



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

January 31, 2006

Docket No. 04008980

License No. SMB-1541

Patricia Gardner
Chief, Bureau of Environmental Radiation
New Jersey Department of Environmental Protection
P.O. Box 415
Trenton, NJ 08625

SUBJECT: RESPONSE TO COMMENTS ON NUCLEAR REGULATORY COMMISSION
(NRC) STAFF DOSE ASSESSMENT OF THE HERITAGE MINERALS, INC.
(HMI) SITE IN MANCHESTER TOWNSHIP, NEW JERSEY

Dear Ms. Gardner:

This is in response to your letter dated October 28, 2005, forwarding the New Jersey Department of Environmental Protection (NJDEP) comments on the draft NRC staff dose assessment of the licensed portions of the HMI site. We considered your comments and have detailed our responses as an enclosure to this letter. Heritage Minerals, Inc. also provided comments on the dose assessment in a letter dated October 2, 2005. NRC response to those comments, along with the final staff dose assessment for the HMI site, are being provided as enclosures to an NRC Inspection Report. You will be provided a copy of the report and its enclosures upon its mailing.

Once you have had an opportunity to review these documents, we suggest a meeting between our agencies in continuation of efforts to mutually understand our respective regulatory requirements for site remediation and license termination regarding the Heritage site. Please contact Marjorie McLaughlin of my staff at 610-337-5240 with your availability.

Sincerely,

Original signed by Marie Miller

Marie Miller, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure:
NRC Staff Response to NJDEP Comments on Dose Assessment

P. Gardner

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cc w/enclosure:

Kent Tosch, NJDEP

Jill Lipoti, Ph.D., NJDEP

Jennifer Goodman, NJDEP

Michael Fressola, Mayor, Manchester Township, NJ

Edele Hovnanian, Hovnanian Industries

John Lord, Heritage Minerals, Inc.

Anthony Thompson, Esquire

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U.S. Nuclear Regulatory Commission (NRC) Region I
Responses to Comments Received
from the New Jersey Department of Environmental Protection (NJDEP)
on Staff Dose Assessment
for Unrestricted Future Use Scenarios Following License Termination
of the Heritage Minerals, Inc. (HMI) Site in Lakehurst, New Jersey

(Note: Comments are condensed)

NJDEP Comment 1

There does not appear to be an absolute account of the location of the former monazite pile and there is no comprehensive map showing all post-remediation sampling data. The naming of the sampling points is confusing, and the same sample identification numbers were used at different locations.

Region I Response

The former monazite pile describes the land area at HMI where the pile of licensed source material was stored. The pile was formed in 1989, when HMI first submitted its application for an NRC license, after an inspection identified that source material was being concentrated in the process waste. The location of the pile remained unchanged until September 2001, when the fence was removed, and the material excavated and shipped for disposal offsite. An NRC inspector observed the excavation, loading, and shipping of the material, as described in NRC Inspection Report 04008980/2001001 (ML023570327).

When the pile was shipped, Radiation Services, Inc. (RSI) (the decommissioning contractor at the time) removed the material using large excavating equipment (front end loader). This left a visible, recessed land area in the location where the pile had been. ENERCON Services, Inc. (ENERCON), the contractor who replaced RSI, considered the entire depressed area of land as being the footprint of the former monazite pile, and performed a walkover survey of this area, logging with a Global Positioning System (GPS). The GPS survey map was provided to NRC in a report titled, "Removal of Fugitive, Licensable Soil, Heritage Mineral, Inc.," dated June 26, 2003 (ML031960118). The map is drawn in units of feet, as was described to NJDEP in an email dated 10/31/05.

The NRC inspector assigned to HMI remained unchanged between 1998 - 2004. This inspector had observed the location of the pile when the material was still staged, observed the excavation and shipment of the material, and performed surveys of the footprint with ENERCON after the material was removed. This inspector reviewed the results of the soil samples and concurred with the location of the footprint as described by ENERCON in the 2003 map. Based on consistent NRC oversight of the HMI decommissioning activities and the fixed location of the pile, NRC staff is satisfied that the parameters of this licensed area are defined.

