**Response to Comments on**
**Homestake Mining Company of California**
**Decommissioning and Reclamation Plan, Update 2013**

On April 4, 2013, Homestake Mining Company of California (HMC) submitted its Decommissioning and Reclamation Plan (DRP), Update 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML131070607). The U.S. Nuclear Regulatory Commission noticed receipt of the DRP and offered an opportunity to request a hearing in the Federal Register (ADAMS Accession No. ML13141A575) on June 27, 2013. The opportunity to request a hearing closed on August 26, 2013.

Comments on the DRP were received from the New Mexico Environment Department (NMED) (ADAMS Accession No. ML13309A557), the New Mexico Office of the State Engineer (NMOSE) (ADAMS Accession No. ML13309A558), and the New Mexico Environmental Law Center (NMELC) (ADAMS Accession No. ML13239A087). In addition to comments on the DRP, the NMELC submitted a number of comments on the CAP. Since the comment period on the CAP is closed, these comments are not being considered. Below are NRC Responses to the DRP comments received.

**New Mexico Environment Department (NMED)**

**NMED Comment 1**
The proposed use of either or both Evaporation Ponds 1 and 2 ("EP-1" and "EP-2") " ... as a Waste Disposal Cell ... for disposal of contaminated building debris ... contaminated soils, and other contaminated material generated during closure activities" (p. 1-5) must be preceded by an evaluation of the ability of the existing liner materials to isolate these materials from possible leaching actions. HMC notes that the newer EP-2 is double-lined (p. 4-2), and therefore may be a better choice for this repository.

**NRC Response:**
HMC's plans for the use of the evaporation ponds as a waste disposal cell for the disposal of contaminated building debris was described in Chapter 4 of the Homestake Mining Company of California, Grants Operation, Reclamation Plan, Revision 10/93 (ADAMS Accession Nos. ML091490367 and ML091490469). The NRC approved the Reclamation Plan in May 1995, with issuance of License Amendment 21. License Condition 37 provides the NRC requirement that the large and small tailings impoundments be reclaimed. The requirements for waste disposal areas are contained in Criterion 6 of 10 CFR Part 40, Appendix A. HMC will need to demonstrate compliance with those requirements before their license can be terminated which ever evaporation pond is used for waste disposal.

**NMED Comment 2**
Work to clear windblown sediments and reestablish the diversion channel that is proposed to occur during final reclamation activities (p. 2-48) instead should be implemented as soon as possible in order to provide flood protection to the site and to avoid uncontrolled distribution of contaminated sediments.

**NRC Response:**
The accumulation of windblown sediments in the diversion channel should be promptly addressed if the diversion channel is no longer providing an adequate level of flood protection for the site. However, the DRP does not indicate that windblown sediments are impacting the

diversion channels ability to provide adequate erosion protection during flooding events. The NRC staff agrees that HMC must determine if the amount of accumulating windblown sediments in the diversion channel is reducing the level of erosion protection for the site.

**NMED Comment 3**
As part of the Discharge Permit DP-200 renewal, NMED will require HMC to submit a closure plan for the land application areas, which will include evaluation of potential long-term ground water impacts, which is not addressed by the proposed Multi-Agency Radiation Survey and Site Investigation Manual Survey ("MARSSIM") in this document.

**NRC Response:**
In Section 9.7.3 of the DRP, HMC commits to survey the land application areas to document the contaminant concentrations in the soil and verify that the levels are below the soil clean-up criteria, which take into consideration dose from all pathways including drinking groundwater.

**NMED Comment 4**
NMED notes that HMC has been operating the Reverse Osmosis Water Treatment System ("ROWTS") at less than half of its designed capacity (HMC, March 2013. "2012 Annual Monitoring Report performance review for Homestake's Grants Project pursuant to NRC Materials License No. SUA-1471 and Discharge Plan DP-200," p. 2.1-2), but does not disclose this fact herein, despite its assertion that construction of EP-3 was intended to allow for this higher operational rate (p. 9 -11). NMED will require HMC to identify reasons for this sub-capacity performance, as well as a proposal to bring the ROWTS operation to the designed capacity as soon as possible as part of the DP-200 renewal. Operation of the ROWTS at designed capacity would mitigate predicted delays in HMC's completion of ground water remediation that HMC claims would be attributable to NMED's continued restriction (p. 9-25 and 9-27) and requirement to terminate land application activities within two years. Additionally HMC should review and revise, as appropriate, its closure cost estimate and schedule with the presumption that NMED will not permit land application to continue through 2020 (p. 9-33).

**NRC Response:**
As NMED notes, this requirement will be implemented under NMED’s discharge permit, and thus would not be addressed in HMC’s DRP. However, HMC should factor into its DRP any decommissioning cost and schedule changes related to any water treatment requirements imposed by NMED.

**NMED Comment 5**
HMC's assertion that " ...only surface soils known to exhibit elevated mill-related radionuclide concentrations are the soils near the evaporation pond spray systems" (p. 9-21) does not account for potential contamination from reported overspray due to wind dispersion. Therefore, the historical areal extent of such overspray also should be determined and characterized as appropriate during final decommissioning activities.

**NRC Response:**
Section 4.3, page 4-3, of the DRP states that upon final reclamation of EP-1, EP-2 and EP-3, these areas will be surveyed to determine the extent of contamination, if any, and removed and disposed of as necessary.

**NMED Comment 6**
NMED has previously commented that HMC's mass removal analysis of dissolved uranium (p. 9-25) is inconclusive [NMED, May 29, 2012. "Subject: Transmittal of New Mexico Environment Department comments pertaining to review of the Updated Corrective Action Plan {March 2012} for the Grants Reclamation Project at the Homestake Mining Company Superfund Site (EPA ID: NMD007860935) in Milan, New Mexico"].

**NRC Response:**
The NRC staff has submitted a Request for Additional Information (RAI) to HMC regarding the groundwater Corrective Action Program (CAP) with respect to HMC's conclusions about the performance of the plume control program using the mass removal analysis (CAP RAI #3). Deficiencies with the mass removal analysis will be addressed through the CAP review.

**NMED Comment 7**
NMED notes that demonstration of ground water restoration under Water Quality Control Commission regulations (e.g., 20.6.2 NMAC) require achievement of site standards at any place of withdrawal for present or reasonably foreseeable future use, and not just at the NRC determined Point of Compliance wells (p. 12-8 and 12-9).

**NRC Response:**
As stated in the HMC DRP, "The POC [former Point of Compliance] wells will eventually be used to demonstrate groundwater restoration, but they are currently not representative of offsite groundwater quality conditions. The ultimate goal of the groundwater restoration program is to restore the concentration of each COC [Constituent of Concern] to levels that meet the accepted groundwater site standards for each constituent in designated aquifers at the Grants site. The NRC, EPA, and NMED have agreed upon the groundwater site standards for each COC for each aquifer at the site…These standards were incorporated into the NRC license through License Amendment No. 39 [see License Condition 35B] as groundwater protection standards (GWPSs)."

