UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

October 29, 2020

Sandra L. Ross, PG
Site Manager
Rio Algom Mining LLC
P.O. Box 218
Grants, NM 87020

SUBJECT: RIO ALGOM MINING LLC INSPECTION REPORT 040-08905/2020-001

This letter refers to the remote U.S. Nuclear Regulatory Commission (NRC) inspection conducted from September 29-October 1, 2020, at the Ambrosia Lake facility in McKinley County, New Mexico. The purpose of the inspection was to determine whether decommissioning activities were being conducted safely and in conformance with NRC requirements and the conditions of your license.

This inspection examined activities conducted under your license as they relate to public health and safety, the common defense and security, and to confirm compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records and interviews with personnel.

The NRC inspectors discussed the results of the inspection with you and members of your staff at the conclusion of the inspection on October 1, 2020. The results of the inspection are documented in the enclosure to this letter. No violations were identified, and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS) accessible from the NRC Web Site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response, if you choose to provide one, should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Dr. Robert Evans at 817-200-1234, or the undersigned at 817-200-1156.

Sincerely,

Heather J. Gepford, PhD, CHP, Chief
Materials Licensing & Decommissioning Branch
Division of Nuclear Materials Safety

Docket No.: 040-08905
License No.: SUA-1473

Enclosure:
Inspection Report 040-08905/2020-001

cc:
M. Hunter, New Mexico Environment Department
S. Rodriquez, New Mexico Environment Department
B. Tsosie, U.S. Department of Energy

RIO ALGOM MINING LLC INSPECTION REPORT 040-08905/2020-001, DATED - OCTOBER 29, 2020

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U.S. NUCLEAR REGULATORY COMMISSION
Region IV

Docket No.:	040-08905
License No.:	SUA-1473
Report No.:	040-08905/2020-001
Licensee:	Rio Algom Mining LLC
Facility:	Former Ambrosia Lake mill
Location:	McKinley County, New Mexico
Inspection Dates:	September 29-October 1, 2020
Inspectors:	Robert Evans, PhD, PE, CHP, Senior Health Physicist Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety
	Linda Gersey, Health Physicist Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety
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Accompanied by:	Brittany Bolz, Health Physicist Uranium Recovery and Materials Decommissioning Branch Division of Decommissioning, Uranium Recovery & Waste Programs Office of Nuclear Material Safety and Safeguards
Approved by:	Heather J. Gepford, PhD, CHP, Chief Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety
Attachment:	Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

Rio Algom Mining LLC
NRC Inspection Report 040-08905/2020-001

This inspection was a routine, announced, remote inspection of decommissioning activities being conducted at the former Ambrosia Lake Mill in McKinley County, New Mexico. In summary, the inspectors concluded that the licensee was conducting site activities in accordance with license and regulatory requirements.

Management Organization and Controls/Emergency Preparedness

- The licensee's organizational structure agreed with license requirements, and the licensee had sufficient staff for the work in progress. The licensee conducted routine audits and site inspections in accordance with procedural and regulatory requirements. The licensee established and maintained procedures in compliance with license requirements. The licensee established an emergency response program in accordance with procedure requirements. During the period of the COVID pandemic, the licensee conducted facility activities in timely compliance with license requirements. (Section 1.2)

Radiation Protection/Operator Training

- The licensee implemented its radiation protection and training programs in compliance with license and regulatory requirements. Occupational exposures were small fractions of the annual regulatory limits. (Section 2.2)

Radioactive Waste Processing, Handling, Storage, and Transportation

- The licensee conducted field work activities and managed waste material in accordance with license requirements and commitments provided in recent letters to the NRC. (Section 3.2)

Effluent Control and Environmental Protection

- The licensee implemented the environmental and groundwater monitoring programs and reported the results to the NRC as required by the license. Public doses were small fractions of the regulatory limit. The licensee continued to implement a work plan to collect information for a future application for a change in selected groundwater alternate concentration levels. The licensee conducted a land use surveys as required by the license. (Section 4.2)

Report Details

Site Status

The Ambrosia Lake Mill processed approximately 33 million tons of uranium ore from 1958-1985. Reclamation of the two tailings cells commenced in 1989, and the mill was demolished in 2003-2004. Reclamation activities were completed in May 2016 with a few minor exceptions.

