, within 90 days following the completion of the soil cleanup and verification program, the licensee shall submit to the NRC a report documenting the cleanup activities and providing the results of all soil sampling and gamma surveys conducted to verify the adequacy of cleanup.

The licensee's windblown tailings cleanup completion report submitted by its letter dated February 16, 1999, is considered acceptable. Furthermore, the licensee's environmental report on the cleanup status of Reid Draw with 'no action' alternative submitted by letter dated August 28, 1998, as revised, is accepted.

[Applicable Amendments: 29, 39, 46, 57, 58]

30. Occupational exposure calculations shall be performed and documented within 1 week of the end of the regulatory compliance period as specified in Table 2 of the submittal dated February 27, 1995.

[Applicable Amendment: 45]

31. The tailings impoundment area shall not be expanded by raising the height of the present dam or constructing a new dam except as authorized by this license.

32. The licensee shall implement an interim stabilization program which consists of the placement of a soil cover over all exposed tailings. The effectiveness of the soil cover shall be evaluated by means of a monthly documented inspection of all tailings areas. Written procedures which address the monthly inspections and the corrective actions to be taken in response to inspection findings shall be established.

[Applicable Amendments: 27, 37]

33. Standard written operating procedures (SOPs) shall be established for nonoperational activities to include environmental monitoring, and instrument calibrations. All written 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 operating procedures at least annually.

[Applicable Amendments: 29, 45]

34. The licensee shall implement the embankment inspection program specified in Section 5.5.7.8 of the license renewal application, with the exceptions that embankment settlement surveys shall be conducted at least semiannually, and that dam inspections need not be conducted on company holidays and

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weekends when personnel are not present onsite. All embankment inspections shall be documented. The monitored piezometers and the settlement monuments shall consist of those presented in the licensee's submittal by letter dated November 9, 1998.

[Applicable Amendments: 29, 41, 45, 55]

35. The RSO shall have the following education, training and experience:

- A. Education: A bachelor's degree in the physical sciences, industrial hygiene, or engineering from an accredited college or university or an equivalent combination of training and relevant experience in uranium mill radiation protection. Two years of relevant experience are generally considered equivalent to one year of academic study.
- B. Health physics experience: At least 1 year of work experience relevant to uranium mill operation in applied health physics, radiation protection, industrial hygiene, or similar work. This experience should involve actually working with radiation detection and measurement equipment, not strictly administrative or "desk" work.
- C. DELETED by Amendment No. 45.
- D. Specialized knowledge: A thorough knowledge of the proper application and use of all health physics equipment used in the restricted area, the chemical and analytical procedures used for radiological sampling and monitoring, and methodologies used to calculate personnel exposure to uranium and its daughters.

[Applicable Amendment: 45]

36. DELETED by Amendment No. 45.

37. The licensee shall conduct at least an annual ALARA audit of the radiation safety program and shall submit a written report to the corporate management. The ALARA audit report shall summarize at least the following data:

- A. Employee exposure records (external and internal time weighted calculations)
- B. Bioassay results
- C. Inspection log entries and summary reports of daily, weekly and semimonthly inspections.
- D. Documented training program activities
- E. Radiation safety meeting reports
- F. Radiological survey and sampling data

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- G. Reports on overexposure of workers submitted to NRC, Mine Safety and Health Administration (MSHA), or States
- H. Operating procedures that were reviewed during this time period.

The report on the annual radiation protection and ALARA audit should specifically discuss the following:

1. Trends in personnel exposures for identifiable categories of workers and types of operational activities
2. Whether equipment for exposure control is being properly used, maintained, and inspected
3. Recommendations on ways to further reduce personnel exposures from uranium and its daughters.

A copy of the ALARA audit report shall be kept on site for examination by NRC staff.

[Applicable Amendments: 42, 44, 45]

38. The licensee shall be required to use a Radiation Work Permit (RWP) for work or non-routine maintenance jobs where the potential for significant exposure to radioactive material exists and for which no standard written operating procedures already exist. The RWP shall be issued by the RSO or his designate and shall at least describe the following:
- 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 before, during, and following completion of the work.
39. For the area sampling of airborne radioactivity, the sample volume and analysis shall be sufficient to achieve a lower limit of detection of 10 percent of the MPC listed in Table 1 of Appendix B to 10 CFR 20.
- [Applicable Amendment: 32]
40. The licensee shall perform quarterly spot checks for surface contamination in eating rooms and offices when such facilities are being utilized by personnel during remaining site reclamation activities.
- [Applicable Amendments: 29, 45]
41. The licensee shall conduct safety meetings at least semiannually when personnel are routinely working within the restricted area. The licensee shall maintain a record of attendees and subjects covered.
- [Applicable Amendments: 29, 45]
42. DELETED by Amendment No. 45.

