June 25, 2009

Mr. Terry L. Fletcher, President
Rio Algom Mining LLC
P.O. Box 218
Grants, NM 87020

SUBJECT: REQUEST TO BEGIN PLACEMENT OF THE RADON BARRIER ON THE POND 2 DISPOSAL CELL AT THE RIO ALGOM MINING LLC, AMBRIOSIA LAKE FACILITY, MATERIALS LICENSE NO SUA-1473

Dear Mr. Fletcher:

We have received your letter dated May 11, 2009, requesting permission to begin placement of the radon barrier on the Pond 2 Disposal Cell at the Ambrosia Lake facility. Condition 37 of license SUA-1473 requires that settlement survey data be submitted for the U.S. Nuclear Regulatory Commission (NRC) review and approval prior to placement of the radon barrier.

NRC staff has reviewed your request and agrees with the results of Rio Algom Mining (RAM) LLC's analysis. The specifics of NRC's review are given in the attached Technical Evaluation Report. RAM can begin placing the radon barrier on the Pond 2 Disposal Cell.

If you have any questions regarding this letter, please contact me at (301) 415-5869 or via e-mail to TGM@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Tom McLaughlin, Project Manager
Materials Decommissioning Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 40-8905
License No.: SUA-1473

Enclosure: Technical Evaluation Report

June 25, 2009

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Enclosure: Technical Evaluation Report

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# TECHNICAL EVALUATION REPORT
# POND 2 DISPOSAL CELL PRIMARY SETTLEMENT
# RIO ALGOM MINING CORPORATION, GRANTS, NEW MEXICO

**DOCKET NO.:** 40-8905

**LICENSE NO.:** SUA-1473

**DATE:** June 8, 2009

**FACILITY:** Rio Algom Ambrosia Lake

**TECHNICAL REVIEWERS:** Doug Mandeville, Dan Gillen

**PROJECT MANAGER:** Tom McLaughlin

## SUMMARY AND CONCLUSIONS

By letter dated May 11, 2009, Rio Algom Mining (RAM) LLC, submitted a letter to the U.S. Nuclear Regulatory Commission (NRC) requesting permission to begin placement of the radon barrier on the Pond 2 Disposal Cell at the Ambrosia Lake facility. Condition 37 of license SUA-1473 (NRC, 2008) requires that settlement survey data be submitted for NRC review and approval prior to placement of the radon barrier. The submittal contains an evaluation of the observed settlement of the existing tailings in the Pond 2 footprint to verify that at least 90 percent of the primary settlement has occurred. The NRC staff reviewed the submittal, and performed an independent evaluation of the settlement data. The NRC staff agrees with the results of RAM's analysis, which indicates that at least 90 percent of the primary settlement has taken place. RAM can begin placing the radon barrier at its earliest convenience.

## BACKGROUND

RAM is conducting reclamation of its uranium processing facility located in the Ambrosia Lake Valley northeast of Grants, New Mexico. Revision 1 to the reclamation plan (RAM, 2007) calls for relocating the evaporation pond sediments and related impacted materials from the Section 4 Ponds and Pond 9 to Tailings Cell 2. The foundation materials for Tailings Cell 2 are soft sands and/or slimes that were expected to settle under the increased loading from the Section 4 and Pond 9 sediments. The reclamation plan estimated the amount of time that would be necessary for the foundation soils to consolidate under the increased loading. RAM installed a series of four settlement plates to verify the consolidation of the foundation soils. The elevation of these settlement plates was measured on a weekly basis. The reclamation plan calls for placing the radon barrier on Tailings Cell 2 once 90 percent of the primary settlement of the foundation soils has occurred. License Condition (LC) 37 requires that settlement data be submitted to NRC for review and approval.

