



Homestake Mining Company of California

Thomas Wohlford
Closure Manager

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U.S. Nuclear Regulatory Commission,
Washington, DC 20555-0001

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Mr. Jeffrey Whited

Materials Decommissioning Branch (Mail Stop T-8F5)
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Office of Nuclear Material Safety and Safeguards
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Mr. William Pearson

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New Mexico Environment Department
PO Box 5469
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Region VI Superfund Division
1445 Ross Avenue, Suite 1200
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**RE: REPORT OF 2017 ANNUAL INSPECTION OF TAILING IMPOUNDMENTS AND PONDS,
HOMESTAKE GRANTS PROJECT, GRANTS, NEW MEXICO**

Dear Sirs:

On November 8, 2017 Alan Kuhn Associates performed the annual visual inspection of the tailing impoundments and evaporation ponds at the Homestake Grants Project located at Grants, New Mexico. Reginald Shirley (contract engineer with Brown and Caldwell) and myself accompanied Alan Kuhn on the inspection. As the Closure Manager of Homestake Mining Company, for these impoundments, we are required to annually inspect the stability and functionality of the impoundments per NRC Radioactive Materials License SUA-1471, Condition 12 and DP-200, Condition 52i.

Subsequent to the visual inspection, the additional information included was reviewed:

- Impoundment piezometer readings taken by Homestake personnel during 2017 and tabulated at various times through the year.
- Summary of tailing collection well and tailing drainage sump collection rates through 2017.
- Map and table of tailing impoundment phreatic levels most recently measured in 2017, provided by Hydro Engineering on January 10, 2018.
- The settlement monument survey performed by Professional Land Surveying Services on 11/29-12/01/2016 and dated 01/04/2017.
- Sump discharges recorded by Homestake during 2017.

NM5501

- Leak detection monitoring records for evaporation ponds #2 and #3.
- Pond level measurements by Homestake through 2017.

These records are typically included in Homestake's Annual Report, so they are not included here. This report, which is appended to the Annual Report, addresses the observations and findings of this site inspection, as well as, Kuhn's assessment of the additional information listed above.

Thank you for your time and attention on this matter. If you have any questions, please contact me at the Grants office at 505.287.4456, extension 34, or call me directly on my cell phone at 505.290.2187.

Respectfully,



Thomas Wohlford

Closure Manager
Homestake Mining Company of California
Office: 505 287-4456 x34 | Cell: 505 290 2187

Copy To:

B. Tsosie, DOE, Grand Junction, Colorado (electronic copy)
M. McCarthy, Barrick, Salt Lake City, Utah (electronic copy)
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January 31, 2018

File No.: HMC2017

Mr. Tom Wohlford
Homestake Mining Company of California
P.O. Box 98
Grants, NM 87020

**SUBJECT: REPORT OF 2017 ANNUAL INSPECTION OF TAILING IMPOUNDMENTS
AND PONDS, HOMESTAKE GRANTS PROJECT, GRANTS, NEW MEXICO**

Dear Mr. Wohlford:

On November 8, 2017 the undersigned performed the annual visual inspection of the tailing impoundments and evaporation ponds at the Homestake Grants Project located at Grants, New Mexico. Tom Wohlford (Closure Manager of Homestake Mining Company) and Reginald Shirley (contract engineer with Brown and Caldwell) accompanied me on the inspection. As the Responsible Engineer for these impoundments, I am required to annually inspect the stability and functionality of the impoundments per NRC Radioactive Materials License SUA-1471, Condition 12 and DP-200, Condition 52i.

Subsequent to my visual inspection, I reviewed additional information including:

- Impoundment piezometer readings taken by Homestake personnel during 2017 and tabulated at various times through the year,
- Summary of tailing collection well and tailing drainage sump collection rates through 2017,
- Map and table of tailing impoundment phreatic levels most recently measured in 2017, provided by Hydro Engineering on January 10, 2018,
- The settlement monument survey performed by Professional Land Surveying Services on 11/29-12/1/2016 and dated 1/04/2017,
- Sump discharges recorded by Homestake during 2017,
- Leak detection monitoring records for evaporation ponds #2 and #3,
- Pond level measurements by Homestake through 2017,

These records are typically included in Homestake's Annual Report, so they are not included here. This report, which is appended to the Annual Report, addresses the observations and findings of my site inspection as well as my assessment of the additional information listed above.

OBSERVATIONS

The undersigned performed visual observations of the tops and outslopes of both tailing impoundments and of the dikes, slopes, and liners of the evaporation ponds. The weather was

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sunny and breezy with temperatures in the low 60's. The ground surface was dry with no standing water.