The NRC requires achievement of site standards anywhere groundwater has been impacted. Groundwater monitoring will continue to be a requirement of HMC's license even after groundwater remediation has been completed. Groundwater monitoring performed after completion of HMC's groundwater CAP activities will be reviewed to determine if concentrations are rebounding and to ensure that concentrations are below the approved groundwater protection standards. After completion of the CAP, POC wells will be designated and used to ensure that the potential source of any future contamination (e.g., Large Tailings Pile and Small Tailings Pile) are monitored under U.S. Department of Energy's (DOE) general license described in the site's Long-Term Surveillance Plan (LTSP). Since the groundwater protection standards are based on background conditions or Maximum Contaminant Levels (MCL) instead of Alternate Concentration Levels (ACL), the future POC wells will be considered the point of exposure because they will be near the boundary of the DOE's controlled area under the LTSP and thus a potential point of exposure to the public.

**New Mexico Office of the State Engineer (NMOSE)**

**NMOSE Comment 1.a.**
Section 2.2.2.1, Diversion levee, Page 2-29:
The level of flood protection is not included as part of the narrative for the diversion levee. This section of the DRP would be enhanced by including such (e.g.: 100-year, 24-hour duration precipitation event or whatever storm event was evaluated for the design).

**NRC Response:**
Section 4.2.3 of the 1993 HMC Reclamation Plan included a discussion of the design runoff events for erosion protection measures at the HMC site, including the diversion levee. This discussion states that the diversion levee was designed for the runoff that would be caused by the greatest possible precipitation event, the Probable Maximum Precipitation (PMP) storm.

Section 2.2.2 of the DRP is a discussion of the completed reclamation/decommissioning activities. The DRP need not to include a discussion of the design basis for activities that have already been completed in accordance with an approved plan.

**NMOSE Comment 1.b.**
The second paragraph on Page 2-32 makes reference to "contaminated borrow and fill used for recontouring the LTP…" The report could be further enhanced by including a figure or series of figures that fully depict the geometric configuration of the LTP subsequent to the recontouring effort. Currently, there is no such information included within the DRP. Having such information in combination with present day or recent piezometric surfaces is necessary to fully evaluate slope stability for the LTP.

**NRC Response:**
License Condition 12 requires HMC to conduct an annual technical evaluation of the impoundments. HMC reports the results of the inspection in the Annual Monitoring/Performance Review reports. As a result of the 2009 annual inspection (ADAMS Accession No. ML101100735), HMC conducted a slope stability analysis of the LTP to evaluate the effects of the tailing flushing program on the stability of the LTP. The 2010 report of this analysis (ADAMS Accession No. ML13345A017) found that even with the rise in the saturated zone within the LTP, the static and pseudo-static factors of safety remain well above the design minimum values of 1.5 and 1.0, respectively. NRC staff believes that the 2010 analysis addresses slope stability on the LTP.

This response also applies to NMOSE Comments 2.a., 2.b., 2.c., 2.d., 3., 5.a., 5.b., 6., 7., and 8.d.

**NMOSE Comment 2.a.**
Section 2.2.2.2, Pages 2-38 through 2-46, Tailings Pile Reclamation:
The second paragraph under Large Tailing Pile on Page 2-40 makes reference to Figure 2.2-7 for the LTP reclamation plan design details. From a dam safety perspective involving a comprehensive assessment of slope stability, the referenced figure is incomplete and does not exhibit the overall geometry of the LTP in its existing configuration, nor does it show the staged approach to construction of the dam and the material strength properties of the dam associated

with the various stages of construction. A depiction similar to Figure 2.2-6 (Cross Homestake Mining Company Tailings Dam (decommissioned) Section Design of Re-contoured Small Tailings) shown prior to Figure 2.2-7 would be required for the LTP along with the corresponding shear strength parameters for any particular zone of the dam and the impounded tailings. A review of the 1980 Stability Assessment Report by D' Appolonia (on file with HMC) would expedite the assignment of shear strength parameters.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 2.b.**
The last paragraph of Step 1 of the Stabilization of the LTP on Page 2-41 states "Water is being re-injected into the LTP and extracted via a large number of wells located on the LTP as a means of flushing out contaminants present in the tailings." In the context of the stability of the various slopes that comprise the LTP, monitoring of the phreatic surface (akin to the groundwater table in natural ground) within the LTP is a requirement for developing slope stability models for cross-sections and/or embankment profiles of interest. If not already known, a discussion with HMC concerning their ability to use the injection wells as monitoring wells for defining phreatic surface elevations within the LTP is recommended. Given that the side slopes of the LTP have been reconfigured to 5:1 (h:v) as a result of the re-contouring process, it not likely that slope stability issues will arise, however, information related to water surface elevations within the LTP are not apparent in the DRP and would be required if a detailed analysis involving slope stability of the LTP are to be considered as part of the full decommissioning/reclamation of the project.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 2.c.**
Paragraphs 2 and 3 of Step 2 of the Stabilization of the LTP on Page 2-42 makes reference to the 5:1 (h:v) slopes performed by HMC as part of the re-contouring process. Similar to a prior comment regarding cross-sections and/or profiles of the LTP, cross-sections and/or profiles of the LTP in its existing configuration should be included as part of the DRP.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 2.d.**
Step 4 of the Stabilization of the LTP on Page 2-44 involves settlement monitoring. In the context of the tailings flushing program, information needs to be obtained from HMC concerning whether or not phreatic surface elevations within the LTP are also being monitored. Questions pertinent to slope stability of the LTP cannot be reasonably answered if phreatic surface elevations in the LTP are not known. If no monitoring is taking place, then an explanation justifying such in the context of slope stability should be provided from HMC.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 3.**
Section 3.6.4, Seismology, Page 3-25: The last paragraph of this section refers to the NRC evaluation of the HMC submittal of a reclamation plan revision prepared by AKG and Jenkins in 1993 and indicates that the seismic design of the LTP slopes are acceptable. Narrative within the paragraph further states that details of the NRC staff review were discussed in the Technical Evaluation Report (NRC 1999). From a dam safety perspective, it is not expected that any significant changes to the seismology or recommended Peak Ground Acceleration (PGA) is required, however, if it is determined that a significant portion of the LTP is saturated as a result of the current practice of tailings flushing, then a reevaluation of embankment stability may be warranted. If a re-evaluation is deemed necessary, then updated seismology should be considered, particularly in the context of liquefaction given that most of the LTP is comprised of liquefiable material under saturated conditions.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 4.**
Section 3.7, Surface Water Hydrology, Page 3-25: In the absence of the Updated CAP referred to in the first paragraph of this section, the OSE-DSB cannot render an opinion concerning the narrative within the DRP pertinent to surface water hydrology. The former dam that contained the storage ponds and tailings is no longer considered a dam being that it is reported to be incapable of storing water or tailings due to its reconfiguration as a result of the re-contouring effort. It is not likely that updated hydrologic and flood routing analyses will alter the conclusions arrived at by those involved with the sizing of the division channel and/or berm and the extent of the present day erosion protection used to protect the LTP and the HMC facility as a whole.

**NRC Response:**
The DRP does not indicate that windblown sediments are impacting the size of the diversion channel or its ability to provide adequate erosion protection during flooding events. The NRC staff agrees that HMC must determine the amount of accumulating windblown sediments in the diversion channel, if the accumulation is reducing the level of flood protection for the site, and if so, address the impact to reasonable assurance of control of radiological hazards at the site 10 CFR Part 40, Appendix A, Criterion 6.