Since 2016, the licensee implemented several work plans. These work plans included the dam safety review, Section 4 supplemental characterization work plan, soil characterization work, cultural resource survey, and alternate concentration limit (ACL) work plan. The inspectors reviewed the status of each work activity during the inspection. (Details of these work activities are provided in Sections 3.2 and 4.2 of this inspection report.) The licensee also continued to prepare the construction completion report for future submittal to the U.S. Nuclear Regulatory Commission (NRC) for review and approval. The licensee plans to continue to implement the various work plans, with the goal of submitting the results of the work to the NRC under separate correspondence at a later date.

1 Management Organization and Controls/Emergency Preparedness (Inspection Procedures 88005 and 88050)

1.1 Inspection Scope

The inspectors reviewed the licensee's oversight and control of licensed activities.

1.2 Observations and Findings

a. Site Staffing

The organizational requirements are provided in License Condition 10, which references the licensee's letter dated January 13, 1998 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML18292A685). Details of the organization were provided in Section 2.0, "Organization and Management," of the licensee's Radiation Protection and Environmental Program Manual dated March 2020. The Manual provides the required organizational structure, staff responsibilities, and qualifications for the health physics staff.

At the time of the inspection, site staffing consisted of a combination of licensee personnel and contractors. The site manager was the highest ranking individual. Other staff assigned to the project included the site principal, site specialist, and radiation safety officer (RSO). The licensee recently hired a full-time senior health physicist to support site activities. Contractors and consultants were available as needed to provide radiation protection, environmental, groundwater, and site support services. All management level positions were filled, and the licensee had sufficient staff to maintain compliance with license requirements. The inspectors confirmed that the licensee's organization agreed with the requirements provided in the Radiation Protection and Environmental Program Manual.

b. Routine Site Audits, Inspections, Reports and Procedures

Title 10 to the *Code of Federal Regulations* (10 CFR) 20.1101(c) requires licensees to periodically (at least annually) review the radiation protection program content and implementation. In addition, Section 3.3 of the Radiation Protection and Environmental Program Manual states that the RSO shall prepare an annual report summarizing the results of the radiation protection and environmental monitoring programs for the previous calendar year. The inspectors reviewed the licensee's most recent annual As Low As is Reasonably Achievable (ALARA) audit during the inspection.

The annual ALARA audit for calendar year 2019 was conducted in June 2020. A courtesy copy of the audit was provided to the NRC by letter dated June 23, 2020 (ADAMS Accession Nos. ML20188A053 and ML20188A054). The annual audit summarized site activities, occupational doses, public doses, radiation work permits (RWPs), contamination surveys, safety/training activities, and site inspections. The inspectors concluded that the ALARA report for 2019 provided adequate summaries of the radiation protection and environmental programs, as well as applicable trends and corrective actions. The inspectors concluded that the licensee had conducted the annual program review as required by regulations and the Radiation Protection and Environmental Monitoring Program Manual.

Section 3.3 of the Health Physics and Environmental Program Manual specifies that the licensee's staff shall conduct routine facility inspections. The licensee conducted facility inspections monthly during periods of onsite activity; otherwise, the inspections were conducted quarterly. The inspectors reviewed the licensee's site inspection records for 2019-2020. The records included observations of site conditions and work in progress at that time. In summary, the licensee's records indicate that the facility had been inspected in accordance with procedural requirements since the last inspection.

License Conditions 10, 14, and 16 require the licensee to establish certain procedures. The inspectors conducted a limited review of the licensee's procedures that were active at the time of the inspection. All active procedures had been updated in 2020 and were found to be acceptable for the work in progress. A detailed review of site procedures will be conducted during the next onsite inspection.

c. Emergency Preparedness

The licensee is not required by the license to establish a formal emergency response program based on current site conditions. However, the licensee maintained a corporate emergency response program and provided emergency response instructions to employees via an emergency response manual. The inspectors reviewed the status of the licensee's emergency preparedness program.