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43. DELETED by Amendment No. 13.
44. The RSO shall conduct an investigation of the employee's work record and exposure history when an action level of 25 percent of the maximum permissible time weighted exposure for the week or quarter is reached depending on the material solubility. Any personnel exposure exceeding 25 percent of the maximum permissible external exposure in any calendar quarter shall also be investigated. Corrective action shall be promptly initiated.
45. DELETED by Amendment No. 29.
46. DELETED by Amendment No. 45.
47. The licensee shall follow the lower limits of detection contained in the guidance entitled, "Proposed Alternate Lower Limits of Detection for Environmental Monitoring at Lucky Mc Mill," for analysis of samples collected pursuant to the environmental monitoring program required in License Condition No. 48.
- [Applicable Amendments: 3, 63]
48. The licensee shall implement the effluent and environmental monitoring program specified in Table 5.5.7.1 of the renewal application with the following modifications:
- A. Annual vegetation samples shall be collected at each air monitoring location and analyzed for Ra-226 and Pb-210.
 - B. DELETED by Amendment No. 22.
 - C. DELETED by Amendment No. 22.
 - D. DELETED by Amendment No. 22.
 - E. The location of background site A-1 shall be as specified in the licensee's April 23, 1992, letter.
- [Applicable Amendments: 6, 10, 20, 22, 31]
49. DELETED by Amendment No. 29.
50. The licensee is authorized to begin dismantling Dam No. 4, in accordance with its plan submitted by letters dated October 20, and November 9, 1998.
- [Applicable Amendments: 29, 55]
51. DELETED by Amendment No. 29.
52. DELETED by Amendment No. 29.
53. DELETED by Amendment No. 55.

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54. The licensee shall reclaim the tailings disposal area in accordance with Sections 3 through 7 and 10 through 11 of the July 21, 1992, submittal titled Lucky Mc Mine Tailings Reclamation Plan, Source Material License No. SUA-672, Volumes I and II, as modified by letters dated June 4, June 11, and June 21, 1993; April 7, December 16, and December 29, 1994; September 26, 1995; April 7, and December 17, 1997; May 6, May 29, and July 29, 1998; and March 11, May 7, and August 6, 1999, except as stipulated below. Items A-K shall be submitted to the NRC for review and approval at least 90 days prior to initiation of construction. Items L-N shall be included in the licensee's quality control program and implemented during construction.
- A. DELETED by Amendment No. 50.
- B. DELETED by Amendment No. 62.
- C. DELETED by Amendment No. 44.
- D. DELETED by Amendment No. 44.
- E. DELETED by Amendment No. 44.
- F. DELETED by Amendment No. 44.
- G. DELETED by Amendment No. 44.
- H. DELETED by Amendment No. 44.
- I. DELETED by Amendment No. 44.
- J. DELETED by Amendment No. 44.
- K. DELETED by Amendment No. 44.
- L. DELETED by Amendment No. 44.
- M. DELETED by Amendment No. 44.
- N. DELETED by Amendment No. 44.
- O. Before the nuclear density gauge (ASTM D-2622) can be used to determine the in place density of the fill, an acceptable correlation between the test results from the nuclear density gauge (ASTM D-2622) and the sand cone apparatus (ASTM D-1556) shall be established. The definition of an acceptable correlation and the procedure for determining that an acceptable correlation exists shall be submitted to NRC for review and approval prior to use of the gauge in the quality control program.
- P. A completion report including as-built drawings, verifying that reclamation of the site has been performed according to the approved plan, shall be provided within 6 months of the completion of

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construction. The report shall also include summaries of results of the quality assurance and control testing to demonstrate that the approved specifications were met.

- Q. As committed in its letter dated November 7, 1997, upon placement of a suitable base layer that will support a drill rig, the licensee will collect samples at 20 locations. All samples will be analyzed for Ra-226 and Th-230. The licensee may select 20 of the samples for radon emanation coefficient measurements and use the mean value to model the flux; otherwise, the NRC default value of 0.35 shall be used.

As soon as the data and new radon flux calculations are available, the licensee shall submit these to the NRC. If the additional data indicate that a modified radon barrier design is appropriate, the new barrier design shall be submitted to the NRC for review and approval.

