UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 25, 2000

Mr. T. W. Hardgrove, Manager
Environmental and Regulatory Services
Pathfinder Mines Corporation
935 Pendell Boulevard
P.O. Box 730
Mills, WY 82664

SUBJECT: WINDBLOWN TAILINGS CLEANUP COMPLETION - AMENDMENT NO. 49

Dear Mr. Hardgrove:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of Pathfinder Mines Corporation's (PMC's) windblown tailings cleanup completion report (CR) for the Shirley Basin, Wyoming, uranium mill site, submitted by letter dated October 29, 1999. Based on its review of the information provided by PMC, the NRC staff concludes that the CR is acceptable. The NRC staff, therefore, has amended Condition 51.B of the Shirley Basin Source Material License SUA-442, reflecting its concurrence in the CR.

The reissued license and the staff technical evaluation report that documents this licensing action are enclosed. If you have any questions regarding this action, please contact the NRC Project Manager, Mohammad Haque, at (301) 415-6640.

Sincerely,

Thomas H. Essig, Chief
Uranium Recovery and
Low-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-6622

Enclosures:
Technical Evaluation Report
Source Material License SUA-442

cc: G. Beach, DEQ, WY
R. Chancellor, DEQ, WY

TECHNICAL EVALUATION
OF
PATHFINDER SHIRLEY BASIN MILL SITE WINDBLOWN TAILINGS
CLEANUP COMPLETION REPORT (OCTOBER 1999)

LICENSE AMENDMENT NO. 49

DATE: February 14, 2000

DOCKET NO. 40-6622

LICENSE NO. SUA-442

LICENSEE: Pathfinder Mines Corporation

FACILITY: Shirley Basin Uranium Mill

PROJECT MANAGER: Mohammad Haque

TECHNICAL REVIEWER: John H. Lusher, Health Physicist

SUMMARY AND CONCLUSION

By letter dated October 29, 1999, Pathfinder Mines Corporation (PMC) submitted a windblown tailings cleanup completion report (CR) for reclamation of off-pile windblown areas for the Shirley Basin uranium mill site. The primary cleanup of windblown contaminated soils occurred during the summer of 1997, until inclement weather forced termination of cleanup activities. Further assessments of the residual contamination after cleanup were necessary due to the presence of high natural background concentrations of Th-232. Cleanup and further contamination assessment continued in the summers of 1998 and 1999.

The CR states that the cleanup of the off-pile windblown area was complicated by the presence of thorium (Th-232) ore outcrops. High concentrations of Th-232 in uranium-bearing areas are very rare and were unexpected at the Shirley Basin mill site. After exhaustive attempts at removing the contaminated material in these areas, off-site laboratory results confirmed that the high gamma levels were a result of Th-232 daughter products. This anomalous situation resulted in significant delays in the reclamation activities.

Based on the NRC staff review of the information presented in the CR, submitted by letter dated October 29, 1999, the staff concludes that the cleanup of the windblown tailings area is in accordance with the requirements of Criterion 6(6) of 10 Code of Federal Regulations (CFR) Part 40, Appendix A.

BACKGROUND

The mill site is located in the Shirley Basin area of Wyoming approximately thirty-four miles south of Casper, Wyoming. A ground water remediation effort is underway, and upon

ENCLOSURE

completion, associated facilities will be decommissioned and consolidated with the tailings, or the materials will be surveyed and released for unrestricted use. No other structures currently remain within the NRC-regulated restricted area. The licensee has structures remaining at the site which include an office building, maintenance shop facilities, and various storage structures. These structures will be razed upon completion of all site activities (including mine reclamation). Final tailings reclamation is on hold, awaiting the elimination of stored water on top of the tailings. The Source Material License SUA-442 allows the licensee to complete tailings reclamation by December 31, 2005.

The first mining of uranium by the licensee's predecessor in Shirley Basin occurred in 1959. Milling operations at Shirley Basin commenced in 1971. Mining operations were ended in May 1992, and the mill facility decommissioning was completed in July 1994.

DESCRIPTION OF LICENSEE'S REQUEST

By letter dated October 29, 1999, the licensee submitted a windblown tailings cleanup completion report for reclamation of off-pile windblown area for the Shirley Basin uranium mill site. The licensee submitted the CR in fulfilment of the requirements of Condition 51.B of Source Material License SUA-442 for the Shirley Basin Uranium Mill. The licensee requested NRC's concurrence with the CR and an amendment of the license to reflect NRC's concurrence.

The CR indicates that the primary cleanup of windblown contaminated soils occurred during the summer of 1997. Further assessment of the residual contamination after the cleanup was determined to be necessary due to the presence of high natural background concentrations of Th-232. The licensee continued further contamination assessment and cleanup activities in the summers of 1998 and 1999. The cleanup process included scraping the windblown contaminated materials shown to be elevated above the cleanup criteria, and disposing them into the tailings piles.

Areas to the immediate south and west of the tailings were not included in the windblown tailings survey discussed in the report because the licensee indicated that these areas would be subject to significant regrading activities when the tailings reclamation is accomplished. The licensee indicates that the radiological status of these areas will be evaluated upon completion of the regrading. These areas are not down wind at the site, and residue contamination relating to tailings and milling activities is anticipated to be minimal. The licensee indicated that any residual contamination to the south and west of the tailings would most likely be related to mining activities. The windblown tailings impacted area addressed in the CR was never affected by solution spills related to mill operations, nor was there any ore haulage on the primary access road that runs adjacent to the toe of the No. 5 tailings embankment. Spring Creek, which flows through the windblown tailings area, runs adjacent to a reclaimed mine waste dump located upgradient of the surveyed area.

TECHNICAL EVALUATION:

The NRC staff based its evaluation on the information provided in the CR submitted by letter dated October 29, 1999. The licensee provided soil verification survey and sampling data through the use of Global Positioning System (GPS)-based gamma surveys. The plan called

for the use of the GPS to identify areas requiring cleanup. Gamma action levels were determined by correlation studies in the windblown areas. The studies were completed, with the data supporting the use of the gamma action level of 41,000 counts per minute (cpm) for vehicle-mounted surveys and 47,000 cpm for walking surveys.

The plan was based on removal of surface soils having Ra-226 concentrations that exceed 5 pCi/g above background, or 8.0 pCi/g averaged over a layer with thickness 15 cm and an area of 100 m^2. For subsurface layers of 100 m^2 area, the cleanup criterion is 15 pCi/g above background, or 18.0 pCi/g. Heavy earth moving equipment was used to remove the surface soils to a depth of 15-30 cm (6-12 inches). The areas were re-surveyed and areas requiring additional removal were identified. This iterative procedure was used until all areas were below the action level or it was determined that the elevated readings resulted from natural background radionuclide concentrations.

During the cleanup, scrapers were used to remove 6-in to 12-in thick layers of soil. Once the gamma action level was met, the area was sampled according to the NRC-approved Soil Cleanup Verification and Sampling Plan. During this removal, it was discovered that a significant portion of the windblown tailings area still exceeded the gamma-ray action level even after removing several lifts of soil.

Soil samples were taken at 43 locations to a depth of 24 inches in 6-inch segments. The samples were analyzed on the on-site NaI gamma spectrometer where most of the samples indicated elevated Ra-226. However, samples analyzed by Energy Laboratories, Inc. (ELI) using radiochemistry indicated that most of the samples had low Ra-226 and U-nat content. The laboratory results show that for most of the sampling points, the Ra-226 cleanup criterion was met even for areas that exceeded 100,000 cpm, far higher than the gamma action level of 41,000 cpm. In order to better understand this discrepancy, splits from six of these samples were sent to Acculab Research for Ra-226 analysis. The results were in agreement with the ELI results. After carefully evaluating the spectra from the on-site laboratory, it was discovered that the photopeak (609 keV) of interest was broader than normal, indicating that an interfering gamma ray existed. It was concluded that the interfering gamma ray was from the 587 keV decay of Tl-208, a radionuclide in the Th-232 decay chain.

While Th-232 ore does not commonly exist in uranium mining areas, a gamma-ray spectral analysis of the soil samples using a high resolution Germanium detector confirmed the presence of elevated Th-232 series radionuclides. The predominant gamma rays are associated with the decaying radionuclides for the Th-232 series, concentrations are reported for Ra-228, Th-228, Ra-224, and Pb-212. For the U-238 series, concentrations are reported for Bi-214 and Pb-214. Because of the short half life of Rn-220, all radionuclides in the Th-232 series are expected to be in equilibrium with Ra-228 and probably with Th-232 (unconfirmed). From the laboratory results, the Ra-228 concentrations range from 6 pCi/g to 98 pCi/g with an average of approximately 30 pCi/g. The results for the Ra-226 daughters indicate average concentrations of 5.0 pCi/g for Bi-214 and 5.3 pCi/g for Pb-214. Since these samples had not necessarily been aged or sealed prior to analysis, the results reported for the U-238 series are not necessarily representative of the Ra-226 in the samples. However, assuming a radon emanation fraction of 0.35, the results of the Ra-226 can be estimated as being less than 1.54 times the reported values for Bi-214 and Pb-214. Therefore for any reported value of 5.2 pCi/g or lower, the maximum Ra-226 concentration is less than 8 pCi/g. The data indicate that approximately one third of the samples have the potential to exceed the 8 pCi/g Ra-226

criterion. The results from radiochemical analysis show that only 6 of the 43 samples analyzed exceeded the 8 pCi/g cleanup criterion. It is worth noting that 5 of the 6 samples where the Ra-226 concentration exceeded 8 pCi/g also had Ra-228 concentration exceeding 60 pCi/g. This infers that there is some geochemical association between the uranium series radionuclides and the Th-232 series deposits in this localized area.

The licensee collected 188 verification samples and had them analyzed using radiochemical methods. Of the 188 samples analyzed they ranged from 1.1 pCi/g to 7.8 pCi/g. None of the samples exceeded the 8.0 pCi/g Ra-226 cleanup criterion.

Additionally, the licensee provided information, maps, and justification of the naturally mineralized area, within the windblown tailings area. The licensee also provided Quality Assurance data through inter-laboratory comparisons of Ra-226, natural Uranium, Th-230 and Th-232 samples.

The staff determined that adequate sampling and surveying were performed for the areas requiring the cleanup and the 250 foot buffer zone. The staff determined that results in the CR supports the cleanup of the windblown tailings area, and is in accordance with the requirements of criterion 6(6) of 10 CFR Part 40, Appendix A.

RECOMMENDED LICENSE CHANGE:

The staff recommends that Condition 51 of Source Material License SUA-442, for the Shirley Basin uranium mill, be amended to reflect NRC concurrence in the windblown tailings cleanup completion report submitted by PMC's letter dated October 29, 1999. The amendment should add the following text to Condition 51.B of the license.

> "The licensee's windblown tailings cleanup completion report submitted by its letter dated October 29, 1999, is considered acceptable."

ENVIRONMENTAL IMPACT EVALUATION:

In accordance with the categorical exclusion contained in Paragraph (c)(11) of 10 CFR 51.22, an environmental assessment is not required for this licensing action. Therefore, an environmental report, as required by 10 CFR 51.60(b)(2), is not necessary.

REFERENCES:

Pathfinder Mines Corporation (PMC), 1999. Submittal, titled "Shirley Basin Mill Site Completion Report for Reclamation of Off-Pile Windblown Area," by letter dated October 29, 1999.

U.S. Nuclear Regulatory Commission (NRC), 1997. License Amendment No. 45 - NRC's Concurrence in PMC's Soil Cleanup Verification and Sampling Plan for Shirley Basin, Wyoming Uranium Mill Site.

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.

Licensee	
1. Pathfinder Mines Corporation	3. License Number: SUA-442, Amendment No. 49
2. Shirley Basin Mine Shirley Basin, Wyoming 82615	4. Expiration Date: Until NRC determines site reclamation is adequate. [Applicable Amendments: 32]
	5. Docket or Reference No.: 40-6622

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
Uranium	Any	Unlimited

9. Authorized place of use: The licensee's uranium facility located in Carbon County, Wyoming. [Applicable Amendments: 32]

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 4 and 5 of the licensee's application dated November 30, 1994, except where superseded by license conditions below.

    In addition, the site restricted area boundary shall be as shown on the map (Figure 2-2, dated April 2, 1996) accompanying the licensee's April 9, 1996, submittal. Furthermore, the licensee is authorized to discharge from the surficial aquifer collection system to the Area 2/8 reclamation reservoir as proposed in the licensee's April 9, 1996, submittal, and as shown in Exhibit 1.

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

    [Applicable Amendments: 4, 29, 37, 39, 41]

12. DELETED by Amendment No. 32.

13. DELETED by Amendment No. 32.

14. DELETED by Amendment No. 39.

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 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.

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16. DELETED by Amendment No. 32.

17. DELETED by Amendment No. 39.

18. Release of equipment or packages from the restricted area shall be in accordance with attachment 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.

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 five miles (8 km) of any portion of the restricted area boundary and submit a report of this survey to the NRC. This report shall indicate any differences in land use from that described in the last report.

    [Applicable Amendment: 39]

22. The results of all effluent and environmental monitoring required by this license shall be reported in accordance with 10 CFR 40, Section 40.65 with copies of the report sent to the NRC. Monitoring data shall be reported in the format shown in attachment entitled, "Sample Format for Reporting Monitoring Data."

    [Applicable Amendment: 39]

23. DELETED by Amendment No. 32.

24. The licensee shall immediately notify the NRC Operations Center, by telephone, of any failure to the tailings dam 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.

    [Applicable Amendment: 39]

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. The licensee shall implement a program to minimize dispersal of dust from the ore stock pile area(s). This program shall include written operating procedures.
The effectiveness of the control method used shall be evaluated weekly by means of a documented inspection.

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. Within three months of NRC approval 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. The attachment entitled, "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates," outlines the minimum considerations used by the NRC in the review of site closure estimates. Reclamation/decommissioning plans and annual updates should follow this outline.

Pathfinder Shirley Basin's currently approved surety, Irrevocable Letter of Credit No. SB 20.851, issued by Compagnie Financiere de CIC et de l'Union Europeenne, New York Branch, in favor of the NRC, shall be continuously maintained in an amount not less than $13,863,948 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: 12, 14, 17, 21, 26, 28, 33, 35, 38, 42, 44, 46]

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.

29. DELETED by Amendment No. 32.

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30. DELETED by Amendment No. 39.

31. The tailings impoundment area shall not be expanded by raising the height of the present dam or constructing a new dam without specific prior approval of the NRC in the form of a license amendment.

32. The licensee shall implement an interim stabilization program for all tailings not covered by standing water. This program shall include written operating procedures and shall minimize dispersal of blowing tailings. The effectiveness of the control method used shall be evaluated weekly by means of a documented tailings area inspection.

33. Standard written operating procedures (SOPs) shall be established for environmental monitoring, bioassay analyses, and instrument calibrations. An up-to-date copy of each written procedure shall be maintained on file by the Radiation Safety Officer (RSO).

    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 Amendment: 39]

34. Radiation monitoring equipment shall be calibrated after repairs and at least semiannually or at the manufacturer's suggested interval, whichever is sooner, and checked for proper operation using a radiation check source prior to use.

    The licensee shall conduct and document annual calibrations and weekly checks of the pressure gauges used to determine air flow for environmental air samplers. The calibrations shall include the generation of a graph depicting the relationship between air pressure differential and air flow rate. Instrumentation used in generating the graphs shall be calibrated annually prior to the calibration of the air pressure gauges. The weekly calibration checks shall include a documented check of the air pressure differential with a clean filter. If the check indicates that the gauge reading differs by more than 1.0 inch of water from the value determined during the annual calibration, the instrument shall not be used to determine air flow rates until it has been recalibrated or repaired. The air pressure differential gauge shall be read no higher than the next lowest full inch for the purpose of determining air flow rates. In addition, the licensee shall, by March 31, 1989, provide documentation to the NRC, indicating that the air pressure differential gauges have been modified for low temperature use per manufacturer recommendations.

    [Applicable Amendments: 18, 39]

35. In addition to the training program as outlined in Section 5.3 of the license application, the licensee shall conduct and document the attendance at bi-monthly safety meetings for all restricted area facility employees.

    [Applicable Amendment: 39]

36. The annual ALARA report and recommendations by the Audit Committee to the Mine Manager shall include a determination of the following:

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A. If there are any upward trends developing in personnel exposures for identifiable categories of workers or types of operations or effluent releases;

B. If exposures and effluents might be lowered under the concept of as low as reasonably achievable;

C. If equipment for effluent and exposure control is being properly used, maintained, and inspected;

In addition, the RSO shall be one of the members of the annual Audit Committee. A copy of the ALARA report shall be submitted to the NRC, no later than 1 month after it was submitted to the Mine Manager.

[Applicable Amendment: 39]

37. The licensee shall maintain a minimum of 3.0 feet of freeboard on the No. 4 tailings impoundment and a minimum of 4.5 feet of freeboard on the No. 5 tailings impoundment throughout the project life.

38. The licensee shall implement the environmental and effluent monitoring program as specified in Table 5.8 and Figure 2-2 of their amendment application dated November 1994.

In addition to the parameters specified in Table 5.8, all surface water sampling sites shall be monitored for pH and all the chemical parameters specified for the ground-water wells in Table 5.8. Notwithstanding the above, the ground-water monitoring shall be as specified in License Condition No. 47.

[Applicable Amendments: 16, 22, 27, 30, 37, 39]

39. DELETED by Amendment No. 39.

40. DELETED by Amendment No. 22.

41. The licensee shall implement the embankment inspection and monitoring program described in Section 4.2 of the amendment application of November 1994, with the exception that daily dam inspections need not be conducted on weekends and company holidays. In addition, the licensee shall conduct technical evaluations of the tailings embankment which meet the minimum requirements specified in Regulatory Guide 3.11.1. A copy of the report documenting the annual technical evaluation shall be submitted to the NRC no later than 1 month after it was submitted to the Mine Manager. Further, pond water levels shall be measured monthly, and the results documented.

[Applicable Amendments: 25, 36, 39]

42. In addition to the bioassay program described in Section 5.5.4 of the license application, the licensee shall comply with the following:

A. Anytime an action level of 15 ug/l uranium for urinalysis or 9 nCi of natural uranium for in vivo measurement is reached or exceeded, the licensee shall document the corrective actions which have been performed in accordance with Revision 1 of Regulatory Guide 8.22, dated

January 1987. This documentation shall be submitted to the NRC, as part of the semiannual report required by 10 CFR 40.65.

B. Anytime an action level of 35 ug/l for two consecutive specimens or 130 ug/l uranium for one specimen for urinalysis or 16 nCi uranium for an in vivo measurement is reached or exceeded, the licensee shall document the corrective actions which have been performed in accordance with Revision 1 of Regulatory Guide 8.22. This documentation shall be submitted to the NRC, within 30 days of exceeding the action level.

C. DELETED by Amendment No. 39.

D. DELETED by Amendment No. 39.

[Applicable Amendments: 11, 24, 39]

43. In the event of an emergency, the licensee shall implement the Emergency Response Plan described in the licensee's Plan dated July 1994. In addition, the licensee shall perform a documented review of the plans at least annually, updating it if necessary.

Whenever the words "will" or "may" are used in the above referenced sections it shall denote a requirement.

[Applicable Amendments: 6, 39]

44. The licensee shall implement the environmental quality assurance program as described in Appendices A and B of their submittal dated March 25, 1985 as supplemented by their submittal dated July 10, 1985.

[Applicable Amendments: 5, 8, 39]

45. DELETED by Amendment No. 39.

46. In accordance with the licensee's submittals dated November 2, 1984, and April 13 and September 23, 1992, the licensee is hereby authorized to dispose of byproduct material generated onsite or at other licensed facilities, subject to the following:

A. Disposal of up to 10,000 cubic yards of byproduct material per year from generators other than in situ leach facilities is authorized provided that written approval is obtained from the NRC for each specific generator prior to disposal. Information submitted in support of a specific disposal request shall include the physical, radiological, and chemical characteristics of the byproduct material and shall address potential impacts to the tailings reclamation plan.

Disposal of byproduct material from in situ leach facilities does not require specific authorization from the NRC.

B. All contaminated equipment shall be dismantled, crushed, or perforated to minimize void spaces. Barrels containing materials other than soil or sludges shall be emptied into the disposal area and the barrels crushed. Barrels containing soil or sludges shall be verified to be full prior to disposal. Barrels not completely full shall be filled with tailings or soil.

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C. No material other than soils shall be buried closer than 100 feet from the centerline of Tailings Dam No. 5. The material shall be covered with clean fill material within 30 days of disposal.

D. Written procedures shall be established to describe the inspection and disposal of byproduct material. The procedures shall assign specific responsibilities for all activities, including program oversight.

E. All disposal activities shall be documented. The documentation shall include descriptions of the byproduct material and the disposal locations, as well as all actions required by this condition.

[Applicable Amendments: 1, 31, 34]

47. The licensee shall implement a ground-water compliance monitoring program containing the following:

A. Sample wells MC7, RP120A, RPI21B, MC6, 5A1, RPI42A, MC9, RPI19B, NP01, MC14, and MC11, on a quarterly frequency for chloride, nitrate, sulfate, pH, TDS, and water level, and on a semiannual frequency for arsenic, barium, beryllium, cadmium, chromium, gross alpha, lead, molybdenum, nickel, radium-226 and 228, selenium, thorium-230, and uranium.