The licensee maintained an emergency contact list to be used in the event of an emergency. The licensee has conducted desktop drills for emergency scenarios and planned to conduct a real-time field drill in the future. The licensee stated that the largest risks on site stem from possible vehicular interactions, as well as the site's remote location in a region with little cell phone reception. First aid kits were available at the site and in each company vehicle. In summary, the licensee maintained an emergency preparedness program in accordance with site procedures.

d. COVID-19 Pandemic Effects on Licensed Activities

To determine the impacts of the COVID-19 pandemic on site activities, the inspectors interviewed licensee representatives and reviewed applicable records to verify if routine facilities activities continued to be performed in timely compliance with license requirements. From February 2020 to the time of this inspection, facility activities susceptible to the spread of COVID-19 (e.g., site sampling, surveying, and inspections) were performed in accordance with facility operating procedures, but with consideration of COVID-19 State Health Orders, COVID-19 Federal Guidelines, and the facility personnel's safety.

In accordance with the NRC's April 21, 2020, approval of the licensee's request for a temporary license exemption for the collection of monthly groundwater monitoring data required in accordance with License Condition 34 (ADAMS Accession No. ML20111A322), inspectors verified the timely compliance with license requirements after termination of the temporary exemption period. Other delays of non-routine facility activities (e.g., shielded gamma surveys, depth profiling of facility areas, and cultural resource surveys) did not require a temporary license exemption.

1.3 Conclusions

The licensee's organizational structure agreed with license requirements, and the licensee had sufficient staff for the work in progress. The licensee conducted routine audits and site inspections in accordance with procedural and regulatory requirements. The licensee established and maintained procedures in compliance with license requirements. The licensee established an emergency response program in accordance with procedure requirements. During the period of the COVID pandemic, the licensee conducted facility activities in timely compliance with license requirements.

2 Radiation Protection/Training (Inspection Procedures 83822 and 88010)

2.1 Inspection Scope

The inspectors reviewed the licensee's radiation protection and training programs to verify compliance with 10 CFR Part 20 and license requirements.

2.2 Observations and Findings

License Condition 10 requires, in part, that the licensee maintain a health physics program. Details about the program are provided in the licensee's Radiation Protection and Environmental Program Manual. The inspectors reviewed the licensee's implementation of its occupational exposure, RWPs, contamination control, training, and instrument calibration programs. The licensee eliminated the bioassay and respiratory protection programs in 2016 due to a reduction in onsite activities.

The inspectors reviewed personnel dosimetry records for 2019 through the second quarter of 2020. The licensee measured occupational radiation exposures using optically stimulated dosimeters. The maximum radiation exposure received by a worker in 2019 was 9 millirem. Staff exposures for the first two quarters of 2020 were less than 1 millirem. These results were well below the regulatory limit of 5,000 millirem per year for total effective dose equivalent exposures.

As stipulated by RWPs, the licensee conducted air sampling during non-routine work to ensure that no worker received an internal exposure greater than 10 percent of the regulatory limits specified in 10 CFR 20.1201. Since the results of air sampling were well below the 10 percent of the limit for the most restrictive radionuclide, the licensee did not assign internal doses to any worker since the previous inspection, as allowed by 10 CFR 20.1202. The inspectors reviewed the licensee's records and confirmed that the air sample results were well below the regulatory limit for reporting.

The licensee continued to implement a contamination control program. Personnel monitoring records since the previous inspection indicated that no individual left the site with contamination above the licensee's action level. Equipment release records created since the previous inspection indicate that no component was released with contamination above the respective action level specified in License Condition 25. The equipment release records included construction vehicles and various equipment used during implementation of the work plans.

License Condition 15 provides the RWP requirements. Details of this program are provided in Section 3.7 of the licensee's Radiation Protection and Environmental Program Manual. Since the previous inspection, the licensee issued one RWP involving the windblown tailings investigation. The RWP provided comprehensive information about radiological conditions, dosimetry and air sampling requirements, and job-specific hazards.

The Radiation Protection and Environmental Monitoring Manual does not require routine external radiation surveys since the reclamation work has been completed and the tailings material has been covered. However, the licensee's staff conducted surveys of the waste storage area when conditions changed. The waste material in storage included tailing collected during implementation of the dam safety work plan in 2018.

License Condition 10 provides the training requirements. Details about training are provided in Section 3.1 of the licensee's Radiation Protection and Environmental Program Manual. The training included visitor orientation, initial site training, on-the-job training, safety training, and daily job safety training. The inspectors reviewed the licensee's training records for visitor orientation and radiation protection training for site workers. The training program covered the topics as provided in Regulatory Guide 8.30, Health Physics Surveys in Uranium Recovery Facilities, and Regulatory Guide 8.31, Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Recovery Facilities will be As Low As is Reasonably Achievable. The inspectors confirmed that a test was administered after completion of radiation protection training for both routine and project-based site workers.

The inspectors evaluated the process that the RSO used to ensure that annual training was maintained for all site workers. The RSO tracked training of routine site workers using a spreadsheet. All training records were found to be complete, and the system for ensuring annual completion of required training for all onsite workers was adequate.

The licensee maintained radiation detection instrumentation for routine and non-routine activities being conducted at the site. The licensee established a program to ensure that survey instruments were calibration checked at the intervals specified in site procedures. Portable radiological survey instruments and equipment were functionally examined to

verify operability, response, and proper settings. The inspectors confirmed that the licensee's instrument calibration program followed license requirements and site procedures.

2.3 Conclusions

The licensee implemented its radiation protection and training programs in compliance with license and regulatory requirements. Occupational exposures were small fractions of the annual regulatory limits.

3 Radioactive Waste Processing, Handling, Storage, and Transportation (Inspection Procedure 88035)

3.1 Inspection Scope

The inspectors interviewed licensee representatives and reviewed applicable records to determine if the licensee had established and maintained an effective program for managing radioactive wastes.

3.2 Observations and Findings

The inspectors discussed the status of several work projects in progress or recently completed at the site. The first project was the dam safety review. By letter dated February 9, 2018 (ADAMS Accession Nos. ML18044A111 and ML18044A112), the licensee notified the NRC that it intended to implement a work plan involving dam safety and tailings characterization of the two tailings impoundments and Pond 3, a pond located adjacent to the impoundments. The licensee conducted the work in response to a request for additional information by the licensee's parent company. As part of the work plan, the licensee's contractors drilled a number of core borings and replaced some of the bore holes with lysimeters or piezometers for future use. The work included a surface topographical survey that was conducted in 2019. The field work was conducted in 2018-2019, and the inspectors reviewed a limited sampling of the work during the previous inspection (ADAMS Accession No. ML18271A159).

The inspectors reviewed the status of the licensee's dam safety review during the inspection. The licensees' representatives stated that the information will be used for dam safety, groundwater balancing, and groundwater modeling. The licensee plans to submit the results of its review to the NRC in a geotechnical investigation report. The proposed date for submittal of the report was April 2021.

The inspectors also reviewed the status of the Section 4 property. The licensee submitted a request in 2017 to release the Section 4 property for unrestricted use (ADAMS Accession No. ML17340A482). In August 2019, in response to two NRC requests for information, the licensee notified the NRC that the requested information would require the implementation of a work plan to gather additional subsurface information (ADAMS Accession No. ML19232A082). The licensee also requested 1 year extension from October 2019 to October 2020, for a response to the NRC. The licensee subsequently submitted the work plan to the NRC by letter dated November 1, 2019, describing how it planned to conduct supplemental characterization of the property (ADAMS Accession No. ML19311C535).

The inspectors reviewed the status of the licensee's supplemental characterization work plan. By letter dated August 25, 2020, the licensee requested that the deadline for the supplemental characterization report be delayed by one additional year. The date that the licensee expects to submit a response to the NRC's two requests for information was extended to October 29, 2021 (ADAMS Accession No. ML20248H486). At the time of the inspection, the licensee had not started the supplemental characterization field work.

The inspectors reviewed the status of the licensee's soils characterization work. In 2017, the licensee attempted to implement a final status survey using the methodology described in the Soil Decommissioning Plan (ADAMS Accession No. ML18166A182). The preliminary results were found to be problematic due to high error rates and poor correlation between ambient gamma count rates and radionuclide concentrations in the soil. In 2018, the licensee conducted a pilot study to identify possible methods to improve the correlation. In April 2019, the licensee submitted a proposed final status survey work plan for NRC consideration for the windblown tailings affected areas (ADAMS Accession No. ML19099A196). The objective of this work plan was to provide information to support a future revision to the Soil Decommissioning Plan. The licensee initially proposed to modify the current final status survey integrated survey approach from unshielded gamma surveys and 5-point composite sampling to a shielded gamma survey and ranked-set sampling approach. In 2019, the licensee conducted a shielded gamma survey in areas designated as affected by windblown tailings.