[Applicable Amendments: 29, 39, 44, 48, 50, 51, 52, 56, 59, 60]

55. DELETED by Amendment No. 29.

56. DELETED by Amendment No. 29.

57. DELETED by Amendment No. 28.

58. DELETED by Amendment No. 29.

59. The licensee is authorized to use protection factors for respirators not to exceed the values specified in Appendix A of 10 CFR 20 for the purpose of assigning an exposure to airborne radionuclides provided that the respiratory protection program specified in Standard Operating Procedure No. 02.100.00 and its attachments, submitted to the NRC on November 14, 1984 and modified by letter dated January 14, 1985, is implemented.

Further, the Radiation Safety Officer (RSO) shall perform qualitative fit tests using irritant smoke for all employees required to wear respirators prior to the initial use of a respirator and annually thereafter. During the annual fit test, the RSO shall assure that the employee is correctly performing negative pressure fit checks and shall instruct the employee that the fit check is to be performed each time a respirator is donned and prior to entering an area where respirators are required. The fit tests and fit check instruction shall be documented.

[Applicable Amendment: 1]

60. Based on the application for Alternate Concentration Limits (ACL) for ground water, dated December 21, 2000, as revised January 11 and November 4, 2002, the licensee shall implement a compliance monitoring program containing the following:
- A. Sample wells T1-12 (POC), AL-1, AL-6 (POE), AL-7, AL-8, AL-9, and T1-6 (background) on a quarterly frequency for chloride, nitrate + nitrite, TDS, sulfate, pH, conductivity, water level, arsenic, beryllium, cadmium, chromium, nickel, combined radium-226 and 228, thorium-230, selenium, and uranium.

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- B. Comply with the following ground water protection standards at point of compliance (POC) well T1-12 with background being recognized in well T1-6:

arsenic = 0.05 mg/l, beryllium = 0.07 mg/l, cadmium = 0.02 mg/l, chromium = 0.05 mg/l, nickel = 0.85 mg/l, combined radium-226 and 228 = 7.5 pCi/l, selenium = 1.10 mg/l, thorium-230 = 13.2 pCi/l and uranium = 1.70 mg/l.

Submit a semiannual ground water monitoring report, on or before January 30, and July 30 of each year. This report must include ground water contour maps; iso-concentration maps for selenium, uranium, combined radium-226 and 228, sulfate, chloride, and TDS; and time versus concentration graphs for selenium, uranium, combined radium-226 and 228, sulfate, chloride, and TDS.

- C. Deleted by Amendment No. 63.
- D. If a ground water protection standard (as stated in Condition 60.B) at the point of compliance is exceeded, the licensee shall notify the NRC within 30 days and shall increase the sampling frequency to monthly, until it is determined by the NRC staff, that a true exceedance has occurred. If it is determined that a true exceedance has occurred, the licensee shall comply with the requirements per 10 CFR Part 40, Appendix A, Criterion 5D. If the NRC staff determines that it is not a true exceedance, the licensee will revert back to quarterly monitoring as indicated in License Condition 60.A.

[Applicable Amendments: 4, 5, 15, 17, 19, 22, 28, 35, 38, 41, 42, 44, 63]

61. The licensee shall complete site reclamation in accordance with the approved reclamation plan and ground-water corrective action plan, as authorized by License Condition Nos. 54 and 60, respectively, in accordance with the following schedules.
- B. To ensure timely compliance with target completion dates established in the Memorandum of Understanding (MOU) 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 - September 30, 1996.
 - (2) Placement of the interim cover to decrease the potential for tailings dispersal and erosion - April 30, 1993.
 - (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 - December 31, 2002.
- B. Reclamation, to ensure required longevity of the covered tailings and ground-water protection, shall be completed as expeditiously as is reasonably achievable, in accordance with the following target date for completion:

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- A. Placement of erosion protection as part of reclamation to comply with Criterion 6 of Appendix A of 10 CFR Part 40 - December 31, 2002.
- B. DELETED By Amendment No. 63.
- 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 risk to the public health and safety and the environment, with the 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: 53, 63]

62. Required written notice to NRC under this license should be sent: c/o Document Control Desk, Chief, Fuel Cycle Facilities Branch, Division of Fuel Cycle Safety and Safeguards, Mailstop T8-A33, U.S. Nuclear Regulatory Commission, 11545 Rockville Pike, Rockville, MD 20852-2738.

Incident and event notifications, which require telephone notification under 10 CFR 20.2202 and 10 CFR 40.60, shall be made to the NRC Operations Center at (301) 816-5100.

[Applicable Amendment: 63]

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Date: December 20, 2002

Daniel M. Gillen, Chief
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards