



August 24, 2011

Mr. Keith I. McConnell, Deputy Director
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management and
Environmental Protection
Office of Federal and State Materials and
Environmental Management Programs
U. S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, Maryland 20852-2738

Ref: Docket No. 40-6622, Source Material License No. SUA-442 - *Shirley Basin*

Dear Mr. McConnell:

Enclosed please find two copies of an annual radiation safety ALARA audit report covering year 2010 for the Shirley Basin mill and tailings site as required by condition 36 of Source Material License No. SUA-442.

Sincerely,

A handwritten signature in blue ink, appearing to read 'R. Mark Owens', is written over a horizontal line.

R. Mark Owens
General Manager

Enclosure

Cc: D. B. Spitzberg, USNRC, Region IV

PATHFINDER MINES CORPORATION

935 PENDELL BLVD., P.O. BOX 730 MILLS, WYOMING 82644, U.S.A.
TEL.: 307 234 5019 FAX: 307 473 7306 WWW.US.AREVA.COM

Annual ALARA Audit

For 2010

PATHFINDER MINES CORPORATION

Shirley Basin Mine

Source Material License SUA-442

Prepared By

**T. Hardgrove
Consultant**

June 16, 2011

A. Introduction

An annual ALARA audit of the radiation safety program at the Shirley Basin Mine was conducted June 13-14, 2011. The audit was conducted in fulfillment of condition 36 of the license. The audit entailed a review of 2010 radiation safety records and an evaluation of conformance with requirements of the license.

B. Personnel Dose Records

No doses were assigned during 2010. The mill has been decommissioned, and the tailings area has been reclaimed for a number of years now, eliminating most sources of personnel exposure at the site. The remaining un-reclaimed portion of the tailings area consists of approximately 25 acres in the Pond 3 basin dedicated to the licensed disposal of byproduct waste materials from ISL licensees. This disposal activity has been ongoing for over fifteen years, and the historical exposure/dose records for the site have demonstrated very low exposure potential due to the manner in which the incoming wastes are handled.

The loads arrive in end dump tractor-trailer rigs or dedicated containers. A load is dumped into or at the edge of the disposal pit. Any material left outside the pit is subsequently dozed into the pit, and the dumped material is covered with clean fill within thirty days of disposal, consistent with Condition 46 of SUA-442. The handling procedures for byproduct waste eliminate direct contact with the material by site personnel, resulting in little risk of exposure. A review was done during this audit of the 2010 ISL waste disposal summary report prepared by Pathfinder management. There were 387 shipments received at Shirley Basin during the year; 369 of those shipments consisted primarily of soils excavated from the Uranium One Holiday-El Mesquite site in south Texas. These soils typically had low levels of radioactivity, further reinforcing the conclusion regarding very low probability of personnel exposure while disposing of ISL byproduct material.

There continues to be only one worker on site on a part time basis, working as a contractor. The only other employee, the mine manager who also functions as radiation safety officer (RSO), visits the site periodically. The lack of recent exposure records is consistent with the requirements of 10 CFR 20.1502 since individual exposure monitoring is required if the external exposure is greater than 500 mrem, or if the internal exposure is greater than ten percent of the applicable ALIs from Appendix B to 10 CFR 20. Individual TLD monitoring had indicated zero external dose for over ten years prior to 2008, and the highest recorded average individual annual ALI for the previous nine years was 0.7 uCi Rn222 with daughters, well below the 10 uCi threshold for monitoring. Other previously monitored radionuclides such as Unat and Ra226 measured zero or near-zero intake for years prior to 2008.

C. Bioassays

No bioassay samples were taken in 2010. There were no unique circumstances that warranted urinalysis. The NRC license does not require routine urinalyses, and no measurable intakes were indicated for bioassays done prior to 2008 for a number of years.

D. Inspections

There were no formal NRC inspections conducted during 2010. NRC Region IV inspects the site and the radiation safety records every other year. The last inspection was conducted on July 29-30, 2009.

E. Training

The current mine manager began functioning as the RSO on November 1, 2010. A review of Section 5.2 of the November 30, 1994 amendment request referenced in Condition 11 of the license confirmed that the individual met the qualifications for the position of RSO. He had received appropriate radiation safety training some years previously, and then completed a radiation safety officer training course during the period of November 8-12, 2010. His formal education and years of experience in the uranium industry are consistent with the requirements of the referenced Section 5.2.

In response to a 2009 NRC inspection violation concerning the lack of US DOT-mandated hazmat training, the licensee provided the requisite training by hiring a consultant (Sheryl Garling, R and D Enterprises, Inc.) to conduct the DOT General Awareness/Familiarization and Security Awareness Component on October 9, 2009. The training was provided to the contractor who releases empty byproduct waste shipment containers for return to various ISL sites. The contractor will require refresher training prior to October 9, 2012. The RSO also received the same training in May, 2011. The consultant provided Certificates of Completion at the end of the training and after both participants successfully completed a test over the course materials. Documentation of all training is maintained in a file at Pathfinder offices in Mills, Wyoming.

F. Safety Meetings

The NRC issued a NOV in its 2009 inspection report for the lack of documented bimonthly safety meetings, including year 2008. Subsequently, bi-monthly safety meetings were conducted through August, 2010. A meeting was not held in October, 2010 during a period of personnel changes. The bi-monthly meetings were resumed in December, 2010. The meetings are documented by written reports maintained in a file at the PMC Mills office. Subject matter for the meetings included radiation safety aspects of site activity, conventional safety matters, and operating equipment problems with safety implications.

G. Radiological Surveys and Sampling Data

Surveys of equipment (primarily ISL waste delivery trucks) prior to release from the restricted area are well documented. There was a three month period (January 22, 2010 to April 20, 2010) when a non-calibrated beta/gamma instrument was utilized for the release of ISL delivery trucks from the restricted area. A total of 43 trucks were released during this period using the non-calibrated instrument. The use of the non-calibrated instrument is discussed in Section H of this report. In addition to the release of ISL byproduct waste delivery trucks there were nineteen separate surplus equipment releases done during 2010. Most were for small vehicles removed as scrap material. All such equipment was well under release limits.

An alpha personnel survey meter was maintained in the site office for the exit surveying of truck drivers and the site contractor. The exit scan log sheets were reviewed, and it appears that personnel did routinely scan for alpha contamination prior to exiting the facility. No personnel contamination problems occurred. No other radiological surveys or sampling were done in 2010, consistent with the site status.

No routine (quarterly) contamination surveys of small vehicles leaving the restricted area were conducted in 2010. There is a standard operating procedure for the conduct of such surveys. While the likelihood of unacceptable contamination on such vehicles is low, such surveys should be conducted to confirm there is no contamination in excess of the limits.

H. Equipment Used for Exposure Control

As noted in Section G above there was a repeat of the use of a non-calibrated radiation detection instrument for the release of ISL byproduct waste delivery trucks early in 2010. A similar event occurred in 2008 and was treated as a non-cited violation by the NRC in a 2009 inspection. At that time the self-identified violation was corrected by scheduling routine annual instrument calibrations during the winter months when the facility was not receiving ISL byproduct waste shipments. During late 2009 and through 2010 there was no winter shutdown, and the failure to note the calibration due date was repeated by the contract technician. Upon discovery of the oversight the instrument was taken out of service until the calibration was done, and the release data were reviewed for any indications of instrument malfunction or check source reading variations. The review (dated May 4, 2010 and located in the subject instrument calibration file) concluded that the possibility of the release of unacceptably contaminated equipment from the site using the non-calibrated instrument was low. The corrective action taken in response to the 2010 non-calibration was to modify the equipment release form to require the notation of the calibration due dates for survey instruments used. That action has appeared to resolve the problem. This event was also discussed in the 2009 ALARA audit report even though it did not occur until 2010.

Otherwise, the radiation safety instrumentation program is in order. All other instruments were calibrated when used, and check sources were always utilized to confirm instrument function prior to use.

I. Reports on Overexposures

There were no overexposures during 2010.

J. Standard Operating Procedures Review

The records with the SOPs documented the required annual review of all active SOPs by the RSO.

K. Radiation Work Permits

No radiation work permits (RWP) were issued during 2010.

L. Recommendations on Ways to Further Reduce Personnel Exposures

- Continue to emphasize good housekeeping and personal hygiene practices as a means to avoid contamination problems, particularly in conjunction with ISL waste shipments delivery.
- Continue to conduct bi-monthly safety meetings.
- Insure that the form documenting equipment/ISL waste delivery truck release surveys is carefully completed, including the notation of calibration due dates for the instruments used for the surveys. Careful attention to calibration due dates should be emphasized in light of the discussion under item H above.
- Conduct quarterly contamination surveys on small vehicles used in support of the ISL byproduct waste delivery program that leave the restricted area.

M. Concluding Comment

During 2010 radiation doses were likely at background levels with only one part time contractor on site to handle the ISL waste shipments delivery and disposal. The radiation safety program at Shirley Basin conforms with the requirements of the license and is appropriate for the kind and level of activity at the site.



Tom Hardgrove
Consultant

Annual ALARA Audit

For 2010

PATHFINDER MINES CORPORATION

Shirley Basin Mine

Source Material License SUA-442

Prepared By

**T. Hardgrove
Consultant**

June 16, 2011

A. Introduction

An annual ALARA audit of the radiation safety program at the Shirley Basin Mine was conducted June 13-14, 2011. The audit was conducted in fulfillment of condition 36 of the license. The audit entailed a review of 2010 radiation safety records and an evaluation of conformance with requirements of the license.

B. Personnel Dose Records

No doses were assigned during 2010. The mill has been decommissioned, and the tailings area has been reclaimed for a number of years now, eliminating most sources of personnel exposure at the site. The remaining un-reclaimed portion of the tailings area consists of approximately 25 acres in the Pond 3 basin dedicated to the licensed disposal of byproduct waste materials from ISL licensees. This disposal activity has been ongoing for over fifteen years, and the historical exposure/dose records for the site have demonstrated very low exposure potential due to the manner in which the incoming wastes are handled.

The loads arrive in end dump tractor-trailer rigs or dedicated containers. A load is dumped into or at the edge of the disposal pit. Any material left outside the pit is subsequently dozed into the pit, and the dumped material is covered with clean fill within thirty days of disposal, consistent with Condition 46 of SUA-442. The handling procedures for byproduct waste eliminate direct contact with the material by site personnel, resulting in little risk of exposure. A review was done during this audit of the 2010 ISL waste disposal summary report prepared by Pathfinder management. There were 387 shipments received at Shirley Basin during the year; 369 of those shipments consisted primarily of soils excavated from the Uranium One Holiday-El Mesquite site in south Texas. These soils typically had low levels of radioactivity, further reinforcing the conclusion regarding very low probability of personnel exposure while disposing of ISL byproduct material.

There continues to be only one worker on site on a part time basis, working as a contractor. The only other employee, the mine manager who also functions as radiation safety officer (RSO), visits the site periodically. The lack of recent exposure records is consistent with the requirements of 10 CFR 20.1502 since individual exposure monitoring is required if the external exposure is greater than 500 mrem, or if the internal exposure is greater than ten percent of the applicable ALIs from Appendix B to 10 CFR 20. Individual TLD monitoring had indicated zero external dose for over ten years prior to 2008, and the highest recorded average individual annual ALI for the previous nine years was 0.7 uCi Rn222 with daughters, well below the 10 uCi threshold for monitoring. Other previously monitored radionuclides such as Unat and Ra226 measured zero or near-zero intake for years prior to 2008.

C. Bioassays

No bioassay samples were taken in 2010. There were no unique circumstances that warranted urinalysis. The NRC license does not require routine urinalyses, and no measurable intakes were indicated for bioassays done prior to 2008 for a number of years.

D. Inspections

There were no formal NRC inspections conducted during 2010. NRC Region IV inspects the site and the radiation safety records every other year. The last inspection was conducted on July 29-30, 2009.

E. Training

The current mine manager began functioning as the RSO on November 1, 2010. A review of Section 5.2 of the November 30, 1994 amendment request referenced in Condition 11 of the license confirmed that the individual met the qualifications for the position of RSO. He had received appropriate radiation safety training some years previously, and then completed a radiation safety officer training course during the period of November 8-12, 2010. His formal education and years of experience in the uranium industry are consistent with the requirements of the referenced Section 5.2.

In response to a 2009 NRC inspection violation concerning the lack of US DOT-mandated hazmat training, the licensee provided the requisite training by hiring a consultant (Sheryl Garling, R and D Enterprises, Inc.) to conduct the DOT General Awareness/Familiarization and Security Awareness Component on October 9, 2009. The training was provided to the contractor who releases empty byproduct waste shipment containers for return to various ISL sites. The contractor will require refresher training prior to October 9, 2012. The RSO also received the same training in May, 2011. The consultant provided Certificates of Completion at the end of the training and after both participants successfully completed a test over the course materials. Documentation of all training is maintained in a file at Pathfinder offices in Mills, Wyoming.

F. Safety Meetings

The NRC issued a NOV in its 2009 inspection report for the lack of documented bimonthly safety meetings, including year 2008. Subsequently, bi-monthly safety meetings were conducted through August, 2010. A meeting was not held in October, 2010 during a period of personnel changes. The bi-monthly meetings were resumed in December, 2010. The meetings are documented by written reports maintained in a file at the PMC Mills office. Subject matter for the meetings included radiation safety aspects of site activity, conventional safety matters, and operating equipment problems with safety implications.

G. Radiological Surveys and Sampling Data

Surveys of equipment (primarily ISL waste delivery trucks) prior to release from the restricted area are well documented. There was a three month period (January 22, 2010 to April 20, 2010) when a non-calibrated beta/gamma instrument was utilized for the release of ISL delivery trucks from the restricted area. A total of 43 trucks were released during this period using the non-calibrated instrument. The use of the non-calibrated instrument is discussed in Section H of this report. In addition to the release of ISL byproduct waste delivery trucks there were nineteen separate surplus equipment releases done during 2010. Most were for small vehicles removed as scrap material. All such equipment was well under release limits.

An alpha personnel survey meter was maintained in the site office for the exit surveying of truck drivers and the site contractor. The exit scan log sheets were reviewed, and it appears that personnel did routinely scan for alpha contamination prior to exiting the facility. No personnel contamination problems occurred. No other radiological surveys or sampling were done in 2010, consistent with the site status.

No routine (quarterly) contamination surveys of small vehicles leaving the restricted area were conducted in 2010. There is a standard operating procedure for the conduct of such surveys. While the likelihood of unacceptable contamination on such vehicles is low, such surveys should be conducted to confirm there is no contamination in excess of the limits.

H. Equipment Used for Exposure Control

As noted in Section G above there was a repeat of the use of a non-calibrated radiation detection instrument for the release of ISL byproduct waste delivery trucks early in 2010. A similar event occurred in 2008 and was treated as a non-cited violation by the NRC in a 2009 inspection. At that time the self-identified violation was corrected by scheduling routine annual instrument calibrations during the winter months when the facility was not receiving ISL byproduct waste shipments. During late 2009 and through 2010 there was no winter shutdown, and the failure to note the calibration due date was repeated by the contract technician. Upon discovery of the oversight the instrument was taken out of service until the calibration was done, and the release data were reviewed for any indications of instrument malfunction or check source reading variations. The review (dated May 4, 2010 and located in the subject instrument calibration file) concluded that the possibility of the release of unacceptably contaminated equipment from the site using the non-calibrated instrument was low. The corrective action taken in response to the 2010 non-calibration was to modify the equipment release form to require the notation of the calibration due dates for survey instruments used. That action has appeared to resolve the problem. This event was also discussed in the 2009 ALARA audit report even though it did not occur until 2010.

Otherwise, the radiation safety instrumentation program is in order. All other instruments were calibrated when used, and check sources were always utilized to confirm instrument function prior to use.

I. Reports on Overexposures

There were no overexposures during 2010.

J. Standard Operating Procedures Review

The records with the SOPs documented the required annual review of all active SOPs by the RSO.

K. Radiation Work Permits

No radiation work permits (RWP) were issued during 2010.

L. Recommendations on Ways to Further Reduce Personnel Exposures

- Continue to emphasize good housekeeping and personal hygiene practices as a means to avoid contamination problems, particularly in conjunction with ISL waste shipments delivery.
- Continue to conduct bi-monthly safety meetings.
- Insure that the form documenting equipment/ISL waste delivery truck release surveys is carefully completed, including the notation of calibration due dates for the instruments used for the surveys. Careful attention to calibration due dates should be emphasized in light of the discussion under item H above.
- Conduct quarterly contamination surveys on small vehicles used in support of the ISL byproduct waste delivery program that leave the restricted area.

M. Concluding Comment

During 2010 radiation doses were likely at background levels with only one part time contractor on site to handle the ISL waste shipments delivery and disposal. The radiation safety program at Shirley Basin conforms with the requirements of the license and is appropriate for the kind and level of activity at the site.



Tom Hardgrove
Consultant