The NRC staff discussed the status of the licensee's soils characterization work. In 2020, additional field data were collected for analysis of the extent of windblown tailings and estimated soil cleanup volume. This field work included expanded shield gamma surveys, a rank set sampling pilot study, and an investigation of the depth of windblown tailings. A goal of the 2018-2020 studies was to determine how the contaminated material can be excavated in a cost-efficient manner. The inspectors also briefly discussed the possible disposal options for the collected material. At the time of the inspection, the licensee planned to dispose of the contaminated windblown tailings collected during future reclamation work in a new onsite repository. The proposed repository (Cell 4) will require NRC review and approval prior to construction and use. The licensee plans to continue with the soil characterization work into 2021.

During the inspection, the licensee informed the inspectors that it had performed a cultural resource survey during March-July 2020. The survey was partially delayed due to the COVID-19 pandemic. The licensee conducted the survey as required by Section 106 of the National Historic Preservation Act and 36 CFR 800, "Protection of Historic Properties." The objective of the survey was to prepare for the windblown tailings cleanup work. The work consisted of a literature search and archeological survey. The licensee plans to present a high-level summary of the results to the NRC staff in November 2020.

Also during the inspection, the licensee informed the inspectors that it had conducted radon flux sampling in the areas designated as alternate release criteria areas (refer to Section 5.2 of the Soil Decommissioning Plan for a discussion of the alternate release criteria areas). The sampling was conducted in June 2020. The licensee conducted this sampling on a voluntary basis for internal use.

By letter dated November 27, 2017 (ADAMS Accession Nos. ML17340A824 and ML17340A826), the licensee notified the NRC that it planned to implement a work plan

to gather more information to support a future license amendment request for supplemental ACLs. Thus far, work completed consisted of coring and geophysical logging at three locations, installation and development of eight monitoring wells, aquifer testing and associated well re-development, petrography and analysis of 27 core samples. Future work will include continued groundwater monitoring, groundwater flow and geochemical modeling, and calculation of the proposed ACLs. (Refer to Section 4.2.c of this inspection report for more details about this work plan.)

Wastes (e.g., drill cuttings and fluids) generated from the implementation of the ACL work plan were initially containerized and managed in 21 roll-off bins in a fenced area. In 2020, after the wastes in these bins had dried, the wastes were removed and stored in one large frac tank. The licensee plans to transfer the wastes to the new repository that will be constructed in the future. Water generated from the ongoing groundwater monitoring and aquifer testing have been stored in a second frac tank at the facility. All wastes generated from the implementation of the ACL work plan were being handled and stored at the facility in compliance with regulatory requirements.

Finally, the inspectors reviewed the status of the licensee's construction completion report. The NRC suspended its review of the licensee's construction records in 2016 to allow the licensee to organize the records and to assemble the associated construction completion report. The inspectors discussed the status of the report with licensee staff.

The licensee conducted its review of the construction completion report in phases. The first two phases included a license requirement review and data acquisition and information review. At the time of the inspection, the licensee had completed these two phases. The third phase was a data deficiency review. The licensee reported that no major data gaps were identified. The licensee plans to complete the report for submittal to the NRC by the end of 2021.

3.3 Conclusions

The licensee conducted field work activities and managed waste material in accordance with license requirements and commitments provided in recent letters to the NRC.

4 Effluent Control and Environmental Protection (Inspection Procedure 88045)

4.1 Inspection Scope

The inspectors reviewed the licensee's effluent and environmental protection programs to ensure compliance with license and regulatory requirements.

4.2 Observations and Findings

a. Effluent and Environmental Monitoring

The effluent and environmental monitoring program requirements are specified in License Conditions 10 and 29. Section 4.0 of the Radiation Protection and Environmental Program Manual provided detailed instructions for the program. In December 2016, the NRC authorized the licensee to discontinue environmental gamma, surface soil, vegetation, and sediment sampling (ADAMS Accession No. ML16344A027). In December 2017, the NRC agreed with the license's request to

terminate the environmental air particulate sampling program (ADAMS Accession No. ML17293A342). Beginning January 1, 2018, the licensee monitored only for gaseous radon-222, in addition to groundwater sampling.