The sample numbering system at HMI is complex and reflects the need for further remediation after the licensee submitted its Final Status Survey (FSS). To address this concern, we have prepared the following sequential description of the surveys to provide an adequate reference

Enclosure

for each sampling location. The soil sample results used by NRC in the dose assessment constitute final condition surveys of the footprint. Fifteen samples were identified as representing the current condition of the footprint. Ten sample results were provided by ENERCON in the 2003 report referenced above. This sampling occurred after the first NRC confirmatory survey performed by the Oak Ridge Institute for Science and Engineering (ORISE) in December 2001 which had identified that source material concentrations in excess of the release limits remaining within the footprint, and additional licensable source material remaining in soil pockets outside of the footprint. The December 2001 ORISE survey was conducted to verify the FSS performed by RSI in 2001, which indicated that the monazite footprint met the release criteria. ORISE sampled soil locations that exhibited increased radiation levels as identified by a gamma walkover survey. In other words, the survey was biased-high. The sample locations were marked with flags, and numbered sequentially. In many cases, several samples were located in close proximity to each other. Before remediation of these locations was performed, HMI hired a new contractor, ENERCON. ENERCON performed their own walkover survey so that they could determine the rough surface areas of the increased activity identified by the samples. Where ORISE had marked off specific point locations, ENERCON expanded the points into two-dimensional areas. In so doing, multiple sample locations flagged by ORISE that had been located in close proximity to one another, were now replaced by larger footprint locations that encompassed them. The footprint locations were designated by ENERCON descriptions, which did not correlate to the ORISE nomenclature, and ENERCON did not specify or note which ORISE samples became incorporated into which ENERCON footprints.

The footprints were excavated in June 2003, and sample results from the excavations were provided in the referenced 2003 report. Two of the excavated footprints were located within the footprint of the former monazite pile, and soil samples were obtained by ENERCON at the bottom of each footprint (Sample IDs 17-10 and 17-11). ENERCON also obtained soil samples of the undisturbed soil within the monazite pile footprint that surrounded each excavation, obtaining one from each cardinal point (17-10N, 17-10E, 17-10S, 17-10W, 17-11N, 17-11E, 17-11S, 17-11W).

The 2003 report indicated that ENERCON had remediated the remaining material in excess of the release criteria within the monazite footprint and had also remediated the pockets of licensable soil outside the footprint. A second NRC confirmatory survey was performed in April 2003 (ML040250070). This survey was performed using the same methods as the earlier ORISE survey, and encompassed the mill pads, monazite pile area, and land surrounding these areas. Soil samples were again obtained at locations identified as having elevated radiation levels by a gamma survey meter. Soil sample locations were marked with flags, and were numbered sequentially. Because this was a new survey, with new soil sample locations, the sample identifications do not correspond to the identifications from the first ORISE survey. Three soil samples from within the monazite pile footprint met the NRC release criteria. The results from these three samples were used in the staff dose assessment, because they represent final status of those locations within the footprint. Because the locations were identified from a gamma walkover survey, they are biased-high, and therefore are conservative. These samples were identified in the ORISE report as Sample Nos. 36, 37, and 38.

This second confirmatory survey identified two locations within the monazite pile footprint that exceeded the release criteria (Sample Nos. 16/17 and 18/19 (samples in these locations were obtained at two depths at each location, resulting in two ID numbers for each)), and identified additional locations outside the footprint that exceeded the licensable levels for source material. As they had done previously, ENERCON performed a walkover survey to identify the surface area footprints encompassing the elevated sample locations to identify the areas that required additional remediation. These footprints were identified with a new numbering system (1-8), although ENERCON credited ORISE with finding the elevated concentrations by naming the footprints ORISE 1 - ORISE 8. Although the footprints include the word "ORISE" in the names, the IDs do not correspond to the numbering system used by ORISE in the identification of the pin point sample locations. These footprints were excavated in December 2004, and NRC inspectors performed side by side samples of the excavations with ENERCON. The results of the two NRC samples (NRC-04-07 and NRC-04-08) (ML050960038) were included in the dose assessment.

NJDEP Comment 2

The NRC did not include the pockets of licensable source material identified outside the footprint in its dose assessment. Soil within this buffer area with elevated thorium and uranium that did not meet source material concentrations are allowed to remain even though they are above the NRC's cleanup level of 10 pCi/g. What is the NRC's rationale for believing that these areas were not contaminated by licensable activities? A dose assessment of the buffer area results in over 500 mrem/yr. Would residential restrictions be put in place for these areas?

