

**SAFETY EVALUATION REPORT
REVISION TO APPENDIX M, GROUNDWATER MONITORING
PLAN OF THE ALTERNATE CONCENTRATION LIMIT APPLICATION
UMETCO MINERALS CORPORATION EAST GAS HILLS, WYOMING**

DOCKET NO.: 40-0299

LICENSE NO.: SUA-648

LICENSEE: Umetco Minerals Corporation

FACILITY: Gas Hills, Wyoming

TECHNICAL REVIEWERS: Matthew Meyer, Dominick Orlando

PROJECT MANAGER: Dominick Orlando

1.0 SUMMARY AND CONCLUSIONS

By letters dated June 9, 2011, and September 28, 2011, (Agencywide Document Access and Management System (ADAMS) Accession Numbers ML11161A144, ML11273A032) Umetco Minerals Corporation (Umetco) submitted, to the U.S. Nuclear Regulatory Commission (NRC), requests to modify the sampling locations, frequency, and parameters at its former uranium mill site in the East Gas Hills region of Wyoming. Specifically, Umetco requested revisions to the sampling locations contained in Appendix M, Groundwater Monitoring Plan of the Alternate Concentration Limit (ACL) Application, revised on June 17, 2005 (Umetco, 2005) to eliminate the sampling locations at well PW4 and the Iron Spring; to reduce groundwater sampling from a semi-annual to an annual basis; and to eliminate iron and gross alpha from the list of lower detection limits for water quality analysis. Based on discussions with NRC and Wyoming Department of Environmental Quality staff, on October 31, 2011 (ADAMS ML113050552), Umetco revised their request and stated that they would continue to sample the Iron Spring location. Umetco also corrected inconsistencies in the sampling frequency in their proposed revision to Appendix M.

Based on the license amendment request, Umetco has demonstrated that the removal of sampling location PW4 will not reduce the ability to monitor for off-site releases given the numerous sampling locations down-gradient of the tailings impoundment, which would adequately monitor future plume migration. Also, a reduction to groundwater sampling from semi-annual to annual is found to be acceptable due to the lack of temporal variability between sampling events from 2003 to 2010. The staff finds Umetco's proposal to be acceptable and in accordance with 10 CFR Part 40, Appendix A, Criterion 7, and the Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act (U.S. NRC, 2003).

NRC staff discussed Umetco's requests to eliminate the sampling and monitoring of well PW4 and the Iron Spring with the Wyoming Department of Environmental Quality (WYDEQ). By email dated October 3, 2011, WYDEQ staff stated that the elimination of the Iron Spring sampling location was not desirable as it was an important environmental sampling location

(ML112790252). Staff discussed the WYDEQ comment with Umetco on October 4, 2011, and by letter dated October 31, 2011, Umetco stated that they would continue to sample Iron Spring.

License Condition 35 should be revised as requested in the June 9, 2011, amendment request, as modified by the October 31, 2011, letter, to remove sampling location PW4 and to reduce sampling from semi-annual to annual.

During a site inspection on September 20, 2011, NRC staff identified several conditions in Umetco's license that were not consistent with the sampling program discussed in Appendix M - Groundwater Monitoring Plan, for the Alternate Concentration Limits (ACLs) as approved by License Condition 48. These were the inclusion of lower detection limits for iron in License Condition 35D and a requirement to demonstrate gross alpha limits in License Condition 35E. As neither of these conditions are included in the approved ACL Monitoring Plan, NRC staff determined that they may be eliminated. This was discussed with Umetco staff during the inspection.

2.0 BACKGROUND

2.1 Site History

Uranium milling was conducted at the Umetco site from 1960 to 1984 and the mill has been decommissioned. From 1960 until 1979 uranium mill tailings were placed in the Above-Grade Tailings Impoundment (AGTI) and from 1979 to 1984 tailings were placed in the A-9 Repository. The AGTI has been structurally stabilized and an engineered cover placed over it. The AGTI was constructed without a bottom liner, while the A-9 Repository, constructed in a former open-pit mine, has a bottom liner (3 feet of compacted clay), but no side liner. Consequently, water and tailings solution from both disposal areas migrated into the underlying groundwater. Uranium was mined from open pits in the Wind River Formation groundwater up-gradient, cross-gradient, within, and down-gradient of the Umetco facility. These mines were developed by several different companies and involve approximately 684 acres. They have impacted the groundwater quality as surface and groundwater has flowed through the open pit mines, mine spoils, and backfilled reclaimed pits.

