

September 27, 2004

Mr. Thomas Gieck, Remediation Manager
Umetco Minerals Corporation
P.O. Box 1029
Grand Junction, CO 81502

SUBJECT: THE UMETCO MINERALS CORPORATION'S FINAL STATUS SURVEY
REPORT FOR THE GAS HILLS URANIUM MILL SITE, SUA-648 (TAC LU0040)

Dear Mr. Gieck:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the Final Status Survey Report (Report) submitted by Umetco Minerals Corporation's (Umetco) letter dated October 27, 2003, additional information (Addendum 1) dated April 16, 2004, and the revised Report Volume 1 and text of Addendum 1 dated September 2, 2004. As stated in our acknowledgment e-mail dated November 18, 2003, data for several areas are missing from the Report because these areas could not be surveyed this calendar year. As indicated in the enclosed Technical Evaluation Report, the staff determined that the partial report adequately demonstrates compliance with the applicable regulations for the areas addressed. The staff intends to perform a confirmatory survey of remediated areas during a site visit on October 13, 2004.

Umetco will provide the required additional data as an Addendum to the Report when the A-9 Repository, C-18 Pit, and Pond 2 covers are complete, per the commitment contained in your letter dated January 26, 2004. The NRC staff review of this data will be documented in a letter to Umetco. Both that letter and this one should be referenced in the Construction Completion Report.

If you have any questions concerning this letter or the enclosure, please contact Ms. Elaine Brummett of my staff at (301) 415-6606 or via e-mail to esb@nrc.gov.

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

Sincerely,

/RA/

Gary S. Janosko, Chief
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Docket No.: 40-0299
License No.: SUA-648

Enclosure: Technical Evaluation Report for Status Survey

cc: M. Moxley, DEQ WY

September 27, 2004

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cc: M. Moxley, DEQ WY

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DATE	9 /23/04		9/24/04		9/27/04		9/27/04	

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**TECHNICAL EVALUATION REPORT FOR
UMETCO MINERALS CORPORATION'S
STATUS SURVEY REPORT
FOR THE
GAS HILLS URANIUM TAILINGS SITE**

Docket No.: 40-0299 **License No.:** SUA-648

DATE: September 21, 2004

FACILITY: Umetco Minerals Corporation - Gas Hills Uranium Tailings Site, Wyoming

TECHNICAL REVIEWER: Elaine Brummett

PROJECT MANAGER: Elaine Brummett

SUMMARY AND CONCLUSIONS:

By letter dated October 27, 2003, Umetco Minerals Corporation (Umetco) submitted the "Final Status Survey Report" (Report) to demonstrate that one of the requirements under 10 CFR 42(j)(2) has been completed as a step in termination of the license. The Nuclear Regulatory Commission (NRC) staff noted on November 18, 2003, that the submittal was a partial report as it did not contain all the pertinent radiological information. A short part of the A-9 haul road, and the A-9 Repository and Pond 2 covers cannot be surveyed until reclamation is complete.

The NRC staff completed the review and requested additional information by letter dated December 31, 2003. The Umetco response and Addendum 1 to the Report were submitted by letter dated April 16, 2004. Page changes for Volume 1 of the Report and Addendum 1 were requested by staff on July 22, 2004, and the revised text was provided on September 2, 2004. Based on review of these documents and inspection records, the staff has determined that the final status survey essentially complies with the approved survey plan, and that the Report documents that radiological conditions meet the requirements for the areas addressed.

BACKGROUND:

The Umetco Gas Hills site is located in a remote area of central Wyoming, in Fremont and Natrona Counties, approximately 60 miles east of Riverton. The restricted area of the site consists of approximately 542 acres, of which Umetco owns 280 acres and the rest is under the jurisdiction of the U.S. Bureau of Land Management. The mill was constructed in 1959 and was shut down in 1984. Mill building decommissioning was completed in 1993.