Region I Response

The HMI site contains both NRC-regulated material and state-regulated material. The NRC license issued to HMI in 1991 specified the extent of NRC jurisdiction at the site. This was addressed in a letter to NJDEP on 03/13/91 (ML010870190). NRC regulation of source material relates only to material exceeding the unimportant quantity concentration of 0.05% source material. The regulated source material was created through the mechanical processing of HMI property sands. The point at which licensed material was separated from the remaining sands was identified at a particular stage within the wet mill process. This material continued through the remaining stages of wet mill processing and then was processed in the dry mill (all stages). NRC required decontamination of the portions of the mill buildings that were impacted by the licensed material. The mill buildings and the monazite pile contained the only material licensed by the NRC at the site.

The original minerals processing that occurred at HMI also concentrated the natural thorium and natural uranium present in the native sands. NRC samples taken at various stages of the processing operation indicated that the feed material (waste material from early processing operations) contained 0.018% source material (which correlates to up to 40 pCi/g thorium). The leucoxene and zircon products obtained from the processing indicated source material concentrations of 0.014% and 0.035%, respectively (0.035% source material may contain over 78 pCi/g thorium). These materials were transported around the site and stockpiled and regraded continuously, as described in a process description submitted by HMI in November 2002 (ML051990142). The monazite waste, however, was conveyed to the storage area as a

slurry. NRC concurs with HMI that the elevated concentrations of source material identified around the mill buildings and the pile area are the result of regrading and transport of non-licensed sands from other stages of the processing operation.

The NRC confirmatory surveys performed by ORISE in 2001 and 2003 identified soil samples in these surrounding locations with source material concentrations in excess of the unimportant quantity of 0.05%. HMI contended that the samples were localized areas where non-licensed sands had been regraded and/or staged, and enough had built up to exceed the unimportant quantity concentration. NRC agreed that this was likely the case, and that the elevated samples were not from the monazite waste stream covered by the NRC license. Because of this, NRC did not amend the HMI license to add the material in these soil locations. However, because the concentration of source material in several locations exceeded the unimportant quantity exemption, they were deemed to be "licensable", and NRC staff determined that the locations should be remediated before terminating the license. NRC required HMI to decontaminate the licensable material (i.e. any soil locations with source material concentrations exceeding 0.05%) to meet the approved cleanup criteria, even though NRC concurred that these locations were contaminated with state-regulated material, as with the material in the blue and the gray areas.

Although the soils containing licensable material within this buffer zone were removed, state-regulated material remains in place both there and around the HMI site. Samples taken by ORISE (at the locations exhibiting dose rates above background) ranged from <0.001% to 0.047% concentration of source material. The average source material concentration from such samples is approximately 0.013%.

NRC did not include the soil sample results from the buffer zone in its dose assessment (neither the post-remediation results from the licensable material locations nor the as-left results indicating the presence of state-regulated material, as described above). The dose assessment only considered the dose to the average member of the impacted group from residual radioactivity within the portion of the HMI site licensed by the NRC. The NRC only licensed the source material within the monazite pile and the wet mill and dry mill equipment and buildings. Termination of the NRC license and release of the site for unrestricted use also only considers these locations. NRC agrees that there remains at the HMI site a potential significant dose impact from the state-regulated material remaining within the buffer zone and in the blue and gray areas. Although NRC staff have not performed a formal dose assessment within these areas, it is evident, if only through linear extrapolation, that the average dose in some locations exceeds 100 mrem/yr.

The unimportant quantity exemption in 10 CFR 40.13 allows any person to receive, possess, use, transfer, or deliver source material that is less than 0.05% by weight without an NRC license. The existence of elevated concentrations of source material, such as the state-regulated material remaining at HMI is possible in any location. This type of material was present at HMI before NRC-licensed material was created. Termination of the NRC license does not preclude or inhibit the state regulation of the site. HMI has communicated to NRC that it is required and intends to remediate the entire site to New Jersey cleanup criteria. In a letter to NRC dated June 30, 2004, they state, "Since HMI is currently bound by the above-stated ACO (Administrative Consent Order) to 'investigate and cleanup' all contaminants at the site,

including radionuclides, which will require it to satisfy New Jersey's 15 mrem/year standard to release the property for *unrestricted* use, including the planned construction of residential dwellings at the site. . . ." (ML041910222). HMI has provided to NJDEP its proposed remediation plan for the state-regulated material (SENES Pathways Analysis and Remediation Planning for ASARCO/HMI Site, February 2002), which included "the 'Mill Vicinity' area where slightly elevated levels of naturally occurring radionuclides are present due to the use of overflow materials from the milling process for site grading" (ML041910222).