**NMOSE Comment 5.a.**
Section 9.1, Tailings Piles, Page 9-2:
Depending on whether or not a significant portion of the LTP exists under saturated conditions ultimately dictates if slope stability analyses of the LTP in its current configuration is warranted. If updated slope stability is deemed warranted, then it should be considered for the list of remaining reclamation tasks under Section 9.1.1 on Page 9-3.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 5.b.**
For the last paragraph of Section 9.1.1 on Page 9-4, the narrative revolves around settlement monitoring. Similar to prior inferences related to possible saturation of the LTP due to the tailings flushing process, monitoring of phreatic water surface elevations within the LTP is also recommended.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 6.**
Section 9.11.4, Monitoring/Regulatory, Page 9-31: The last paragraph of this section on Page 9-32 includes "surveying and reporting tasks associated with monitoring of physical settlement of the LTP" among the monitoring activities scheduled to continue through the end of the project in 2022. Similar to prior comments related to slope stability of the LTP, monitoring of water levels in the LTP as a result of the tailings flushing process should also be considered. The continuation of water level monitoring can be reconsidered if it is found that water levels within the LTP are low enough such that slope stability is not impaired.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 7.**
Section 11.2.2, Instrumentation Program, Page 11-6: This section is generic in its description of the instrumentation in that it indicates that the HMC Grants Reclamation Project currently has an instrumentation program that complies with 10 CPR 20.1501 (b) and (c). It is not apparent from this section as to whether or not the settlement monuments, seepage collection measurements, and/or any other devices are included among the items considered as instrumentation. In any case, monitoring wells on top of the LTP to verify the existence of phreatic surfaces within the LTP should be considered necessary if an assessment of slope stability is to be given consideration.

**NRC Response:**
See response for NMOSE Comment 1.b.

**NMOSE Comment 8.a.**
Table 2.2-5, Total Settlement Well Monitoring Data Measurements, 2001-2011:
The subject table appears to present raw settlement data, not elevation data as inferred from the description within the table heading and therefore is misleading (i.e., Elevation, feet amsl, where amsl = above mean sea level). The data shown in the table appears to be cumulative settlement for a particular location/instrument for a specific year and although not described in the footnotes to the table, it is presumed that positive values are settlement values and Homestake Mining Company Tailings Dam (decommissioned) September 5, 2013.

**NRC Response:**
The NRC staff agrees that this information is needed to evaluate the stability of the LTP and will submit a request for additional information to HMC to clarify the information in the table.

**NMOSE Comment 8.b.**
Footnote "a" to the table appears to have a typographical error, that is, the top elevation of the D-2 monument is shown as 9995.29 feet whereas other elevations in proximity to D-2 appear to be on the order of 6660 feet.

**NRC Response:**
The NRC staff agrees that this information is needed for completeness and accuracy and will submit a request for additional information to HMC to clarify the information in the table.

**NMOSE Comment 8.c.**
The title "Total Settlement Well Monitoring Data Measurements" is somewhat misleading from a dam safety perspective in that "well" leads one to think that water surface elevations are being monitored.

**NRC Response:**
The NRC staff agrees that this information could be confusing so will request HMC to clarify the information in the table.

**NMOSE Comment 8.d.**
Similar to other prior comments/discussion within this memorandum, monitoring of water surface elevations with the LTP is needed if an evaluation of slope stability is a concern to the NMED and NRC. That is, a table similar to Table 2-2.5 populated with water surface elevations within monitoring wells at predetermined locations on top of the LTP would be needed to accomplish a slope stability assessment of the LTP.

**NRC Response:**
The NRC staff will not request that HMC provide additional information to address NMED's comment because slope stability is addressed by the 2010 HMC slope stability analysis of the LTP and annual inspections. See response for NMOSE Comment 1.b.

**NMOSE Comment 9.**
Figure 2.2-7, Design Details, Reclamation Plan, Large Tailings Pile: Although informative with regard to understanding the design details for the LTP, an additional figure similar to Figure 2.2-6 showing the Cross Section Design of Re-contoured Small Tailings Pile is needed if a slope stability assessment is deemed necessary for the LTP. It is further noted that several cross sections of the LTP would likely be necessary for a comprehensive slope stability assessment of the LTP, similar to what was done in the November 1980 Stability Assessment prepared by D' Appolonia Consulting Engineers, Inc.

**NRC Response:**
The NRC staff will not request that HMC provide additional information to address NMED's comment because slope stability is addressed by the 2010 HMC slope stability analysis of the LTP and annual inspections. See response for NMOSE Comment 1.b.

**NMOSE Comment 10.**
Figure 2.2-10, 100-Year Floodplain (FEMA 2010) Map for HMC Project Area: It is recognized that either the FEMA floodplain map was superimposed on to the HMC Project Area Map or

perhaps the other way around, HMC Project Map was superimposed onto the FEMA floodplain map. However, as presented, the inference is made that the majority of the south and west embankments along with portions of the EP-1 and EP-3 are inundated by the 100-year flood. A footnote that provides clarification concerning actual water levels as a result of the diversion and drainage channels would enhance the figure. Left as is, the figure infers that the LTP and evaporation ponds are subject to inundation from the 100-year event.

**NRC Response:**
Section 9.9 of the DRP provides, "[t]he representation of the FEMA map does not reflect the presence of the site features including the LTP, collection ponds, EP-1 and EP-2, and the existing dike, which will change the flow of water in the immediate area of these features." The DRP also states that:

"HMC will develop a surface water control plan for the surface water generated onsite during flood conditions which considers the location and extent of the FEMA 100-Year Floodplain. Detailed survey data will be collected to support the plan development so that onsite HMC Grants runoff will be controlled with the intent of preventing exacerbation of offsite flooding. The construction engineering of the final reclamation activities (e.g., ponds and site surface areas) will need to be factored into the development of the surface water control plan."

HMC acknowledges that the 100-year Floodplain map does not represent the presence of on-site features and commits to developing a surface water control plan that considers the construction engineering that has occurred at the site. For clarification, the NRC staff will submit a request for additional information to HMC to include features of that plan in the DRP.

**NMOSE Comment 11.**
Figure 2.2-15, Release of Tailings from HMC Large Tailings Pile in 1977: The figure could be enhanced by including a footnote to the figure describing the areal extent in acres and the quantity (volume) of tailings released in 1977.

**NRC Response:**
A description of the release is given in Section 2.2.3.1 of the DRP. For clarification, the NRC staff will recommend that HMC provide this information in the figure.

**NMOSE Comment 12.**
Appendix F, Specifications for Reclamation Activities 1993-1995: Technical Specification No. 85 for Settlement Monument appears to be very comprehensive and meets the need for the settlement monuments. A similar specification for monitoring wells to be established at prescribed locations on top of the LTP and at the downstream toe (if not already established) will be necessary if a comprehensive slope stability evaluation of the LTP in its current configuration is deemed necessary.

**NRC Response:**
The NRC staff will not request that HMC provide additional information to address NMED's comment. See response for NMOSE Comment 1.b.