Large Tailing Impoundment (LTP)

Overall, the surface of the LTP remains in good condition. The outslope riprap appears to be intact throughout and is extensively covered with volunteer vegetation, primarily Russian thistle with scattered small shrubs. The vegetation does not compromise the structural integrity or erosion resistance of the slope riprap; in fact, the vegetation appears to be providing additional erosion protection for the rock cover.

No recent washouts of cover soil under the riprap were observed during this inspection. The repairs of washouts that occurred in 2015 near the top of the south outslope and in 2013 on the north outslope are intact and functioning as intended.

Both zeolite facilities (the older 300 gpm facility and the newer 1200 gpm facility) located on the LTP appear to be stable with no visible indication of negative impact of these facilities on the stability of the LTP. The related pipe corridor on the southeast slope appears to be intact and functioning as intended, with no evident impact on the LTP. Upgrades to the 1200 gpm facility were completed in October 2017; these consisted of reconfiguration of two internal berms and had no effect of the stability of the facility.

No injection of water into the LTP has occurred since 2015.

The buried drains and sumps within the LTP slopes have continued to collect interstitial water draining from the LTP tailings, but the drainage rate (see Records Review below) dropped substantially during 2017 as the phreatic level in the LTP declined. At the time of this site visit, the ground surface in the toe at the east end of the north outslope, where seepage had emerged for many years, remained dry for the second consecutive year, and no standing water was visible anywhere around the toe of the LTP.

The slope stability analysis of the LTP updated in 2010 ("Stability Analysis of the large Tailing Impoundment, Homestake Grants Project, Grants, New Mexico", Kleinfelder, January 21, 2010) is still valid for 2017; the stability parameters have improved as the LTP phreatic surface declines. The static and pseudo-static factors of safety remain well above the design minimum values of 1.5 and 1.0, respectively.

Small Tailing Impoundment/ Evaporation Pond #1 (EP1)

The small impoundment (location of evaporation pond #1, or EP1) remains in generally good condition. The slumps in the subgrade fill of the south inslope of EP1, under the pond liner along approximately 200 feet of the pond westward from the southeast corner (Photo 1), have not visibly changed in 2017, and the liner remains intact. Similar but more limited slumps are now visible along the east inside slope of EP1 (Photo 2). During 2017, the water level was lowered for part of the year, making it possible to examine the precipitated sludge that has accumulated since 1990 (Photo 3). Weathering cracks have developed at several locations in the pond liner. The liner remains functional despite these conditions, but Homestake initiated an engineering feasibility assessment of options to address the issues related to aging of EP1, including the slumps in the liner (letter Wohlford to Meyer, 4/24/17).

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On 6/17/2017 HMC reported the results of its mid-2017 inspection of the EP1 liner to the NRC, EPA, NMED, and NM OSE. That report identified the same conditions addressed in previous Engineer's Inspection Reports.

HDPE drain pipes and the HDPE-liner runoff discharge chute on the south end of the small tailings pile remain in good condition and are functioning as intended and effectively discharging runoff.

On 11/8/2017, EP1 pond water level was approximately 6-8 feet below crest elevation, leaving much more than the required minimum freeboard of 2.0 feet. The highest pond level during 2017 was 12.5 feet on 2/13/17 with freeboard of 2.5 feet, so more than the minimum required freeboard was maintained throughout the year.

At the time of my inspection, the turbo-misters and sprays were shut down for the winter, and the wave dissipater booms were not deployed.

Homestake repaired rills during the 2016-2017 winter, but rills have developed again on all of the small tailing pile outslopes during 2017. On the east outslope, rills were up to 6 inches deep. On the southeast and north slopes, rills were generally 4-8 inches deep but up to two feet deep in a few places downslope from low spots in the EP1 perimeter berm where runoff was concentrated (Photo 4). The west and southwest slopes had minor rilling up to 4 inches deep. HMC has prepared an erosion mitigation plan that includes earthwork to fill rills and deployment of erosion control blanket. Implementation of this plan is expected in early 2017.

Evaporation pond #2 (EP2)

EP2 liner and outslopes are in good condition, protected by the gravel cover on the north and south outslopes, and are free of major rills.

During the annual inspection, the freeboard was estimated at approximately 10 feet. At the highest 2017 pond level on 1/2/17, the water depth was 22.7 feet and the freeboard was 2.3 feet. Required minimum freeboard levels were maintained throughout the year. Evaporation sprays were shut down for the winter prior to the date of my inspection.

Evaporation pond #3 (EP3)

EP3 appears to be functioning in accordance with design and the operating plan. At the time of this inspection, the freeboard was estimated to be 6-7 feet in both cells of EP3. During 2017 water was transferred between EP3 and EP1 to allow observations and repairs of the EP1 liner and to maximize storage and evaporation capacity in the winter months. On 5/8/17 the maximum pond water depth of the year in cell A was 10.35 feet, giving a freeboard of 3.05 feet. Maximum cell B pond depth was 10.2 feet on 6/26-7/3/17, giving a freeboard of 3.2 feet. Required minimum freeboard levels were maintained throughout the year.