NRC termination of the HMI license acknowledges that the NRC-regulated material has been removed and the required portions of the site have been remediated to the cleanup criteria. NRC concedes to the state's authority for the regulation of the remaining material.

NJDEP Comment 3

The soil sample results seem to be questionable. ENERCON underestimated the results for seven out of fifteen of the 'split' samples with the NRC. The laboratory used by ENERCON is not certified by the State of New Jersey so we cannot attest to the accuracy of these results. Ten of the fifteen sample results used in the NRC dose assessment were values provided by the laboratory used by ENERCON.

Region 1 Response

ENERCON sent all HMI soil samples to American Radiation Services, Inc (ARS) in Port Allen, Louisiana for analysis. ARS is accredited under the National Environmental Laboratory Accreditation Program (NELAP) by the states of Florida and Louisiana. The current listing of NELAP-accredited laboratories may be viewed from the U.S. Environmental Protection Agency's (EPA) website at the following address: <http://www.epa.gov/nelac/nelap.html>. ARS participates in the U.S. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP) for radiological soil analysis. The results from the most recent study may be viewed at the following website: <http://www.inel.gov/resl/mapep/reports.html>. ARS analyzed the HMI soil samples by gamma spectroscopy utilizing the process described in the EPA's Environmental Monitoring and Support Laboratory Procedure 901.1. NRC staff found no areas of concern with ARS's accreditation or quality control. The samples that were obtained during December 2004 / January 2005 were not mixed and then split between HMI and NRC, nor did HMI and NRC analyze each other's samples. The samples were taken side by side to provide reasonable verification of the results. Although the analyses did not yield identical values, NRC staff has determined the variations to be within an acceptable range.

NJDEP Comment 4

Because of the questionable location of the footprint of the former monazite pile, we believe that a buffer zone should be included in determining whether to release this area for unrestricted use.

Region I Response

As noted in our response to Comment 1, we believe the footprint of the monazite pile to have been adequately defined. NRC has required HMI to remove the material authorized by its license, and this has been accomplished. The processing activities that resulted in HMI requiring an NRC license produced 1400 tons of licensed source material. As a result of the decommissioning activities performed to meet the NRC cleanup requirements in their approved License Termination Plan, HMI has disposed of 4246 tons of soil. The scope of cleanup performed by the licensee, together with the multiple rounds of surveys and sampling data, provide confirmation that all NRC-licensed material has been removed from the site. Additionally, NRC requiring HMI to remediate soil pockets containing licensable material resulted in the removal of soil beyond what was originally licensed. The scope of decommissioning at this site required for the federally-regulated material is complete, pending Commission approval. As stated previously, decommissioning of the state-regulated material at the site is the stated, intended next step planned by the licensee, and is required by NJDEP regulations. Accordingly, we do not see a basis for a buffer zone around the footprint of the monazite pile.

NJDEP Comment 5

We find that the dose assessment was performed properly using acceptable models. The results are above NJDEP's dose criterion of 15 mrem/yr and the NRC criterion of 25 mrem/yr. New Jersey cannot agree to an unrestricted release of the NRC licensed areas.

Region I Response

Although the NRC-licensed area at the Heritage site does not meet the 25 mrem/yr dose criterion of the License Termination Rule (LTR), as a former-SDMP site, in accordance with 10 CFR 20.1401, it is grandfathered from this requirement. Heritage was required to comply with the decommissioning activities described in their approved Decommissioning Plan, which met the license termination criteria in effect at that time. The staff has concluded that Heritage has completed these activities. Under the Comprehensive Decommissioning Management Plan, Complex Sites such as Heritage are evaluated against the LTR when being considered for release for unrestricted use. A dose analysis is performed, and if the LTR is not met, Commission approval must be obtained prior to termination of the license and release of the site for unrestricted use. NRC staff is preparing a SECY paper requesting Commission approval to terminate the HMI license and release the site for unrestricted use. The staff will assure that the Commission is informed of NJDEP's view on this case.