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Attn: Richard Chang

Reference: **Umetco Gas Hills, Wyoming; Materials License SUA-648; Docket No. 40-0299**
Subject: **One-time Groundwater Sample Event**

Dear Mr. McConnell:

By letter dated September 22, 2009 Umetco Minerals Corporation (Umetco) submitted results of the one-time measurement of constituents of concern as described in NUREG-1620. In this submittal Umetco requested exclusion of cadmium in accordance with 10 CFR 40, Appendix A, Criterion 5B(3). Upon further review and discussions with NRC staff regarding the sample results and the requirements of 10 CFR 40, Appendix A, Criterion 5B(2), it has been determined that the one-time sample results for barium and lead should be addressed as well. Accordingly, this submittal is a continuation of the September 22, 2009 submittal and addresses detection of barium and lead in POC wells.

As presented in Umetco's September 22, 2009 submittal, results of the one-time sample event indicate the following detected concentrations for barium and lead in POC wells.

Table 1: Analytical Results for One Time Measurement

POC	Date	Result	Analyte	Units	MCL[1] 10 CFR 40, App A Table 5C	Background Concentration
GW7	25-Jun-09	0.012	Barium	Mg/L	1	N/A
GW8	25-Jun-09	0.021	Barium	Mg/L	1	N/A
MW1	24-Jun-09	0.0076	Barium	Mg/L	1	N/A
MW21A	24-Jun-09	0.0133	Barium	Mg/L	1	N/A
GW7	25-Jun-09	0.0006	Lead	Mg/L	0.05	0.05
GW8	25-Jun-09	0.0007	Lead	Mg/L	0.05	0.05
MW1	24-Jun-09	< 0.0001	Lead	Mg/L	0.05	0.05
MW21A	24-Jun-09	< 0.0001	Lead	Mg/L	0.05	0.05

N/A – No Background Concentration Set

[1] Maximum Contaminant Level from Title 10 Code of Federal Regulations, Chapter 40, Appendix A, Table 5C

[2] Background concentrations established in Source Material License SUA-648, Amendment 15

While the sample results for barium and lead are well below the respective MCL values, 10 CFR 40, Appendix A, Criterion 5B(2) states:

5B(2) --- A constituent becomes a hazardous constituent subject to paragraph 5B(5) only when the constituent meets all three of the following tests:

(a) The constituent is reasonably expected to be in or derived from the byproduct material in the disposal area;
(b) The constituent has been detected in the ground water in the uppermost aquifer; and
(c) The constituent is listed in Criterion 13 of this appendix.

Accordingly, the detection of these constituents warrants further discussion and determination that barium and lead continue to be excluded as hazardous constituents for this site. The following provides the rationale and basis for this request.

As shown by the result in Table 1, barium and lead in the southwest flow regime and barium in the western flow regime are significantly below the MCL concentrations listed in 10CFR 40, Appendix A, Criterion 5C. In addition, lead is significantly below the NRC approved background value for this site. It is also note worthy that the barium concentration identified in the Tailings solution ranges from <0.01 to 0.14 mg/L and is significantly less then the MCL concentration of 1.0 established in 10CFR 40, Appendix A, Criterion 5C.

Sample results for barium and lead in the southwest flow regime and barium in the western flow regime are well below the MCL but detected using more advanced analytical methods than historically utilized. Historical sample results for lead and barium were completed using Inductively Coupled Plasma Atomic Emission

Spectroscopy (ICP-AES). Laboratory analyses for barium and lead for the one time sample event utilized ICP-Mass Spectrometry (ICP-MS). ICP-MS typically has two to three orders of magnitude better detection limits than ICP-AES. To be consistent with historical measurements additional analyses utilizing the ICP-AES methodology for lead and barium were conducted on the June 2009 samples with the following results.

Table 2: Barium and Lead results using ICP-AES (method 200.7)

POC	Date	Analyte	Result	Unit	Qualifiers
GW7	25-Jun-09	Barium	0.015	mg/L	Value is between MDL and the PQL
GW8	25-Jun-09	Barium	0.020	mg/L	Value is between MDL and the PQL
MW1	25-Jun-09	Barium	0.006	mg/L	Value is between MDL and the PQL
MW21A	25-Jun-09	Barium	0.013	mg/L	Value is between MDL and the PQL
GW7	25-Jun-09	Lead	< 0.04	mg/L	Non-detect
GW8	25-Jun-09	Lead	< 0.04	mg/L	Non-detect
MW1	25-Jun-09	Lead	< 0.04	mg/L	Non-detect
MW21A	25-Jun-09	Lead	< 0.04	mg/L	Non-detect

Utilizing ICP-AES (method 200.7) the four barium results were between the Method of Detection Limit (MDL) and the Practical Quantitation Limit (PQL) and as such the analysis does not reliably indicate that barium is in fact present in the samples. The practical quantitation limit, or PQL, is the lowest concentration at which reliable measurements can be made. The PQL is defined as *"the lowest concentration of an analyte that can be reliably measured within specified limits of precision and accuracy during routine laboratory operation conditions"* (52 FR 25690, July 8, 1987). Another way of looking at the PQL is to say that just because we can differentiate between an analyte signal and instrument noise does not mean that we can necessarily know how much of the analyte there actually is. ICP-AES sample results for lead in GW7 and GW8 resulted in non-detection.