**New Mexico Environmental Law Center (NMELC)**

**NMELC Comment 1.**
BVDA and MASE contend that the U.S. Nuclear Regulatory Commission [NRC], pursuant to its regulations at 10 CFR Parts 20, 40 and 51, the AEA and CERCLA, has a joint responsibility with the U.S. Environmental Protection Agency (Region 6) [EPA] to conduct an Environmental Impact Study [EIS] of the Homestake-Barrick Gold superfund site, surrounding communities and the natural environment. No EIS has been done for human and natural environment at this site and the surrounding area. The findings of the EPA's recent Final Draft Human Health Risk Assessment [DHHRA] raise serious questions concerning the levels of radiation exposure to humans, animals and plants surrounding the site. When combined with existing knowledge of the levels of contamination of ground water due to the Homestake-Barrick Gold tailings piles, and the fact that the large tailings pile does not have an adequate cover, this new information is sufficient to require an EIS. Therefore, BVDA and MASE request that the NRC and EPA jointly conduct an EIS on the human and natural environment of the site and surrounding communities to ascertain whether historic operations of the Homestake uranium mill--and subsequent insufficient protections of the public during the on-going decommissioning process for the site--contaminated the site and the human and natural environment surrounding it.

**NRC Response:**
NRC staff does not agree with this comment. Under CERCLA, the EPA does not prepare EISs. Instead, the EPA prepares Records of Decision (RODs), which it considers to be comparable to an EIS. EPA's initial ROD for the HMC site was completed in 1989. The EPA is now developing two additional RODs

The NRC's environmental review process is described in NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS programs, dated August 2003. This NUREG is publicly available from the NRCs public Web site at: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1748/sr1748.pdf. As explained in NUREG-1748, the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321 et seq.) requires Federal agencies, as part of their decision-making process, to consider the environmental impacts of actions under their jurisdiction. The NEPA process is illustrated in Figure 1 of NUREG-1748. If an Environmental Assessment (EA) supports a Finding of No Significant Impact (FONSI), the environmental review process is complete. If the EA reveals that the proposed action may significantly affect the environment and cannot be mitigated, the environmental review activities transition to the process necessary to develop an EIS. The NRC staff plans to prepare an EA to evaluate the activities associated with the DRP, and will proceed as appropriate based upon its findings.

**NMELC Comment 2.**
BVDA and MASE also contend that a large number of factors weigh heavily against going forward with the decommissioning plan approval process at this time. These factors include, but are not limited to:

**a.** The EPA's and NRC's failure to conduct an EIS although there is a high probability it would lead to information necessary for an adequate site decommissioning plan;

**NRC Response:**
As part of its licensing review, the NRC must obtain all information necessary to determine whether the proposed DRP meets applicable requirements. Nonetheless, it is important to note that the purpose of an environmental review is to allow a Federal agency to determine whether a proposed licensing action might have a significant impact on the environment, as well as to identify whether there is specific mitigation that could be taken to lessen or negate these impacts.

**b.** The EPA's failure to have completed and issued by this time a Record of Decision [ROD] on the appropriate final disposition of the tailings piles at the site;

**NRC Response:**
The NRC has regulatory authority over the decommissioning of the HMC site under the AEA. EPA has regulatory authority for remediation activities at HMC under CERCLA. Under CERCLA, EPA has divided site remediation activities into three distinct Operable Units (OU1, OU2, and OU3). OU1 addresses restoration of groundwater, which is contaminated by tailings. OU2 addresses long term stabilization of the tailings, surface reclamation, and mill decommissioning. OU3 addresses indoor and outdoor radon concentrations in areas adjacent to the mill. In 1989, EPA issued a "No Action" ROD for OU3. In 1993, EPA entered into a Memorandum of Understanding (MOU) with NRC to address remediation activities for OU1 and OU2. The MOU provides that the NRC will be the lead agency for the remediation of the byproduct material disposal area (groundwater restoration (OU1) and surface reclamation (OU2)) under the AEA and 10 CFR Part 40, Appendix A. The AEA does not require that NRC issue RODs, although prior to issuing determinations on licensing actions, the NRC conducts a health and safety review of the proposed action and an environmental review.

On August 7, 2012, EPA informed NRC that it plans to develop RODs for OU1 and OU2. The EPA plans to complete RODs for OU1 and OU2 by September 2016. The EPA's decision to pursue a ROD has no impact on the NRC's responsibilities under the AEA. Additional information regarding the EPA's ROD plans and process should be directed to the EPA.

**c.** The EPA's failure to have completed and issued by this time a Final Human Health Risk Assessment [FHHRA] for the site and a ROD based upon the findings of the FHHRA;

**NRC Response:**
Subsequent to receipt of this comment, the EPA published the FHHRA in December 2014. It is available at: http://www.epa.gov/region6/6sf/newmexico/homestake_mining/homestake-hhra-final-12-14.pdf.

The FHHRA concludes that:

"The level of risk presented by the HMC facility apart from background would generally indicate the need for long-term clean-up in the Superfund program. Long-term clean-up of the HMC facility is ongoing under state and federal authorities." On August 7, 2012, EPA informed NRC that it plans to develop RODs for OU1 and OU2. EPA plans to complete RODs for OU1 and OU2 by September 2016.

**d.** The failure of the EPA and NRC to adequately assure public health and safety as evidenced by the DHHRA revealing that local residents' life-time cancer risks are approximately 18 times higher than $10^{-4}$--which may translate into over 560 mrem/year fence-line dose (i.e., more than five times higher than the 10 CFR Part 20, subpart D, limit for exposures to members of the public from a licensed uranium mill operations);

**NRC Response:**
The NRC staff does not believe that the EPA's HHRA demonstrates NRC is not adequately protective of public health and safety and therefore should suspend its review of the proposed DRP.

On June 18, 2013, the EPA published the draft HHRA for comment. One of the findings made in the draft HHRA is that the excess cancer risk value calculated for residents living near the HMC site is $1.8 \times 10^{-3}$ (0.0018 or 18/10,000). In an e-mail dated July 26, 2013 (ADAMS Accession No. ML15148A481), the EPA informed BVDA that they were interpreting the findings of the HHRA incorrectly, and that HMC was not responsible for the entire excess cancer risk to residents. The EPA stated:

> EPA's acceptable risk range of $1 \times 10^{-4}$ to 1 x 10-6 represents the probability of one excess cancer in 10,000 individuals (1/10,000 or 0.0001) to one excess cancer in one million individuals (1/1,000,000 or 0.000001). The term "excess cancer risk" means that EPA calculates the additional probability of an individual developing cancer from exposure to contamination over the national average. In the United States, the probability of a person developing cancer today is 3 in 10 or 0.3. This is equivalent to 3,000 people developing cancer out of 10,000 individuals. Therefore, the upper end of EPA's acceptable risk range represents one additional cancer risk over the national average of 3,000. This shows that EPA's acceptable risk range above the national risk level is very small and represents a very conservative approach by EPA to protecting human health.
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> The draft excess cancer risk value calculated by EPA for residents living near the Homestake site is $1.8 \times 10^{-3}$ (0.0018 or 18/10,000). This means that there is the probability of 18 excess cancers out of 10,000 individuals. Although this represents 18 excess cancers above the upper end of EPA's acceptable risk range of one in 10,000 (0.0001), it is still a very small number when compared to the national average of 3,000 out of 10,000 (or 0.3). If 10,000 people lived near Homestake, this would equate to 3,018 total cancer risks out of 10,000 individuals.
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> As part of the risk assessment, the EPA also calculated excess risk for local ambient (background) conditions that would not be affected by contamination from the Homestake site. The village of Bluewater was selected as the nearby background area. The draft excess risk value calculated for the background area is $1.3 \times 10^{-3}$ (0.0013 or 13/10,000). This means that there is the probability of 13 excess cancers occurring in 10,000 individuals. When considering the national

risk level of 3,000 out of 10,000, the total cancer risk estimated for the background area is 3,013 out of 10,000. This is also above the upper end of the EPA's acceptable risk range of one in 10,000.