The inspectors reviewed the licensee's environmental and effluent monitoring results for 2019 and the first half of 2020 (ADAMS Accession Nos. ML19246A104, ML20054A402, and ML20248H485). The licensee collected radon-222 samples at seven stations. The licensee also collected duplicate samples at several locations for quality control reasons. The inspectors concluded that the radon-222 samples were collected and reported to the NRC in accordance with License Condition 19 requirements. No sample result exceeded the effluent concentration limit provided in Appendix B to 10 CFR Part 20.

The licensee conducted public dose assessments as part of its annual ALARA program reviews. The inspectors reviewed the licensee's dose assessment for calendar year 2019. The licensee's assessment concluded that annual doses to the nearest resident, delivery person, and visitor from licensed operations were less than 6 millirem. These calculated doses were well below the regulatory limit of 100 millirem per year as specified in 10 CFR 20.1301(a).

b. Groundwater Compliance Monitoring – Routine Program

License Condition 34 states that the licensee shall implement a groundwater compliance monitoring program. The program includes semi-annual sampling of 23 wells in four geological layers: Dakota Formation (KD); Tres Hermanos A (TRA) and Tres Hermanos B (TRB) in the Mancos Formation; and Alluvium. Four of the 23 wells are designated as background wells.

License Condition 34.A requires that the samples be analyzed for gross alpha, lead-210, radium-226 plus radium-228, thorium-230, natural uranium, several non-radiological chemical constituents, and as-found water conditions (water level, pH, and electrical conductivity). License Condition 34.D requires the licensee to submit semi-annual groundwater monitoring reports to the NRC. For wells requiring monthly measurements under License Condition 34.F due to exceedances of the groundwater protection standards (GPSs), the licensee submitted the first and third quarter monthly results in first and third quarter groundwater reports. Monthly results for the second and fourth quarters were submitted in the semi-annual submissions to the NRC.

The inspectors reviewed the semi-annual reports for 2019 and the first half of 2020 (ADAMS Accession Nos. ML19214A107, ML20045D953, and ML20223A110). The inspectors also reviewed the quarterly reports for the first and third quarters of 2019 and first quarter of 2020 (ADAMS Accession Nos. ML19158A090, ML19339E369, and ML20157A082). In April 2020, the licensee requested (ADAMS Accession Nos. ML20111A028 and ML20111A045) and the NRC approved (ADAMS Accession No. ML20094F627) an exemption from monthly groundwater sampling during the months of April and May of 2020 due to Covid-19 concerns.

In accordance with License Condition 34.D, the semi-annual reports included potentiometric surfaces and estimates of groundwater gradients for each unit, hydrographs for the groundwater levels at each well, and tabular and graphical analytical results for ACL constituents. Results for GPS constituents were not provided in the semi-annual reports, which is consistent with the requirements specified in License

Condition 34.D. The inspectors also confirmed that constituents that must meet the GPSs listed in License Condition 34, for which the results are not reported in semi-annual reports, were both traceable and below the GPS levels. For example, several constituents from Well 36-06 KD for the sampling event dated February 25, 2020, were located in the electronic project database and found to be below GPS. In addition, two ACL constituents for the same sampling event were traced from the database to entries in the entries in the 2020 first half semi-annual report. Other than during the exempted months of April and May 2020, the inspectors concluded that the licensee collected all required samples and reported the sample results in the quarterly and semi-annual reports as specified in License Condition 34.D.

The licensee monitored the water levels in 41 wells in the alluvium located in and surrounding the site, of which 8 were sampled for compliance with License Condition 34.B requirements. One new well was installed in the alluvium in 2019 near the downgradient boundary of the site as part of the 2017 Supplemental ACL Work Plan (ADAMS Accession No. ML17340A826). The most notable observation in the hydrologic data in the alluvium was the continued decline in the potentiometric surface.

The licensee has observed that water levels continued to slowly decline in the past year, which is consistent with the long-term trend. Nine of the 41 wells installed in the alluvium unit continued to be dry. The decline in water levels was attributed to the discontinuance of the alluvium corrective action program in 2006 that previously maintained an artificial groundwater mound in the vicinity of the site. Of the 8 wells designated for chemical analysis of groundwater in the alluvium in License Condition 34, 2 wells could not be sampled due to insufficient volumes of water.