Enclosure

The Umetco site soils were contaminated with mill tailings and mill solutions that are regulated under 10 CFR Part 40, as byproduct material. In 1993, Umetco performed soil cleanup on 4 acres north of the restricted area, using a background radium (Ra-226) value of 2.2 pCi/g and procedures required by License Condition 30.B. Reports on additional soil contamination and proposed revisions to the Ra-226 background value were submitted in 1996, 1999, and 2000, and the NRC staff provided comments. Background Ra-226 and uranium values are difficult to quantify because the site is on land containing natural deposits of uranium, open pit uranium mines are on and adjacent to the site, and the Wyoming Abandoned Mines Program has used mine overburden (spoils) to fill some adjacent open pit mines so that surface soil contains up to 20 pCi/g Ra-226.

The North and South evaporation ponds are mentioned in Addendum I, but data is not included in the Report because the NRC approved the remediation plan and radiological data for this area on December 9, 1999 (Amendment 42). The plan stated that pond sludge and the upper clay liner were removed and borehole data and geochemical studies indicated that mine spoils (overburden soil containing naturally occurring uranium and radium that was excavated from the mine pit areas) were beneath the liner, so no further remediation was required.

Three revised documents (Background Characterization Report, Final Status Survey (FSS) Plan, and the East Canyon Creek Risk Assessment) were submitted by Umetco on September 15, 2000. Additional clarification was provided by Umetco's letter of November 17, 2000. The NRC staff approved the FSS Plan, and the "no action" alternative for East Canyon Creek (including the part of Carbide Draw north of the county road) on April 5, 2001. The Quality Control Program was provided by Umetco on August 14, 2000, indicating that 5 percent of the soil samples are to be sent to an outside laboratory as quality control samples. The draft procedures were reviewed with the FSS Plan and the final versions were reviewed during the July 2002 NRC inspection.

The Report addressed soil cleanup in Pond 1 (11 acres), the northern Windblown Area (111 acres surveyed and about 70 acres impacted), the DW-6 process water pipeline (3 miles long), Carbide Draw between the tailings dam and the county road, and three small trash pits. The volumes of soil removed and placed in the A-9 Repository during remediation are: Pond 1 - 30,000 cubic yards (cy), windblown area - 4,950 cy, pipeline trench - 18,338 cy, and Carbide Draw - 6,324 cy, for a total of 59,680 cy.

The Report also contains the gamma exposure survey data on the covers of the Above Grade Tailings Impoundment (AGTI) and Heap Leach Area (200 acres) to demonstrate compliance with Part 40, Appendix A, Criterion 6(1). Umetco indicated by letter dated January 26, 2004, that the required gamma exposure rates on the A-9 Repository, C-18 Pit, and Pond 2 covers, and data for a portion of the A-9 haul road will be provided as Addendum 2 and Addendum 3 to the Report after cover construction and road cleanup are completed.

TECHNICAL EVALUATION:

The NRC staff evaluated the Report for compliance with the approved FSS Plan and 10 CFR Part 40, Appendix A, Criterion 6(6) for soil cleanup. The impoundment covers were evaluated for compliance with the portion of Criterion 6(1), which states, "Direct gamma exposure from

the tailings or wastes should be reduced to background levels.” This review was also performed to determine if the Report complies with 10 CFR 42(j)(2) in providing a radiation survey demonstrating that the site is suitable for release. To support this determination, the site was inspected and soil decommissioning activities were observed by an NRC inspector on July 31, 2002.

Building Cleanup

The FSS Plan indicated that the only building in the restricted area is a mobile soils laboratory and that it will be disposed in the tailings disposal cell when site reclamation is complete. However, the Report (page 4) stated that the laboratory will be surveyed and released. In response to NRC comment 2, the Addendum indicated that two laboratory trailers are on site. Umetco indicated that the newer trailer, Soils Lab A, should meet release criteria for unrestricted use, considering the trailer as a piece of equipment that will be moved off the site. The older trailer is presumed to be heavily contaminated and would be demolished and placed in the A-9 Repository.