The Umetco mill site is located within the Canyon Creek drainage, a sub-basin of the Wind River Surface Water Basin. With the exception of manmade impoundments for evaporation ponds, there are no perennial surface water bodies in the vicinity of the Umetco site. Consequently, any surface water drainage from the site is into ephemeral streams (U.S. NRC, 2002).

2.2 Description of Amendment Request

The Umetco East Gas Hills site contains two reclaimed disposal areas; the AGTI and the A-9 Repository. The license establishes separate groundwater sampling locations for each area. Sampling location PW4 provides early detection monitoring of boundary conditions within the southwestern flow regime plume and the Iron Spring location provides the closest surficial discharge point for groundwater migrating from the site in the western flow regime.

The license amendment request, as modified by Umetco's October 31, 2011, letter, requests a revision to Appendix M, Groundwater Monitoring Plan of the ACL Application to remove

sampling location PW4 as a compliance monitoring location. The request also proposes to reduce groundwater sampling from semi-annual to annual.

License Condition 35A requires Umetco to conduct monitoring as described in the Groundwater Monitoring Plan (ACL Application, Appendix M, January 5, 2004). The license amendment request indicates that the reduction of sampling locations for both the southwestern flow regime and the western flow regime would not hinder early detection of plume migration.

In its June 9, 2011 request Umetco proposed the following modifications (underlined/strike through) to License Condition 35:

The Alternate Concentration Limits (ACL) for groundwater contained in Umetco 's application dated May 11 and May 18, 2001, as revised by submittals of July 30, 2001, December 3, 2001 and March 4 and October 2, 2002, and June 17, 2005, and June 9, 2011, have been approved for this site. The licensee shall implement a groundwater compliance monitoring program that includes the following.

A. Conduct monitoring as described in the Groundwater Monitoring Plan (ACL application, Appendix M) in the January 5, 2004, submittal, as revised by the submittal dated June 9, 2011. The validation of ACL exceedance will be in accordance with Section 4 of Appendix M. The licensee shall submit this monitoring data to the NRC by September 30th of each year and include groundwater contour maps, contamination iso-concentration maps and trend graphs.

However, based on discussions with WYDEQ and NRC staff, on October 31, 2011, Umetco revised their request and stated that they would continue to sample the Iron Spring location. Their revision also corrected several inconsistencies in the frequency of the sampling described in the June 9, 2011 request.

3.0 TECHNICAL EVALUATION

3.1 Hydrogeology

The Umetco site is located in the Wind River Basin of Central Wyoming. The Wind River Basin is a large sediment filled, northwest-trending structural depression that was formed as a result of Late Cretaceous and Early Cenozoic tectonic activity. The Wind River Formation was formed from the deposition of alluvial fans, stream channels, flood plains, lakes, and swamps and is comprised of alternating and discontinuous layers of sandstone, siltstone, claystone, and conglomerate. Thickness ranges from a few feet near the basal margin to several thousand feet in the northern part of the basin. Beneath the site, the Wind River Formation is approximately 91.4 m (300 feet) thick.

Uranium occurs naturally in the Wind River Formation as roll-front deposits at the interface between oxidized and reduced rock. This deposit occurs in the Gas Hills in a section approximately 8 km (5 miles) wide by 32 km (20 miles) long in three north-trending belts.

Groundwater, for the purposes of compliance by Umetco, occurs in two flow regimes of the Wind River (upper) aquifer. The shallowest groundwater beneath the A-9 Repository is defined as the Southwest Flow Regime (SWFR) and includes the upper portion of the Wind River Formation. This regime is characterized by more oxidizing conditions. The Western Flow

Regime (WFR) is characterized by deeper, more reducing conditions. A mudstone unit separates the two flow regimes. In the vicinity of the site, groundwater is constrained by pre-Wind River deposits made up of granite, gneiss, and schist. East of the site, groundwater pinches out against these deposits. Regional groundwater flow is toward the northwest, with a western component north of the site. Groundwater flows toward the Pathfinder Lucky Mc Uranium Mill site (Source Materials License SUA-672) which is located 8 km (5 miles) from the Umetco site.

Natural widespread ambient contamination and mill-related impacts are limited to the uppermost occurrence of groundwater where oxidizing conditions predominate. As mentioned earlier, uranium was mined from open pits in the Wind River Formation up-gradient, cross-gradient, within, and down-gradient of the site. Geochemical processes related to mining and reclamation have affected groundwater quality because oxygenated surface water has percolated through open-pit mines, mine spoils, and backfill materials dissolving previously reduced minerals such as uranium and radium (U.S. NRC, 2002).