The pond outslopes are in good condition with rills up to 6 inches on the outslopes. There is no visible indication of slope deformation or leakage through the lining system.

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RECORDS REVIEW

Evaporation Pond Freeboard

Homestake measured and recorded freeboard levels for the ponds during 2017. The minimum freeboard levels at any time during 2017 were:

- EP1 – 2.5 feet
- EP2 – 2.3 feet
- EP3A – 3.05 feet
- EP3B – 3.2 feet

All freeboard levels exceeded the minimum required freeboard of 2.0 feet.

LTP Drainage

HMC recorded tailing water drainage/ withdrawal data for the LTP on a weekly basis. Hydro Engineering reported that the average LTP dewatering rate was 0.9 gpm, which was down considerably from the 4 gpm in 2016 and from the 16.88 gpm average of 2015. Collection rates in the sumps averaged 10.4 gpm, down from an average rate of 14 gpm in 2016 and 19.9 gpm for 2015.

EP2 and EP3 Leak Detection Systems

During 2017, Homestake obtained and recorded weekly measurements of leakage through the primary liners collected in sumps of the leak detection and recovery system (LDCS) in EP2 and EP3 in accordance with DP 200 and the NRC Source Material License. Gallons of water removed through the collection sumps each week were recorded, and these records are maintained on site.

In its November 14, 2017 letter to the NRC, HMC reported leakage rate exceedances in the LDCS of EP2 and EP3. Subsequently, HMC has initiated a root cause analysis of the leakage. Starting in mid-2017 HMC began replacing the manual-control pumps on the LDCS sump pumps with pumps equipped with water-level activated switches to provide real-time response to primary liner leakage and more precise control of the hydrostatic head on the secondary liner. The pumps with water-level activated switches will limit the head across the bottom liner to less than 1.0 feet as required by DP 200 and 40 CFR 264.222.

For EP2, primary liner leakage rates varied through the year and did not appear to be correlated to pond water levels or weather. Zone 1 had minor (below the Action Leakage Rate, ALR) recorded leakage during 2017. In Zone 2, leakage rates exceeded the ALR briefly in July and August and for one week in early September but dropped to zero after the water-level activated pump was installed. Zone 3 had one week of leakage above the ALR in December, none otherwise for the year. Leakage in Zone 4 was below the ALR throughout 2017. Zone 5 leakage exceeded the ALR for several weeks in the first half of 2017 but was negligible through remainder of the year. Leakage rates in EP2 during 2017 were not consistently above the ALR, did not correlate with pond water stage, and were not considered evidence of unacceptable primary liner performance per DP 200 Condition 34, which specifies that pump capacity should be sufficient to minimize the amount of liquid in the inter-liner interstitial space, per SUA-1471, Condition 35D (via 7/18/2007 reference).

In EP3, only minor, intermittent primary liner leakage was recorded in cell A zones 2, 3 and 5 during May and June. Highest leakage rates in EP3A occurred in zones A2, A3 and A5 when the freeboard was less than 3.8 feet, and leakage did not persist with even less freeboard (higher pond water stage). Otherwise, cell A has no measureable leakage during 2017.

Through the first three quarters of 2017, Cell B had a only few weeks of ALR exceedance in zone B4 and B5; zones B1, B2 and B3 had none. From 10/30/17 through the end of 2017, zone B1, B2 and B4 had one or two weeks of slight ALR exceedance and zone B5 had none. Zone B3 leakage rates exceeded the ALR from 10/30/17 through the end of the year. There appeared to be no correlation between leakage rates and pond water levels in EP3B.

Piezometer and Settlement Monitoring

During 2017 the LTP continued to drain the interstitial water from the tailings. The phreatic surface continued to drop significantly during 2017. Water level measurements were taken by Homestake on 66 wells or piezometers, 39 of which were the same as those measured during 2016. Thirty six piezometers showed water level declines ranging from -0.02 feet to -15.83 feet, with the average of -3.34 feet.

Three piezometers/wells had anomalous increases recorded, ranging from 7.89 feet to 22.82 feet. There is no evident cause for actual increases, so these probably resulted from erroneous readings or calculations.

The 2017 settlement monument survey was performed by Professional Land Surveying Services on 11/29-11/30/17. Of the 49 monuments found and surveyed, 46 had settlements from 2016 to 2017 of 0.04 feet to 0.17 feet; the other three had no 2016 readings.