These draft calculations show that the residents near Homestake face only slightly higher risks than people living in the background area (Bluewater village). And the risks to the Homestake residents include risks from background sources as well as site contamination. When calculating the excess cancer risk attributable solely to a site, EPA subtracts the risk attributable to background sources to get a total net risk for the site. The calculation would be as follows:

Risk from Homestake Site (including background) – Risk from Background = Net Risk

0.0018 – 0.0013 = 0.0005

The 0.0005 ($5 \times 10^{-4}$) net risk means that there is the probability of 5 excess cancers in 10,000 individuals attributable solely to Homestake contamination. This is only marginally higher than the upper end of EPA's acceptable risk range of one excess cancer in 10,000 individuals (0.0001 or $1 \times 10^{-4}$).

The majority of the risk is believed to be associated with outdoor radon exposure. The cancer risk from outdoor radon in the U.S. is $3 \times 10^{-3}$ (0.003) for smokers and $6.4 \times 10^{-4}$ (0.00064) for nonsmokers. When the risk attributable to Homestake is evaluated in this context, you will note the probability of risk from outdoor radon in the area near Homestake is only marginally higher than the background and national average.

**e.** The NRC's failure to respond to agency and Non-Governmental Organization [NGO] comments on the revised CAP for the site;

**NRC Response:**
On March 15, 2012, HMC submitted Revision 2 of the 2006 CAP (ML12089A052 thru 059) and ML12089A136 and ML12089A137). The NRC requested public comments on Revision 2 of the CAP and requested that EPA and New Mexico Environment Department (NMED) provide a list of any regulatory requirements missing in the CAP. On June 7, 2012, the NRC held a public meeting in Grants, New Mexico expressly for the purpose of receiving comments on the revised proposed CAP. At this meeting, and in response to requests from the public, EPA, and NMED, the comment period was extended from 60 days to 8 months. The NRC received comments on the revised CAP from a number of public interest groups (BVDA, MASE, INFORM, Uranium Watch, Skeo Solutions). However, the EPA did not provide the requested regulatory requirements missing in the CAP. Therefore, by letter dated December 19, 2013 (ADAMS Accession No. ML13331A755), the NRC informed the EPA that the NRC would be proceeding with its review of the CAP with or without EPA input on their regulatory requirements.

On April 30, 2015 (ADAMS Accession No. ML13360A224), by letter to HMC, the NRC published its response to Revision 2 of the CAP which included a request for additional information. The response also included NRC Responses to comments from the EPA, NMED, and the public.

**f.** The NRC's failure to obtain Homestake Barrick-Gold's responses to NRC Staff requests for additional information ["RAIs"] concerning the CAP; and

**NRC Response:**
HMC submitted Revision 1 of the CAP on December 15, 2006. The NRC staff completed its review of Revision 1 of the CAP and transmitted a RAI to HMC on February 4, 2010. On March 14, 2012, HMC submitted Revision 2 of the CAP to the NRC for review and approval. Revision 2 of the CAP included a detailed response to each NRC RAI. As noted above, the NRC staff responded to Revision 2 of the CAP with a second set of RAIs to HMC, which included responses to all of the in scope comments from EPA, NMED, and the public in April, 2015.

**g.** The NRC's failure to complete the CAP approval process.

**NRC Response:**
As noted above, NRC has recently responded to HMC's Revision 2 of the CAP. In that response, NRC has requested that HMC respond to RAIs.

**NMELC Comment 3.**
Homestake Mining Company's (HMC) DRP is incomplete because important questions regarding groundwater at and near the HMC site remain unanswered. The DRP states that groundwater issues are addressed in the Updated Corrective Action Program (CAP). However, the CAP has not been approved by either the U.S. Nuclear Regulatory Commission ("NRC") or the New Mexico Environment Department ("NMED"). In addition, comments on the CAP submitted by the U.S. Environmental Protection Agency, Region VI ("EPA"), the NMED, Skeo Solutions, Uranium Watch, the Information Network for Responsible Mining, BVDA and MASE have not yet been addressed, and neither have the unanswered requests for additional information ("RAIs") which the NRC sent to HMC while it was preparing the revised, updated CAP.

**NRC Response:**
The NRC staff does not believe the DRP is incomplete. However, the staff recognizes that some of the reclamation dates referenced in the DRP are dependent on an approved CAP. Therefore, the staff cannot approve the DRP until after the CAP has been approved. RAIs on the CAP were addressed in the April 30, 2015 NRC Response: to HMC on the updated revised CAP (ADAMS Accession No. ML13360A217). The NRC also addressed HMC's response to previous RAIs and produced new RAIs based on new information in the CAP.

**NMELC Comment 4.**
The following issues remain unaddressed:

**a.** The HMC site is known to have contaminated groundwater in the alluvial aquifer and the three Chinle aquifers. However, HMC has not gathered the data necessary to determine whether contaminants from its site have entered the San Andres/Glorietta Aquifer.

**NRC Response:**
The NRC staff disagrees with the comment. HMC currently monitors wells in the San Andres/Glorietta aquifer and plans to replace or add San Andres wells in Sections 20, 23, 26(2), 27, 28, and 34 to support the proposed expansion of the plume control program. Contamination in the three Chinle aquifers is the result of contaminant migration from the alluvial aquifer to the Chinle aquifers via the Chinle subcrops.

**b.** HMC has not determined the length of time that the Large Tailings Pile (LTP) will continue to contaminate underlying groundwater. HMC's claims regarding the rate that contaminants will be flushed from the LTP are not supported by the data. The figure below is an updated version of figure 1 in the BVDA/MASE comments

**NRC Response:**
The historic seepage released from the LTP to the alluvial aquifer prior to initiating the Source Control program is what currently resides in the underlying groundwater. The Source Control program flushes tailings pore water to collection wells within the tailings, tailings toe drains, and collection wells within the alluvial aquifer below the LTP. Therefore, it is not a continued source of contamination. There will be continued seepage from the LTP after completion of the source control program; this is purpose for reducing the source term concentration. Reducing concentration in the LTP is necessary to ensure continued compliance with the groundwater protection standards after remediation is completed.

Table A-1 to Attachment A of Appendix G to the 2012 updated CAP provides the predicted seepage rates from the LTP through the year 2050. The seepage rates were estimated using the partially saturated flow model VADOSE/W as described in Attachment A of Appendix G to the revised CAP. The NRC staff is cognizant that Table A-1 does not reflect the revised time-line for tailings injection and extraction and that the table only uses projected values after 2004.

The updated figure provided in the comment has plotted the average uranium concentration removed from the extraction wells within the tailings impoundment. This value only reflects areas within the tailings where extraction took place each year and does not take into consideration the volume of pore water removed from a particular area or lower concentration areas where extraction did not take place, e.g., the portion of the tailings impoundment used for the rebound study.