3.1.1 Monitoring Location PW4

Monitoring well PW4 is a non-Point-Of-Compliance (POC) well and is used to provide early detection monitoring of groundwater plume migration within the Southwestern Flow regime plume. PW4 is located approximately 200 feet from POC wells GW7 and GW8 within the Southwest Flow Regime and is only monitored for chloride, sulfate, and natural uranium (Umetco, 2002).

3.1.2 Monitoring Location Iron Spring

The Iron Spring is located approximately 10,000 feet from the AGTI and approximately 6,000 feet from the long-term care boundary. This is the closest surficial discharge point for groundwater migrating from the site. The Iron Spring is named for the natural precipitation of iron it produces. Water discharging from the Iron Spring had pH values of 3.9 in 1954 before mining began, indicating naturally-occurring acidic conditions associated with the oxidation of uranium minerals. Groundwater modeling performed during ACL evaluations indicated that no significant impacts to water quality will result from site derived constituents at the Iron Spring (Umetco, 2001). Umetco revised its request to discontinue sampling Iron Spring on October 31, 2011, and now agrees to continue sampling and analyzing Iron Spring.

3.1.3 Finding

The NRC staff has reviewed the proposed revisions to Appendix M, Ground Water Monitoring Plan of the ACL Application which deletes sampling locations PW4 and the Iron Spring. The review included an evaluation of temporal and spatial concentration data to determine if these monitoring locations were providing useful or pertinent information.

On October 3, 2011, NRC staff discussed Umetco's request with staff from the WYDEQ. WYDEQ staff stated that they agreed with Umetco's request to eliminate well PW4 as a sampling location and that annual sampling was acceptable. However, WYDEQ staff indicated that they believed that the Iron Spring location should continue to be sampled as it was an important environmental sampling location. On October 3, 2011, WYDEQ provided their input via email and restated their conclusion regarding the Iron Spring sampling location

(ML112790252). NRC staff discussed the WYDEQ concern with Umetco staff on October 4, 2011, and by letter dated October 31, 2011, Umetco modified their June 9, 2011, request to discontinue sampling the Iron Spring sampling location.

The NRC staff review determined that concentration trends for chloride, sulfate, and natural uranium at POC monitoring wells GW7 and GW8 are consistent with concentration trends seen at PW4. The close proximity of PW4 to POC wells GW7 and GW8 has been determined to provide duplicate data and is therefore not considered useful or pertinent information and should be removed from groundwater monitoring plan. Furthermore, monitoring well MW82 was installed during the spring of 2002 and is further down-gradient of GW7, GW8, and PW4. MW82 is used monitor contaminant migration toward the long-term care boundary and to validate groundwater model predictions within the SWFR (Umetco, 2002a; 2002b; 2005).

The staff finds Umetco's request for the removal of monitoring location PW4 to be acceptable and finds that the revised groundwater monitoring locations would adequately monitor future plume migration and assure protection of human health and the environment.

3.2 Sampling Frequency

As required by Table M-1 of Appendix M (Umetco, 2005) to the 2001 ACL application, POC wells MW21A and GW7 and non-POC wells MW164, MW70A, MW25, MW71B, MW28, MW77, MW72, and MW82 are sampled semi-annually for natural uranium, sulfate, and chloride. The non-POC and POC monitoring wells previously mentioned were selected to provide early detection of any future down-gradient or vertical contaminant migration and/or to verify groundwater flow and geochemical modeling results presented in the 2001 ACL application.

3.2.1 Finding

The NRC staff have reviewed Umetco's request to reduce groundwater sampling from semi-annual to annual. The review included an evaluation of all non-POC and POC wells currently being sampled semi-annually for natural uranium, sulfate, and chloride. Constituent concentration trends were reviewed from June 2003 to June 2010 (Umetco, 2010) to determine if a reduction in sampling frequency would result in the inability to detect increasing constituent levels or down-gradient contaminant plume migration. Concentration data for the three constituents show that semi-annual results remain relatively consistent with each other, which indicates that temporal variability does not significantly influence sampling results within the same year.