Soil Criteria

The Windblown Area (north of the AGTI) has an approved Ra-226 soil background value of 6.1 pCi/g. Uranium/radium deposits were known to exist north of, and in, this area. The FSS Plan indicated that the other cleanup areas are adjacent to or within mining areas and that the site-wide background value of 10 pCi/g Ra-226 would apply.

Petroleum Cleanup

During the 2002 excavation of the north end of Pond 1, a petroleum odor was detected in the area of the former mill solvent catchment basin. This area was excavated an additional 6 feet until the odor was no longer detected. Later, five soil samples were analyzed for total petroleum hydrocarbon content because records indicated that a kerosene spill was the likely source of the contamination. The kerosene was used in the uranium recovery process so the contaminated soil is byproduct material, but the NRC has no cleanup limits for kerosene. Since kerosene is a Diesel Range Organic (DRO), the Wyoming cleanup standard for DRO of 100 mg/kg was used. None of the post-excavation samples exceeded 10 mg/kg.

Equipment and Procedures

The primary gamma survey method utilized a collimated (2 by 2-inch NaI crystal) detector, mounted on an all terrain vehicle, 12 inches above the land surface and coupled to a global positioning system. This and other equipment used in the final status survey appear to be as described in the FSS Plan. The procedures listed in Table 3.2 of the Report were reviewed during an NRC inspection in July 2002.

Radium-Gamma Correlation and Gamma Guideline

The initial radium-gamma correlation was submitted to the NRC by letter dated August 6, 2001. The staff provided approval with two conditions that Umetco addressed in Section 3.0.2 of the

Report. Appendix C-3 of the Report provided data from 150 soil samples that Umetco used to establish a revised gamma-radium correlation after excavation. Umetco did correlations for each meter used, and separate correlations for the Windblown Area and Pond 1.

The new correlations have low strength, but various data manipulations and evaluations were performed by Umetco to justify the gamma guideline used. Considering the data, site conditions, and the additional excavation in certain areas to assure soil cleanup, the gamma guideline appears adequate.

Quality Assurance

According to page 14 of the Report, all Pond 1 soil samples were shipped to an outside laboratory for analysis of Ra-226, Th-230 and U-nat. Five percent of the samples from the Windblown Area were also sent outside for confirmatory Ra-226 analysis. A portion of each sample was archived for potential future confirmatory analysis by the NRC. Data collection and management procedures were discussed in Appendix A of the Report. The quality assurance aspects of the decommissioning process were apparently followed per commitments in the FSS Plan.

Remedial Efforts

In August 2000, the Pond 1 liner was removed with other materials. A gamma survey and soil sampling in 2001 provided data for 383 (100 m²) grids. Twenty grids with the highest gamma levels and samples from three test pits were analyzed for U-238 and Th-230 in addition to Ra-226. After a geochemical investigation (including chemical, mineralogic (X-ray diffraction) and petrographic analysis plus geochemical modeling), additional excavation and gamma surveys were conducted in May 2002. Of the geochemical test pits, three apparently were impacted by pond solution. Three to four feet of material in the northern section were indicated for removal but Umetco removed up to 6 feet of material to be conservative. Also, the pipeline trench was excavated several feet below the visible tailings, the southern portion of Carbide Draw was excavated to bedrock, and the trash pits were excavated 1 to 3 feet below the level of the trash.

Survey Results

Since Pond 1 was constructed on mine overburden, the gamma readings in some spots were higher after excavation. The average Ra-226 increased from 17 to 19 pCi/g after more soil removal (spots excavated to 10 feet deep). The final survey encompassed 4400 grids and provided 55,566 data points. According to Figure 5.15 in Volume II of the Report, 383 grids were surveyed and 5.8 percent were above the 25 pCi/g subsurface Ra-226 standard in the northern end of the Pond. The highest estimated value was about 40 pCi/g. The backfill will be over one foot in depth for this area as well as the pipeline trench and the trash pits.