B. Comply with the following ground-water protection standards at point of compliance well Nos. NP01 and RPI19B, with background being recognized in well MC14:

arsenic = 0.05 mg/l, barium = 1.0 mg/l, beryllium = 0.02 mg/l, cadmium = 0.01 mg/l, chromium = 0.05 mg/l, gross alpha = 15 pCi/l, lead = 0.05 mg/l, molybdenum = 0.10 mg/l, nickel = 0.05 mg/l, radium-226 and 228 = 5.0 pCi/l, selenium = 0.01 mg/l, thorium-230 = 0.3 pCi/l, and uranium = 0.07 mg/l.

C. Maintain and operate the seepage collection system as specified in, "Ground-Water Monitoring for Shirley Basin's Tailings Seepage Control Plan," February 1985, and the latest annual update to that plan.

D. Submit, by March 1 of each year, a report on the ground-water recovery system's performance, including an operations log of the collection wells, appropriate water level data, and any proposed changes to the system.

[Applicable Amendments: 3, 7, 13, 15, 19, 22, 39]

48. DELETED by Amendment No. 32.

49. Notification to NRC under 10 CFR 20.2202, 10 CFR 40.60, and specific license conditions should be made as follows:

Required written notice to NRC under this license should be given to: Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

[Applicable Amendment: 39]

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50. The licensee shall complete site reclamation in accordance with the approved reclamation plan and groundwater corrective action plan, in accordance with the following schedule.

    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 tailings pile - December 31, 1997.

        (2) Placement of the interim cover to decrease the potential for tailings dispersal and erosion - December 31, 2001.

        (3) Placement of final radon barrier designed and constructed to limit radon emissions to an average flux of no more than 20 $pCi/m^2/s$ above background - December 31, 2004.

    B. Reclamation, to ensure required longevity of the covered tailings and groundwater protection, shall be completed 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 - December 31, 2005.

        (2) Projected completion of groundwater corrective actions to meet performance objectives specified in the groundwater corrective action plan - December 31, 2005.

    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 Amendment: 40, 43, 48]

51. The licensee shall reclaim the tailings disposal area in accordance with the submittal by letter dated May 22, 1996, titled Shirley Basin Mine Tailings Reclamation Plan, Source Material License No. SUA-442, Volumes I and II, as modified by letters dated November 20, 1996; May 29, September 10, and November 24, 1997; March 6, and July 21, 1998; and April 9, and September 8, 1999; and subject to the following:

    A. Soil cleanup and verification shall be performed in accordance with the Soil Cleanup Verification Survey and Sampling Plan submitted by the licensee's letters dated April 3, May 29, December 4, and December 8, 1997.

License Number
SUA-442, Amendment No. 49

Docket or Reference Number
40-6622

MATERIALS LICENSE
SUPPLEMENTARY SHEET

B. 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 the cleanup. The report shall include gamma-radium correlation on all verification data to confirm the appropriateness of the gamma action level.

The licensee's windblown tailings cleanup completion report submitted by its letter dated October 29, 1999, is considered acceptable.

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

[Applicable Amendment: 45, 47, 49]

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Thomas H Essig

Dated: February 25, 2000

Thomas H. Essig, Chief
Uranium Recovery and
Low-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

February 25, 2000

Mr. T. W. Hardgrove, Manager
Environmental and Regulatory Services
Pathfinder Mines Corporation
935 Pendell Boulevard
P.O. Box 730
Mills, WY 82664

SUBJECT: WINDBLOWN TAILINGS CLEANUP COMPLETION - AMENDMENT NO. 49

Dear Mr. Hardgrove:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of Pathfinder Mines Corporation's (PMC's) windblown tailings cleanup completion report (CR) for the Shirley Basin, Wyoming, uranium mill site, submitted by letter dated October 29, 1999. Based on its review of the information provided by PMC, the NRC staff concludes that the CR is acceptable. The NRC staff, therefore, has amended Condition 51.B of the Shirley Basin Source Material License SUA-442, reflecting its concurrence in the CR.

The reissued license and the staff technical evaluation report that documents this licensing action are enclosed. If you have any questions regarding this action, please contact the NRC Project Manager, Mohammad Haque, at (301) 415-6640.

Sincerely,

[Signed by]
Thomas H. Essig, Chief
Uranium Recovery and
Low-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-6622
TAC No. L51884 (closed)
Enclosures:
Technical Evaluation Report
Source Material License SUA-442

cc: G. Beach, DEQ, WY
R. Chancellor, DEQ, WY

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