**c.** HMC has not determined whether the Small Tailings Pile (STP) is a source of groundwater contaminants, and if so, how long it will remain a source of contaminants.

**NRC Response:**
Seepage from both the LTP and the STP has contributed to groundwater contamination. The STP was operated for only four years from 1958 to 1962. The STP has had over 50 years for consolidation of the tailings and drainage of the pore waters. Also, the additional applied load resulting from the placement of EP-1 on top of the STP expedited pore water drainage and consolidation of the STP. The pore water that has drained from the STP and contributed to the groundwater impacts at the site continues to be captured by the plume control program. In addition, groundwater quality will continue to be monitored at the site under HMC's license after completion of the CAP, and under DOE's Long-Term Surveillance Plan (LTSP) after HMC's license is terminated, to ensure compliance with the groundwater protection standards.

**d.** HMC does not appear to have verified the models it used to: 1) simulate groundwater flow and contaminant transport; 2) estimate the seepage rate from the LTP; and 3) simulate the leaching of uranium beneath irrigated fields. We cannot have much confidence in the results of models that have not been verified.

**NRC Response:**
The NRC staff agrees. Model validation is necessary to provide confidence in model predictions. Additional information regarding the models was requested by the NRC staff in 2015 in the response to the 2012 updated CAP.

**e.** HMC is irrigating four fields with contaminated water from the alluvial aquifer. HMC claims that underlying groundwater has not been affected by the irrigation. However, samples from suction lysimeters and monitor wells indicate that contaminants are moving downward through the soil, and may have affected monitor wells beneath the irrigated fields.

**NRC Response:**
Section 9.7.3 of the DRP, HMC commits to survey the land application areas to document the contaminant concentrations in the soil and verify that the levels are below the soil clean-up criteria. Soil with concentrations above the soil clean-up criteria will be removed and disposed of prior to license termination. HMC would be required to survey potentially impacted subsurface areas of the site in accordance with 10 CFR 20.1501. If activities in the land application areas are found to have impacted groundwater, these areas would also need to be added to the CAP. HMC would be required to remediate impacted groundwater to the standards approved in their NRC license and minimize residual radioactivity at the site in accordance with 10 CFR Part 40, Appendix A, Criterion 6.

**f.** Contaminants in the alluvial aquifer have migrated thousands of feet beyond the HMC site boundary, and contaminant concentrations exceed the established standards. However, HMC has established a restoration schedule only for contaminants within the site boundary, i.e., contaminants up-gradient of the points of compliance. The DRP does not state that HMC will clean-up groundwater contaminants that have migrated beyond the points of compliance. HMC should be required to restore all portions of the alluvial aquifer that have been affected by contaminants emanating from its site.

**NRC Response:**
The goal of HMC's ground water restoration program is to restore affected groundwater aquifers (both on-site and off-site) to levels as close as practicable to the up-gradient site background levels. The 2012 updated CAP is composed of activities designed to control the contamination source, and to control and reduce the contaminant plume that has migrated off-site. The ongoing and future groundwater restoration program is discussed generally in Section 9.10 of the DRP and in detail in the 2012 updated CAP.

**g.** Contaminants from the HMC site are found in the upper, middle, and lower Chinle aquifers. Contaminant concentrations in all three aquifers exceed the established standards. The DRP does not state that HMC will clean-up contaminants that have migrated into the three Chinle aquifers. HMC should be required to reduce contaminant concentrations to the standards established for the Chinle aquifers.

**NRC Response:**
The goal of HMC's ground water restoration program is to restore affected groundwater aquifers (both on-site and off-site) to levels as close as practicable to the up-gradient site background levels. The 2012 updated CAP is composed of activities designed to control the contamination source, and to control and reduce the contaminant plume that has migrated off-site. The ongoing and future ground water restoration program is discussed generally in Section 9.10 of the DRP and in detail in the 2012 updated CAP.

HMC is required to meet the groundwater site standards for the Chinle aquifers. Section 1.1.3.5 of the 2012 CAP provides the site standards for each contaminant in each aquifer and reflect the site standards found in License Condition 35 of HMC's license.

**h.** HMC states: "The long-term goal of HMC is to restore affected groundwater aquifers to levels as close as practicable to the up-gradient site background levels." In using the term practicable, HMC appears to be saying that it may not restore all contaminated groundwater to the established standards. The DRP does not explain why HMC may not be able to restore groundwater to the established standards. HMC should present data and technical analyses to show why they cannot reasonably be expected to restore groundwater to the established standards. Otherwise, HMC should be required to restore all groundwater affected by the HMC site to the established standards. It should be noted that the "up-gradient site background levels" exceed drinking water standards and may be the result of contaminants originating from up-gradient uranium mines and mills. Background water quality may have been better before mining began.

**NRC Response:**
HMC is required to meet the site standards stated in License Condition 35 of HMC's NRC license. The site groundwater standards were set at either the established background values for each Constituent of Concern (COC) or the appropriate drinking water standards. Therefore, if the applicable drinking water standard is greater than the established background value, HMC must restore affected groundwater aquifers to levels as close as practicable to the up-gradient site background levels.

**i.** HMC has estimated background concentrations in the three Chinle aquifers. Some of these estimates are questionable.

**NRC Response:**
The background concentrations for the three Chinle aquifers were established in July 2006, after review and approval by NRC, EPA, and NMED. The basis for this approval is contained in NRC's June 22, 2006 Environmental Assessment (71 FR 35956) and July 10, 2006 approval of a license amendment to revise groundwater protection standards (ML061710354

**Upper Chinle uranium:**

HMC claims that the background concentration of uranium in the Upper Chinle Aquifer is 90 µg/L. However, during the first five years of sampling Upper Chinle background wells, no uranium concentrations exceeded 30 µg/L. Only later did uranium concentrations rise (see figures A-1 and A-2 in appendix 1). This raises the question: why did HMC include the later, higher, uranium concentrations in its estimate of the background concentration? It seems reasonable to estimate the background concentration using only uranium concentrations from earlier times, before the concentrations rose. HMC should explain why it included the later concentrations in its estimate of background.

**NRC Response:**
The background concentrations in the three Chinle aquifers were established in July 2006, after review and approval by NRC, EPA, and NMED. The basis for this approval is contained in NRC's June 22, 2006 Environmental Assessment (71 FR 35956) and July 10, 2006 approval of a license amendment to revise the groundwater protection standards (ML061710354).

**Chinle mixing zone uranium:**

HMC claims that the background uranium concentration for the Chinle mixing zone is higher than the background concentrations in either the alluvial aquifer, or any of the three Chinle aquifers. How can this be if the water in the mixing zone is a mixture of water from the alluvial aquifer and the Chinle aquifers? This question was raised by NMED:

*The proposed mixing zone background concentrations for uranium, molybdenum, vanadium and thorium-230 are actually higher than the proposed alluvial and Chinle background concentrations. How can the mixing zone background concentrations be higher than water that contributes to this mixing zone? NMED would accept these calculated mixing zone concentrations if HMC can provide verification that a geochemical reaction has caused the background values in the mixing zone to be higher than the waters that contribute to this zone.*

In its response to NMED, HMC did not … *provide verification that a geochemical reaction has caused the background values in the mixing zone to be higher* … . Thus the question remains - why is the mixing concentration higher that the concentrations in the water that contributes to the mixing zone?