For the Windblown Area, over 235,000 gamma data points were obtained for 4400 grids and 403 grids (9 percent) failed to meet the Criterion 6(6) surface soil Ra-226 criterion. The pipeline trench results indicate that Ra-226 estimates for the majority of the 233 grids are

well below the 25 pCi/g standard. Only 10 grids exceed this standard and these are adjacent to the B-5 Pit. The maximum grid value was 30 pCi/g and likely reflects mining residue, not NRC licensed material.

Carbide Draw south of the county road (Dry Creek Road) was excavated to bedrock so further cleanup in this area is not realistic. The highest estimated Ra-226 grid value was 14.3 pCi/g which meets the 15 pCi/g site surface criterion.

The trash pits were located in mine spoils areas adjacent to the north end of the North Evaporation Pond and in the B-Spoils Area just south of the AGTI. Gamma scans were generally within background ranges. Only pit #3 had elevated Ra-226 levels. Soil samples analyzed for Ra-226, Th-230, and U-nat demonstrate that the U-nat values are similar to the levels of the two other radionuclides so the soil samples likely represent native material. Byproduct material would have low U-nat levels compared to the other radionuclides in the uranium decay chain.

The Report indicated that for four areas; the northern portion of Pond 1, some grids in the Windblown Area, the pipeline trench next to the B-5 Pit, and trash pit #1, cleanup of byproduct material uncovered uranium and radium mineralization (naturally occurring radioactive material (NORM)). Thus some spots had higher gamma levels after remediation than before soil removal. These NORM areas contain natural uranium deposits or uranium mine pit overburden with the same radionuclides (uranium (U-nat), Ra-226, and thorium (Th-230)) as the byproduct material and are very difficult to distinguish from tailings contaminated soil. Umetco had several procedures in the Survey Plan to make this distinction. Umetco found at the beginning of the final survey that these natural deposits were more extensive than previously indicated. In September 2003, Umetco used a germanium detector to better distinguish the areas containing byproduct material from NORM. No compelling differences were found. Any remaining byproduct material is indistinguishable from the immediate area background radiation.

The Addendum requested and justified an alternate soil criterion of "no further remedial action" for the four specific areas mentioned above. This was done based on the NRC staff's suggestion in the December 2003 request for additional information. On reviewing the recent data, staff has determined that alternate criteria are not needed. Since the four areas are essentially at local radiation background levels, and the presence of byproduct material can not be confirmed, Criterion 6(6) has been met.

In addition, Umetco requested approval of an alternate procedure for verification of compliance because the pipeline and trash pits were not surveyed or soil sampled by 100 m² grids as required by Criterion 6(6). The configuration of a deep narrow trench and trash pits created geometry problems for gamma detectors and the over excavation and visual inspection assured Umetco of byproduct material removal. Umetco did some soil sampling in the impacted area that was composited over 150 m² areas of the pipeline. To provide data by 100 m² grids, Umetco used geo-spatial estimation computer tools and gamma survey values. Several soil samples and gamma readings were obtained for each trash pit. Given the data provided, and considering the B-5 Pit as a local reference area for NORM, the staff considers that the procedures are adequate for these areas.

Impoundment Cover Radiation Levels

The average exposure rate measured on the earthen covers of the AGTI and the Heap Leach was 27 uR/hr, therefore, the gamma levels comply with the approved limit of 30 uR/hr. The potential dose is very low and the radiation levels on the Umetco site are comparable to the surrounding area.

CONCLUSIONS:

The staff determined that the approved Plan verification procedure was not followed for all areas, but that the procedures used for the pipeline trench and trash pits provided adequate data. The minor deviations from the FSS Plan do not impact health, safety, or the environment. The Report provides reasonable assurance that the areas addressed meet applicable criteria and are suitable for release based on the level of licensed material remaining.