Enclosure

**TECHNICAL REVIEW**

This technical evaluation report describes the NRC staff's review of geotechnical engineering issues related to the settlement associated with the placement of the Section 4 and Pond 9 materials in Tailings Cell 2. In the May 11, 2009 submittal, RAM provided the following (i) a narrative discussion of the activities associated with the placement of the Section 4 and Pond 9 materials, (ii) a comparison of the predicted and observed settlements; and (iii) supporting data tables and graphs. The NRC staff reviewed the May 11 submittal and also performed an independent evaluation of the supporting data to verify that 90 percent of the primary settlement has occurred.

*Review of May 11, 2009 submittal*

In its submittal, RAM has provided for each settlement plate, the dates of fill placement, height of fill placed, predicted settlement and observed settlement. This information is summarized in the table below.

| Identification | Dates of Fill Placement | Height of Fill Placed (ft) | Predicted Settlement (ft) | Observed Settlement (ft) |
|---|---|---|---|---|
| Plate 1 | 12/2005 to 3/2009 | 42 | 2 | 1.95 |
| Plate 2 | 12/2005 to 2/2009 | 42 | 0.5 | 0.26 |
| Plate 3 | 12/2005 to 11/2008 | 36 | 0.7 | 0.74 |
| Plate 4 | 4/2007 to 1/2009 | 39 | 0.5 | 0.82 |

The predicted settlements for Plate 1 and Plate 3 compare reasonably well to the observed settlements. For Plate 2, the observed settlement is approximately half of the value of the predicted settlement. RAM reviewed the site characterization data and identified that there was not a slime layer identified in the cone penetrometer test data for the location nearest to Plate 2. RAM identified this as the likely reason for the difference between the predicted and observed settlements at Plate 2. At Plate 4, the observed settlement has been approximately 0.32 ft more than anticipated. However, RAM identified that the amount of fill placed in the vicinity of Plate 4 is about 10 ft more than what was used in the design analysis, and that therefore, more settlement would be expected at this location. For all four plate locations, the settlement versus time graph appears to have reached an asymptote; that is there is no significant increase in settlement over time. This is shown on the settlement plots in Figures 1 through 4 of the submittal. These figures indicate that the time for primary settlement to occur is consistent with the estimated time of approximately 3 months.

*Data Evaluation*

The NRC staff performed an independent evaluation of the settlement data supplied by RAM in the May 11, 2009, submittal. The square root of time fitting method developed by Taylor (Taylor, 1948) was used to estimate the time for 90 percent of the settlement to occur based on the supplied data. In this method, the strain is plotted versus the square root of time, and a best fit line is drawn through the linear portion of the data. A second line is drawn which has the same y-axis coordinates, but with x-axis coordinates equal to 1.15 times more than the x-axis coordinates from the best fit line. The point where the second line crosses the strain versus square root of time data yields the time for 90 percent of the settlement to occur.

The Taylor method was used to evaluate the time required for 90 percent of the settlement to occur at Tailings Cell 2. For each settlement plate, Taylor's method suggests that the amount of time required for 90 percent of the settlement to occur has passed. This indicates that primary settlement is complete.

## CONCLUSION

The NRC staff has reviewed RAM's submittal and performed an independent evaluation of the settlement data. The staff agrees with RAM's evaluation that 90 percent of the settlement of the foundation soils beneath Tailings Cell 2 has occurred. As 90 percent of the settlement has occurred, the staff also agrees with RAM's conclusion that no additional significant settlement is expected and that placement of the radon barrier can begin.

## REFERENCES

Rio Algom Mining LLC, (2009), Letter to T. McLaughlin, Primary Settlement License Condition 37. Paragraph 2, dated May 11, 2009, [ADAMS Accession No. **ML091380326**]

Rio Algom Mining LLC, (2007), Pond 2 Cell Design Plan Revision, Additions/Changes to Revision 1 Reclamation Plan Tailings Cell 2, dated August 1, 2007, [ADAMS Accession No. **ML072260507**]

Taylor, D.W., (1948), Fundamentals of Soil Mechanics, Wiley, New York, 1948

U.S. Nuclear Regulatory Commission (2008), License Number SUA-1473, Amendment 59, dated September 9, 2008, [ADAMS Accession No. **ML081000621**]