With respect to lead, these results are typical of what has been detected historically at the site in background water quality sampling, i.e., range of < 0.01 to < 0.05 mg/L. Sample results for barium are also typical with respect to historical sample events; however, there has never been an established background value or standard set for barium because barium was only periodically detected in the tailings material and then only at very low concentrations, e.g.. < 0.01 to 0.14 mg/L, which is significantly lower then the MCL of 1.0 mg/L.

HISTORICAL EVALUATION of BARIUM and LEAD

An evaluation of background concentrations and identification of hazardous constituents for the Upper and Lower Wind River Aquifers (aka, Southwest and Western Flow Regimes) was conducted on data from 1988 through 1990. Data associated with this evaluation are contained in various submittals to the NRC including:

- Second Stage Detection Monitoring at the Umetco Minerals Corporation East Gas Hills, Wyoming Site, October 1988 (SSDM).

With respect to barium, Umetco identified background concentrations in several Upper and Lower Wind River aquifer wells. As a result of this evaluation Umetco recommended to the NRC a barium background of 0.2 mg/L for the Lower Wind River aquifer (Western Flow Regime) and 0.01 mg/L for the Upper Wind River aquifer (Southwestern Flow Regime). NRC review of the recommended standard for barium resulted in barium being excluded has a hazardous constituent, i.e., no background value or standard established. The specific rationale for this determination is unknown; however, it is reasonable to assume that it was excluded because the barium concentrations detected in the tailings material (< 0.01 to 0.14 mg/L) were less then the proposed background standard (0.2 mg/L). The range of values used to develop the proposed background standard were <0.01 to 0.17 mg/L. The current detected (when detected using ICP-MS analytical methods) concentrations for barium at the POC wells remain significantly lower then the MCL; significantly lower than the historically proposed standard for barium; and consistent with historically measured background concentrations.

In License Amendment No. 15 the NRC did establish a standard and background value for lead of 0.05 mg/L for both the Upper Wind River aquifer (Southwest Flow Regime) and Lower Wind River aquifer (Western Flow Regime). In a letter dated November 19, 1992 based on monitoring data, the NRC removed lead as a hazardous constituent from the groundwater monitoring program. Results of the one-time sample measurement indicate that the highest detection of lead in the POC wells (when detected using ICP-MS analytical methods) of 0.0007 mg/L is significantly lower then the MCL; significantly lower then the historic standard; and significantly lower than established (NRC approved) background concentrations.

10 CFR 40, Appendix A, Criterion 5B(3) Evaluation:

To support Umetco's request to continue exclusion of barium and lead as a hazardous constituent in groundwater at the Gas Hills site an evaluation of 10 CFR 40, Appendix A, Criterion 5B(3) was considered.

Section 5B(3) States:

5B(3) --- Even when constituents meet all three tests in paragraph 5B(2) of this criterion, the Commission may exclude a detected constituent from the set of hazardous constituents on a site specific basis if it finds that the constituent is not capable of posing a substantial present or potential hazard to human health or the environment. In deciding whether to exclude constituents, the Commission will consider the following:

(a) Potential adverse effects on ground-water quality, considering ---

- *(i) The physical and chemical characteristics of the waste in the licensed site, including its potential for migration;*
- *(ii) The hydrogeological characteristics of the facility and surrounding land;*
- *(iii) The quantity of groundwater and the direction of ground-water flow;*
- *(iv) The proximity and withdrawal rates of ground-water users;*
- *(v) The current and future uses of ground water in the area;*
- *(vi) The existing quality of groundwater, including other sources of contamination and their cumulative impact on the ground-water quality*
- *(vii) The potential for health risk caused by human exposure to waste constituents*
- *(viii) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents*
- *(ix) The persistence and permanence of the potential adverse effects*

(b) Potential adverse effects on hydraulically-connected surface water quality, considering ---

- *(i) The volume and physical and chemical characteristics of the waste in the licensed site;*
- *(ii) The hydrological characteristics of the facility and surrounding land;*
- *(iii) The quantity and quality of ground water, and the direction of ground-water flow;*
- *(iv) The patterns of rainfall in the region;*
- *(v) The proximity of the licensed site to surface waters;*
- *(vi) The current and future uses of surface waters in the area and any water quality standards established for those surface waters;*

(vii) The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality;
(viii) The potential for health risks caused by human exposure to waste constituents;
(ix) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
(x) The persistence and permanence of the potential adverse affects.

Given the close proximity of the POC wells to the impoundments, the previous investigations and the concentrations found in the tailings materials there is no evidence supporting adverse affects from or increased concentrations of barium or lead in the aquifers at the site. Without evidence or data to support impact of any kind to the aquifer, a specific evaluation of the 5B(3) criteria is not feasible and would only result in an evaluation of natural background concentrations. Therefore, these constituents are not capable of posing a substantial present or potential hazard to human health or the environment.

If you have any questions or require additional information regarding this submittal and request please contact me at 970-256-889 or by e-mail at gieckte@dow.com.

Regards

Thomas E. Gieck
Remediation Leader

TEG/jfc
cc: Mr. Richard Chang, NRC Project Manager ✓