The NRC staff has determined that Umetco's proposal to reduce the sampling frequency from semi-annual to annual will not influence the ability to detect increasing constituent levels or down-gradient contaminant plume migration. The NRC staff finds Umetco's request that the sampling frequency be reduced from semi-annual to annual to ensure optimization and efficiency to be acceptable.

3.3 Administrative Changes

During a site inspection on September 20, 2011, NRC staff identified several license conditions (35D and 35E) that were not consistent with the ACL Application for Alternate Concentration

Limits for Gas Hills, Wyoming, Appendix M - Groundwater Monitoring Plan (ML020670552). Specifically, a lower limit of detection for iron is included in License Condition 35D and an ACL limit for gross alpha is included in License Condition 35E. However, these parameters are not included as ACLs in Appendix M – Groundwater Monitoring Plan. During the inspection, the NRC staff indicated that Umetco should request that their license be amended to remove these parameters, as they were not included, and thus are not required under the approved ACL Monitoring Plan. The staff finds that Umetco's request is consistent with the approved ACL Monitoring Plan.

4.0 Environmental Review

An environmental assessment was not performed for this action as it is categorically excluded pursuant to 10 CFR 51.22 (c)(11), which excludes license amendments for Part 40 licensees which are administrative in nature or which result in a change in process operations or equipment, provided that: (i) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; (ii) there is no significant increase in individual or cumulative occupational radiation exposure; (iii) there is no significant construction impact; and (iv) there is no significant increase in the potential for or consequences from radiological accidents. As detailed more fully in the preceding analysis, the NRC staff has determined that Umetco's license amendment request to modify its sampling locations and frequency will not result in a significant change in the types or increase in the amounts any effluents released offsite, nor will it result in a significant increase in individual or cumulative radiation occupational exposure. Furthermore, discontinuance of sampling at the PW4 well and a reduction in the sampling frequency of the remaining well is not expected to result in a significant construction impact nor a significant increase in the potential for, or consequences of, a radiological accident.

5.0 References

Letter dated June 9, 2011 from Thomas Gieck, Umetco Minerals Corporation to Dominic(k) Orlando, U.S. Nuclear Regulatory Commission [ADAMS Accession No. ML11161A144]

Letter dated September 28, 2011 from Thomas Gieck, Umetco Minerals Corporation to Dominic(k) Orlando, U.S. Nuclear Regulatory Commission [ADAMS Accession No. ML11273A032]

Letter dated October 31, 2011 from Thomas Gieck, Umetco Minerals Corporation to Dominic(k) Orlando, U.S. Nuclear Regulatory Commission [ADAMS Accession No. ML113050552]

Umetco Minerals Corporation (Umetco), 2005. Application for Alternate Concentration Limits for Gas Hills, Wyoming, Appendix M - Groundwater Monitoring Plan; Revised Table M- 1 [ADAMS Accession No. ML051780369]

U. S. NRC, 2003. Standard Review Plan of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978. (NUREG-1620, Rev. 1, Final Report). Washington, D.C. [ADAMS Accession No. ML032250190]

Email dated October 3, 2011, from Mark Moxley, Wyoming Department of Environmental Quality to Dominick Orlando, U.S. Nuclear Regulatory Commission [ADAMS Accession No. ML112790252]

U.S. NRC, 2002. Technical Evaluation Report, Alternate Concentration Limits Application for Umetco Minerals Corporation, East Gas Hills, Wyoming [ADAMS Accession No. ML021070805]

Umetco Minerals Corporation (Umetco), 2004. Application for Alternate Concentration Limits for Gas Hills, Wyoming, Appendix M - Groundwater Monitoring Plan; Revised Table 3.[ADAMS Accession No. ML040140057]

Umetco Minerals Corporation (Umetco), 2001. Final Application for Alternate Concentration Limits for Gas Hills, Wyoming [ADAMS Accession No. ML011450405]

Umetco Minerals Corporation (Umetco), 2002a. Application for Alternate Concentration Limits for Gas Hills, Wyoming, Appendix M - Groundwater Monitoring Plan [ADAMS Accession No. ML020670552]

Umetco Minerals Corporation (Umetco), 2002b. Application for Alternate Concentration Limits for Gas Hills, Wyoming, Appendix M - Groundwater Monitoring Plan; Revised, Table M- 1 and Table 5 [ADAMS Accession No. ML022890267]

Umetco Minerals Corporation (Umetco), 2010. Nuclear Regulatory Commission Annual Report for Gas Hills, Wyoming [ADAMS Accession No. ML102770461]