HMC should be required to re-evaluate its estimates of background concentrations in the Chinle aquifers.

**NRC Response:**
The background concentrations in the three Chinle aquifers were established in July 2006, after review and approval by NRC, EPA, and NMED. The basis for this approval is contained in NRC's June 22, 2006 Environmental Assessment (71 FR 35956) and July 10, 2006 approval of a license amendment to revise the groundwater protection standards (ML061710354).

**j.** Homestake does not appear to have investigated the possibility that windblown contaminants (tailings or drift from spraying at evaporation ponds) could affect surface water quality and the quality of groundwater that receives recharge from an affected stream.

**NRC Response:**
Reclamation of windblown tailings was completed in December 1995 with submittal of HMC Completion report for Reclamation of Off-Pile Areas (ADAMS ML12291A911). Reclamation was completed in accordance with an approved Soil Clean-up Verification and Sampling Plan (ADAMS ML091420387). In Section 9.7.1 of the DRP, HMC commits to survey soil areas near the evaporation ponds for contamination from evaporation pond spray systems. Soils exceeding the clean-up criteria will be removed and appropriately disposed.

**k.** Evaporation ponds EP-1 and EP-2 may be used as waste disposal cells (WDCs). If a pond is used as a WDC, it will not be excavated. Thus, any contaminated soil underlying the pond will remain in place and may contaminate underlying groundwater. HMC should demonstrate that contaminated soil underlying a WDC will not contaminate groundwater. Otherwise, HMC should be required to remove the contaminated soil.

**NRC Response:**
NRC staff agrees with the comment. HMC addresses soil contamination in Section 4.3 of the DRP. HMC is required to demonstrate that soil, beneath any removed evaporation ponds that are outside of the STP, does not contain COCs in excess of the soil clean-up values.

**l.** Many of the requests for additional information (RAIs) submitted to HMC by the U.S. Nuclear Regulatory Commission staff remain unanswered.

**NRC Response:**
HMC has submitted responses to the RAIs that NRC made on the 2006 revised CAP in their 2012 updated CAP. Since the DRP currently under review by NRC is the first submitted by HMC since 1993, no NRC RAIs on a DRP were outstanding at the time this comment was received.

**m.** The DRP appears to be missing the following figures:
- Figures 3.6-5 through 3.6-8 (referenced on page 3-21).
- Figure 9.2-1 (referenced on page 9-5).
- Figure 9.2.2-5 (referenced on page 9-8).

**NRC Response:**
NRC staff agrees with the comment. The NRC staff will submit an RAI to HMC to provide these missing figures.

**NMELC Comment 5**
Although the DRP addresses environment and health in numerous places (see p. 10-3 and Table 10.3-1), the emphasis is almost entirely on the health of the decommissioning workers themselves. It also assumes that compliance with 10 CFR Part 40 (see p. 2-6 and Appendix D) or 10 CFR 40.28 (see p. 18-2) will assure adequate protection of public health. While this is commendable and required for compliance with existing regulations, the DRP does not address actual tracking of the health of nearby community residents, some of whom have been exposed to contaminants from the site for years and will continue to be exposed as the decommissioning and reclamation plan proceeds.

**NRC Response: below.**

**NMELC Comment 6**
The EPA Draft Human Health Risk Assessment, although still not in final form, documents ongoing exposure pathways and radiation risk to residents near the HMC site. A comprehensive DRP should include consideration of these pathways and population risks, once they have been put in final form. In a fully responsive plan, and in order to protect public health of the community at risk, an integrated community radiation monitoring and cancer incidence tracking program should be put in place as a part of the DRP. The ATSDR Public Health Assessment of a similar mill tailing community, Monticello, Utah, recommends continued tracking of the incidence of cancer in that community. This recommendation was developed and is being carried out as a result of extensive consultation with community representatives.

**NRC Response: below.**

**NMELC Comment 7**
In order to carry out a similar cancer incidence tracking program, the DRP should include public meetings and consultation with representatives of the BVDA and MASE, at a minimum. Other comments on the DRP made on behalf of these groups have addressed the need for radiation monitoring. With the agreement of the affected community representatives, the New Mexico Tumor Registry, at the University of New Mexico, would be ideally suited to conduct cancer incidence tracking. A mechanism for reporting results, while maintaining patient confidentiality, should also be specified. Public health education about the risks of radon, as is being done in Monticello, Utah, should also be provided to residents near the HMC site.

**NRC Response: below.**

**NMELC Comment 8**
In summary, this recent update of the Homestake Mining Company DRP fails to recommend public health measures such as on-going and integrated community radiation monitoring and cancer incidence tracking. This is a serious limitation of the DRP in its present form. A clear

model and precedent exists in an adjacent state and should be incorporated into the DRP for the Homestake Mining Company site in New Mexico.

**NRC Response: NMELC Comments 5, 6, 7, and 8**
HMC must meet the requirements in NRC regulations 10 CFR Part 20. 10 CFR Part 20, Subpart D, contain the radiation dose limits for individual members of the public. Chapter 12 of the DRP describes the environmental monitoring and control program that HMC will implement to ensure compliance with the radiation dose limits of Part 20. HMC is not required to have an integrated community radiation monitoring and cancer incidence tracking program under NRC regulations. EPA published the final Human Health Risk Assessment in December 2014. Public health education about the risks of radon has been provided to the community by EPA and is available on EPA's web site at: http://www.epa.gov/radon/health-risk-radon.

**Comments made on the CAP that relate to the DRP**

The following comments from the U.S. Environmental Protection Agency (EPA) (ML12305A179) and BVDA (ML12306A100) were made in relation to the 2012 updated CAP but also concern the DRP. Therefore, NRC, in our response to comments on the CAP (ML13360A222), committed to address these comments in the response to comments on the DRP.

**EPA Comment 2 on the 2012 updated CAP**
HMC has incorporated EPA's site closure requirements in the CAP in Section 1.1.3.4 – Removal from NPL as stated in the December 13, 2011, letter and found in the National Oil and Hazardous Substances Pollution Contingency Plan [National Contingency Plan (NCP)] (40 CFR 300.425(e)). However, the CAP does not include potential Applicable, Relevant and Appropriate Requirements [ARARs] regarding radon emissions from the site. HMC should include the potential ARARs identified in the December 13, 2011 letter.

**NRC Response:**
The EPA has already identified and documented the potential ARARs regarding radon emissions from the site in Appendix A of the Superfund Record of Decision (ROD), dated September 1989, for Operable Unit 3 (OU3 or The Radon Operable Unit). The requirements found in Section 121(d)(2) of CERCLA have been fulfilled by the initial review performed in the June 1989 EPA Remedial Investigation and Feasibility Study, which included a review of regulations for consideration as potential ARARs, and documentation of selected ARARs in the ROD for OU3. The 1989 ROD for OU3 investigated whether radon associated with the uranium mill tailings operation might be influencing outdoor and indoor radon levels in the nearby subdivisions and concluded that the uranium mill and tailings embankments were not a significant source of radon. However, EPA continues to review outdoor radon monitoring data collected at the facility boundary. EPA also developed a Human Health Risk Assessment (HHRA) to provide information to support a determination of the protectiveness of the OU3 remedy. The final HHRA was published in December 2014. An EPA decision on the protectiveness of the OU3 remedy will be published in the next EPA five-year report scheduled for 2016.