License Condition 34.F states, in part, that if any exceedances continue for 3 consecutive months, the licensee shall submit to the NRC a groundwater corrective action designed to regain compliance with the GPSs. The inspectors reviewed the quarterly and semi-annual reports for 2019 and the first half of 2020 and confirmed that the licensee discussed the exceedances for three wells and the action plan to continue monthly sampling to monitor the downward trends. Samples collected from Wells 36-06 KD, 32-45 KD-R, and 31-02 TRB-R exceeded certain GPSs for 3 consecutive months in prior years, and in some cases, continued to exceed GPSs in the past year.

The reviewed semi-annual reports provided dates of corrective action program submittal for Wells 36-06 KD and 32-45 KD; however, the request for a corrective action program for Well 31-02 TRB-R was not mentioned in the reviewed 2019 and 2020 semi-annual reports. As part of the interview, the corrective action program request for Well 31-02 TRB-R was provided in the 2014 first half report (ADAMS Accession No. ML14217A463). In addition, for the corrective action program, the licensee submitted the 2017 Supplemental ACL Work Plan (ADAMS Accession No. ML17340A826) to obtain data and information to support an ACL request for the three wells.

Gross alpha activity was monitored monthly at all three wells due to exceedances of the GPSs for several years. In addition, beryllium and cadmium at Well 36-06 KD and molybdenum at Well 32-45 KD-R exceeded the GPSs in prior years. In the second half 2019 semi-annual report, the licensee stated that beryllium and cadmium monthly analyses would be discontinued in the first quarter of 2020 because the results had remained below the GPSs since 2016 and 2017, respectively. Measurements at

Well 32-45 KD-R for molybdenum remained in the monthly program. For gross alpha, the semi-annual monitoring reports discussed the problems of uncertainty and lower limits of detections for gross alpha measurements. The licensee discussed limitations of analytical methods for gross alpha when the groundwater samples contain high total dissolved solids that cause interference. Whereas the gross alpha activities levels exceeded the standards, the licensee noted in the semi-annual reports that the significant alpha-producing radionuclides at these three wells met the GPSs as specified in the license.

The Dakota Formation and Tres Hermanos B groundwater layers associated with Wells 36-06 KD, 32-45 KD-R, and 31-02 TRB-R were both included in the proposed corrective action program associated with the 2017 Supplemental ACL work plan (ADAMS Accession No. ML17340A826) as discussed below. Recently, however, the licensee requested a license amendment in February 2020 (ADAMS Accession No. ML20054B747) to exempt gross alpha measurements from the groundwater monitoring program, which was subsequently approved by the NRC in August 2020 (ADAMS Accession No. ML20218A570).

The inspectors noted that the 2019 third quarter report (ADAMS Accession No. ML19339E369) identified an exceedance for gross alpha at one well (31-67 TRB) under the semi-annual sampling program. The July 2019 gross alpha result of 28 picocuries per liter (pCi/L) exceeded the GPS of 21 pCi/L for the Tres Hermanos B sandstone layer. The licensee noted that the result was below the lower limit of detection of 56 pCi/L and the uncertainty in the laboratory result was 24 pCi/L. Considering the high relative uncertainty and that the lower limit of detection was higher than the GPS, the licensee suggested that the gross alpha result may not reflect a true exceedance of the GPS at this well. Therefore, the licensee did not shift this well to the monthly sampling program as dictated by License Condition 34.F.

In summary, the licensee continued to implement its routine groundwater compliance monitoring program in accordance with license requirements.

c. Groundwater Compliance Monitoring - Non-Routine Program

During a public meeting held in April 2016 (ADAMS Accession No. ML16141B267), the licensee indicated that it was considering a proposed license amendment to supplement the ACLs specified in License Condition 34.B due to consecutive exceedances of the GPSs since 2007. Subsequently, a supplemental ACL work plan (ADAMS Accession No. ML17340A826) was provided to the NRC in 2017 to support preparation of a license amendment request for supplemental ACLs.