Because of the apparent systematic error in the 2016 survey that carried through all of the settlement measurements, the 2017 readings were compared to the 2015 readings, as well. Settlements from 2015 to 2017 of zero to 0.07 feet were measured on 26 settlement monuments; the remaining 20 had positive elevation changes (heave) of 0.01 feet to 0.13 feet. The amounts of elevation increase on interior locations were small, 0.01 feet to 0.04 feet, within the margin of expectable survey error. Larger increases, 0.05 feet to 0.13 feet, were limited to southernmost (E) line of monuments near the south edge of the LTP top. Increase in equipment traffic associated with well abandonment is the most likely cause for this minor heaving.

CONCLUSIONS AND RECOMMENDATIONS

The tailing impoundments and the three evaporation ponds are in generally good condition, with exceptions described above. HMC has elevated its maintenance efforts to stay within the operating limits of the NRC license and NMED discharge permit (DP 200).

HMC has recognized the effects of aging on EP1, which has now operated for 27 years, far beyond its design life, and has commissioned a study of alternatives for EP1, including changes to allow it to continue to operate as well as options to replace it. The study is evaluating the feasibility study of relining EP1 or replacing it with a new pond. That study was started in 2017 and will be completed in early 2018.

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The undersigned advised HMC that rill management and grade control are needed annually to maintain erosional stability of the small tailing impoundment, the evaporation ponds, and the interim cover of the LTP. Perimeter berms on the covers of the STP and LTP should be maintained to minimize the potential for surface runoff to create concentrated sideslope flows and sideslope rilling. In response, HMC has developed a plan for erosion control on EP1, with applications for EP3, as well.

Most of the piezometers in LTP were measured at least once during 2017. From those readings it is apparent that the phreatic surface in the LTP is approaching, or falling below, the depth of some of the piezometers. Consequently, fewer water level measurements will be possible in 2018 and later years, so the schedule of measurements can be relaxed to annual measurements.

Consolidation and settlement of tailings, especially slimes, is dependent on drainage of pore water. The LTP has drained enough that consolidation of tailings has probably already reached 90% of primary settlement, despite the residual effects of the tailing flushing program that ended in 2015. The settlement survey demonstrates that some settlement is still continuing but at very small rates. Now that LTP dewatering appears to well advanced and drainage rates have decreased substantially, the record of settlement dating back almost 25 years will be re-evaluated. This re-evaluation was appropriate in 2017, but because the 2016 settlement monument survey was evidently not accurate, it has been postponed until survey errors could be assessed. For 2017 HMC contracted with a different professional land surveyor to perform the annual survey of settlement points, and the results of this survey will support the assessment of settlement progress and whether primary settlement can be deemed complete.

Recent activity on the top of the LTP has resulted in damage to some settlement monuments, HMC should take the measures necessary to protect the survey monuments from further disturbance so that reliable elevation data can be obtained until cover final placement. Caution is especially important during the process of abandoning wells in the LTP near the settlement monument locations.

Until the EP1 options are evaluated and a course of action taken, the slumps along the inside slopes of EP1 should be protected against further displacement to protect the liner. Site staff should note any changes in the slumps and in the condition of the liner.

Outslopes of the LTP should continue to be observed by site staff at least weekly for signs of displacements in the slope surface and for ponding of runoff or rilling on the interim cover of the top. The undersigned should be notified immediately if surface slumps, erosional breaches of the interim cover, or other deformations are observed. Site staff should continue to be vigilant and to be ready to respond promptly to future washouts.

Until the final top cover of the LTP is constructed, the interim cover should be graded toward each HDPE drain so that no low spots remain between the drain pipe collars along the perimeter of the cover.

LIMITATIONS

The recommendations contained in this report are based on the undersigned's field visit, evaluation of information generated by others and obtained from Homestake, and his understanding of the inspected facilities. If any conditions are encountered at this site which are

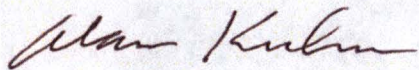
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significantly different than those described in this report, the undersigned should be immediately notified so that he may make any necessary revisions to findings or recommendations contained in this report.

This report was prepared in accordance with generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made. It is the Client's responsibility to see that all parties to the project are made aware of this report in its entirety. The information contained in this report should be used at the Owner's option and risk.

If you have any questions or need additional information, please contact me.

Respectfully submitted,



Alan K. Kuhn, Ph.D., P.E., D.GE
Consultant and Responsible Engineer

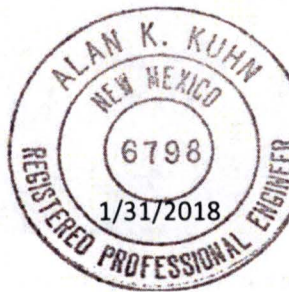




Photo 1 – EP1 liner near the southeast corner. Slumps along right side.



Photo 2 – EP1 east slope. Slumps below normal pool level.



Photo 3 – Close-up of precipitated sludge of the EP1 liner.



Photo 4 – Major rill in EP1 north outslope.