**EPA Comment 3 on the 2012 updated CAP**
The radon emanation modeling that was done in October 1986 assumed that the radium content of the sands is 100 pCi/g; the actual amount is approximately 90 pCi/g. The radium content of the slimes is assumed to be 1,000 pCi/g; the actual amount is approximately 900 pCi/g. The emanation modeling then concludes that if the tailings sand are pushed over the tailings slime they would reduce the emission from the slime. It needs a cover of 15 feet of sand over the slime and then a final one foot cover of compacted soil to reduce the radon emission to levels much lower than the requirements of 40 CFR Part 61 subpart T of not exceeding 20 pCi/($m^2$ sec).

However, the actual flux measurements that were done in 2011 radon flux survey, reported 39 out of 65 measurements were higher than the standard of 20 pCi/(m 2 -sec) in the Large Tailing Pile (LTP) and 14 out of 35 measurements exceeded the standard in the Small Tailing Pile (STP). According to 40 CFR part 61 App B, Method 115, 100 radon flux measurements should be taken from each type of region. The two piles were considered to be as one pile. If the two piles are not connected they should be treated as separate piles and 100 radon flux measurement from each pile and region should be collected. Method 115 should be followed or the results would be invalid.

**NRC Response: below.**

**EPA Comment 4 on the 2012 updated CAP**
It was reported that three flux measurements (29, 17 and 4) had an average of 165.90 pCi/($m^2$-sec) and additional interim cover was placed over these areas to reduce the emission down to 36.8 pCi/($m^2$-sec) and thus reduce the total average to below the 20 pCi/($m^2$-sec).

Measurements need to be repeated from the top region of the LTP and at a minimum 100 measurements need to be made before concluding that the radon emission is below the standard as per method 115.

**NRC Response: to EPA comments 3 and 4 on the 2012 updated CAP**
NRC does not agree with these comments. The standards in 40 CFR Part 61 do not apply to the HMC site per the MOU with EPA (56 FR 55432, October 25, 1991). It should be noted that the majority of the STP is covered by evaporation ponds. In water covered areas, no measurements are required under EPA Method 115, as radon flux is assumed to be zero in such areas.

However, NRC agrees that the basis of HMC's radon flux measurement methodology should be described in the DRP, in particular, which methodology will be used to measure the radon flux from the final cover. This will be the subject of an NRC staff RAI to HMC.

**EPA Comment 5 on the 2012 updated CAP**
The evaporation pond on the STP was assumed to emit zero radon gas because it is covered with water. However, forced spraying of the evaporation water into the air would release radon into the atmosphere and this was not accounted for in the flux measurements for the STP.

Need to provide amount of water forced into air and daily schedule of spraying evaporation pond water into the air.

**NRC Response:**
Any radon emanating from spraying water from the evaporation ponds on top of the STP would not be considered flux from the pile and would not be measured as such. Radon in air is monitored at the site boundaries of the HMC site per the requirements of 10 CFR Part 20.

**EPA Comment 6 on the 2012 updated CAP**
Equilibrium factor between radon gas and its progeny. It was assumed that the equilibrium factor between radon gas and its progeny is 20 percent. The generally accepted equilibrium value is 40 percent. If an assumption is going to be made, it should be in accordance with the generally accepted value. If a site specific value of 20 percent will be used, then it has to be justified by actual measurements of the equilibrium factor between radon gas and its progeny on site and at the fence line. In March 2011, the EPA made the recommendation as part of the Remedy System Evaluation recommendations to demonstrate equilibrium by measurement.

**NRC Response:**
This recommendation is related to how Homestake currently calculates doses from operations. Related to this, NRC initiated a separate request for information by letter dated December 16, 2015 (ML15155B689) that asked, among other things, for a justification of the equilibrium factor used for these dose calculations. Homestake responded by letter dated January 19, 2016 (ML16033A407). The staff is currently reviewing the response.

**BVDA Comment 10 on the 2012 updated CAP**
The CAP summarizes the success of land treatment in Sections 5.3.5, and Section 6.3.5, based on the total amount of uranium and selenium retained in the soil column following spray irrigation. However, there is no discussion on the rest of the COCs, specifically molybdenum, sulfate, chloride, Total Dissolved Solids (TDS), nitrate, vanadium, thorium-230, and radium-226 and 228. Appendix G, Land Treatment, explains that uranium and selenium are considered the primary COCs for land treatment since they sorb significantly to soils and are accumulated in shallow soil intervals, while TDS, sulfate, and chloride are classified as secondary COCs because the very small amount of water that moves through the unsaturated zone can potentially result in measurable concentration increases in the local ground water. It should be noted that the remaining COCs (nitrate, vanadium, thorium-230, and radium-226 and 228) are not discussed in the CAP with respect to land treatment. Based on the information provided throughout the CAP, TASC [Technical Assistance Services for Communities] is concerned that focusing on the contaminant transport behaviors of only two COCs in soil may not address the contamination transport behaviors of other COCs.

Consequently, if the other COCs do not behave in a similar manner as uranium and selenium, the potential exists that the success of land treatment is not fully known and actually could be less if other COCs are not addressed. TASC recommends that the CAP justify why only a subset of COCs are discussed regarding the success of land treatment and explain why secondary COCs (TDS, sulfate, and chloride) and remaining COCs (nitrate, vanadium, thorium--230, and radium-226 and 228) would not impact the success rate of land treatment.

**NRC Response:**
The NRC agrees in part with the comment. The land treatment program was not regulated under HMC's NRC license but rather under the NMED discharge permit DP-200. The NMED discharge permit does not cover all of the constituents that are identified in the NRC license as groundwater protection standards.

In Section 9.7.3 of the 2013 DRP, HMC has committed to survey the land application areas to document the contaminant concentrations in the soil and verify that the levels are below the soil radiological clean-up criteria. However, this commitment does not address clean-up of non-radiological hazards, which is required by 10 CFR Part 40, Appendix A, criterion 6 (The NRC staff will submit RAIs to HMC for this missing information. If approved by license amendment, the commitments in the DRP become license conditions that must be met before license termination.

**BVDA Comment 21 on the 2012 updated CAP**
Section 5.3.5 Land Treatment, Page 5-9: The third paragraph states that ground water from all five aquifers is used in the land treatment program; ground water that does not meet the land treatment standards is blended with unimpacted water to dilute uranium and selenium concentrations in order to comply with these standards before land treatment application. However, over time uranium and selenium could continue to accumulate in soil, resulting in a new secondary source to ground water. TASC recommends that additional explanation be provided that explains how the accumulation of uranium and selenium in soil at land treatment areas will be addressed to avoid creating a secondary source to ground water.

**NRC Response:**
In Section 9.7.3 of the DRP, HMC commits to survey the land application areas to document the contaminant concentrations in the soil and verify that the levels are below the soil clean-up criteria. Soil with concentrations above the soil clean-up criteria will be removed and disposed of prior to license termination.