Based in part on the results of activities described in the supplemental ACL work plan, the licensee elected to submit a request to the NRC to revise the limits for beryllium, cadmium, and molybdenum in the Dakota sandstone unit and gross alpha in the three upper bedrock units. The licensee plans to submit the amendment request to the NRC, after additional data has been collected to identify trends. This proposed license amendment, if approved by the NRC, may eliminate some of the groundwater exceedances as discussed above. The licensee's contractors began implementing the supplemental ACL work plan in 2018. As part of the work plan, seven additional

monitoring wells were installed and tested within the site boundary. Aquifer testing, groundwater chemical analysis, and core mineralogical analysis occurred in 2019 and 2020.

For aquifer testing, the licensee used standard pump tests instead of the pneumatic testing as described in the 2017 supplemental ACL work plan. Analysis of the field data is expected to be completed in October 2020. Estimation of hydraulic conductivity was the primary information to be gained from the aquifer testing. Single-well pump tests included both step tests (monitor three pump rate steps and recovery) and constant-rate tests following ASTM D4050 methods. The inspectors reviewed field data sheets for well 31-70 ALL-R to confirm appropriate information was being recorded and that License Condition 20 was being followed. Analysis of the pump test data will be documented in an internal report cited by or included as an appendix in the future supplemental ACL application.

For groundwater sampling analyses for the supplemental ACL project, the inspectors reviewed the process for the sampling program in light of standard operating procedure ESP-077, Groundwater Sampling with Calibration and Equipment Decontamination. As a spot check, field and laboratory sheets for Well 30-07 KD were reviewed for consistency with the standard operating procedure. During this review, a laboratory results data sheet with unaddressed flags for sample temperature exceedance criteria was found. The licensee discussed the process for finding these errors and how they are typically addressed. In this instance, the temperature flag was a result of miscommunication; the sample did not need to be shipped in a cooler with ice. Data was also traced from the laboratory results to the electronic project database. For mineralogical analyses, petrographic analysis was not yet completed.

d. Annual Land Use Survey

License Condition 39 requires, in part, that the licensee conduct an annual survey of land use. This license condition also requires the licensee to submit the results of the annual land use survey to the NRC by the first of July of each year. The licensee submitted the 2019 land use survey to the NRC by letter dated June 22, 2020 (ADAMS Accession No. ML20188A049).

The land use within two miles of the mill site included livestock grazing and utility distribution. The report noted that the nearest resident was located approximately three miles north-northeast of the mill site. This residence was occupied at the time of the inspection. There were no new land features or structures identified in 2019. In summary, the licensee conducted and submitted a land use land survey for 2019 in accordance with the requirements specified in License Condition 39.

4.3 Conclusions

The licensee implemented the environmental and groundwater monitoring programs and reported the results to the NRC as required by the license. Public doses were small fractions of the regulatory limit. The licensee continued to implement a work plan to collect information for a future application for a change in selected groundwater ACLs. The licensee conducted a land use surveys as required by the license.

5 Exit Meeting Summary

The inspectors presented the inspection results to the licensee's representatives at the conclusion of the remote inspection on October 1, 2020. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

K. Applegate, Site Principle
C. Ardito, Hydrogeologist, INTERA
M. Gorospe, Site Specialist
W. Linderfelt, INTERA
A. Persico, INTERA
S. Ross, Site Manager
E. Ruedig, Senior Health Physicist
M. Schierman, Radiation Safety Officer, H3 Environmental
C. Short, INTERA

U.S. Department of Energy, Office of Land Management

D. Ravelojaona, Site Lead, Navarro
B. Tsosie, Site Project Manager

New Mexico Environment Department

A. Rheubottom, Geologist

INSPECTION PROCEDURES (IPs) USED

IP 83822	Radiation Protection
IP 88005	Management Organization and Controls
IP 88010	Training
IP 88035	Radioactive Waste Processing, Handling, Storage, and Transportation
IP 88045	Effluent Control and Environmental Protection
IP 88050	Emergency Preparedness

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ACL	alternate concentration limit
ADAMS	Agencywide Documents Access and Management System
ALARA	as low as is reasonably achievable
CFR	Code of Federal Regulations
GPS	Groundwater Protection Standards
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission
pCi/L	picocurie per liter
RSO	radiation safety officer
RWP	radiation work permit