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Via Email and U.S. Mail

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Re: Atlantic Richfield's *Arsenic Source Investigation Interpretive Analysis*
Agency Response and Atlantic Richfield's Technical Memorandum and Response

Gentlemen:

The following letter is sent on behalf of Atlantic Richfield in review of EPA's recent comments to Atlantic Richfield's *Draft Arsenic Source Investigation Interpretive Analysis* (dated December 2013) and the April 9, 2014, report by CDM Smith entitled *Agency Interpretive Report for MBMG's ARWW&S Arsenic Source Investigation Final Project Data Summary Report*, dated 10-30-2013 (the CDM Report). Atlantic Richfield strongly disagrees with many of the conclusions reached by EPA and CDM. The CDM Report, in particular, ignores voluminous data, applies strongly biased interpretation, draws technically unsupportable conclusions, and is flawed in several fundamental respects. Data gathered by the Montana Bureau of Mines and Geology (MBMG) and Atlantic Richfield's own interpretive analysis of that data show arsenic levels measured above the Maximum Contaminant Level (MCL) in the groundwater in the Anaconda Regional Water, Waste & Soils Operable Unit (ARWW&S OU) is generally naturally occurring and is not the result of mining-related activity. Even where natural arsenic concentrations may be mixed with mining-related concentrations, such impacts are limited in depth to what the project teams describe to be the "upper aquifer," and within 6 miles or closer to the stack.

Based on this data, Atlantic Richfield's liability at the ARWW&S OU is limited in three respects. First, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) EPA lacks the authority to recover response costs from Atlantic Richfield for removal or remedial actions related solely to naturally-occurring substances. 42 U.S.C. § 9604(a)(3). Second, Atlantic Richfield is not obligated by CERCLA to fund or perform response actions to address arsenic concentrations below the upper aquifer zone or further than 6 miles from the stack. Third, where the data demonstrates a "mixed" arsenic signature (*i.e.*, some naturally occurring arsenic mixed with some mining-related arsenic) within the relevant distal and vertical area, Atlantic Richfield may be responsible only for mining-related arsenic as a component of total arsenic concentrations in the aquifer; and then, only if the remedy addresses concentrations above background.

This letter and enclosed Technical Memorandum and Response, prepared by EnSci, Inc. with input from other geostatistics experts, address the fundamental shortcomings of the CDM Report and

discuss the technical and legal bases for limiting Atlantic Richfield's potential liability for mitigating arsenic concentrations in domestic wells at the ARWW&S OU. Atlantic Richfield looks forward to working with EPA and DEQ towards a technically and legally sound resolution for Atlantic Richfield's participation in the domestic well program proposed by the Agencies which is intended to address both naturally-occurring and mining-related arsenic concentrations in groundwater.

BACKGROUND

Atlantic Richfield has been actively engaged with EPA and the Montana Department of Environmental Quality (DEQ) in investigating the extent of smelter-related contamination in the Anaconda area for over 30 years. Related to those investigations, the original ARWW&S OU Record of Decision (ROD) (EPA 1998) identified groundwater areas of concern based on the existing remedial action goal and site characterization at the time. (ROD Amendment, EPA 2011 at p.21). The 1998 ROD established a sampling program for monitoring compliance with groundwater standards. (ROD, EPA 1998 at 9.1.5). EPA's Proposed Plan (November 2009) for modifications of the 1998 ROD proposed an expanded Domestic Well Area of Concern. Notwithstanding Atlantic Richfield's comments that the proposed area would encompass a geographic area that was not shown by monitoring to show impacts from mining, the 2011 ROD Amendment increased the size of the groundwater areas of concern. (ROD Amendment, EPA 2011 at p. 21-22). Under the 2011 ROD Amendment, the primary contaminant of concern is arsenic and the remedial standard is presently 10 µg/l, which is also the MCL under DEQ rules and regulations.

The 2011 ROD Amendment established a domestic well monitoring and replacement program to periodically test, and replace if needed, all domestic wells within the Domestic Well Area of Concern (DWAOC). (ROD Amendment, EPA 2011 at 9.3). The DWAOC is shown at Figure 9-2 in the 2011 ROD Amendment. Under the domestic well monitoring program, MBMG samples all wells within the DWAOC. Wells with arsenic concentrations between 5 µg/l and 10 µg/l are sampled annually to ensure that levels remain below the MCL. For these wells with arsenic concentrations above the MCL, MBMG is tasked with determining if the arsenic was smelter-related, and, if so, takes action to provide a water supply with suitable arsenic concentrations. (CDM Report at p. 1-1). Atlantic Richfield is responsible for providing a replacement water supply <u>only</u> where the exceedance is determined to be related to historic mining/smelting activities and not naturally-occurring arsenic sources. (Final Short-Term Groundwater Monitoring Sampling and Analysis Plan Addendum 1; March 23, 2009).

In the time that has passed since the 1998 ROD was issued, characterization efforts have continued to document the type and extent of arsenic concentrations in groundwater in the Anaconda area. Through MBMG's and Atlantic Richfield's efforts, significantly more data has been collected; a data set of several hundred groundwater samples has been developed for the DWAOC. Based on this data, Atlantic Richfield performed an assessment that identified and quantified the primary arsenic sources. This assessment included a two-way data normalization procedure that logarithmically transformed and standardized the chemical groundwater data and a progressive statistical computation that linked a K-Means cluster procedure with a general discriminate analysis. Among other things, the results of Atlantic Richfield's assessment demonstrate that smelter-related arsenic is limited distally

(within a radius of 6 mi away from the stack) and vertically (within the shallow aquifer, or no deeper than 35 feet bgs) while the natural occurring geothermal arsenic exhibiting > 10 µg/l is pervasive throughout the DWAOC.

As noted above, in April 2014, CDM Smith prepared a report and technical memorandum "us[ing] the recent MBMG ground water and leaching data along with a significant body of soil and ground water data at the site to develop an interpretation, to the extent possible, and . . . to identify the most likely source of arsenic in ground water at specific locations." CDM Report at 1-1. The CDM Report also attempted to identify an outer boundary for the DWAOC to include all wells potentially impacted by milling/smelting activities and that may impair domestic uses of the wells, but acknowledges that such boundary is "imperfect." *Id.*

The CDM Smith Report (2014) states that "during the four years of implementation of the [sampling] program, there have been cases where it was not possible to definitively determine if arsenic was due to milling/smelting activities or was naturally occurring." In a letter dated February 17, 2014, EPA similarly indicates that:

> EPA and DEQ disagree that geothermal sources are a significant source of arsenic drinking water exceedances at the site. While we concur that mineralized rock may contribute to arsenic exceedances in the Crackerville and English Gulch areas, the existing data is insufficient to separate or differentiate naturally occurring arsenic from smelter-related impacts in ground water in those areas.

Atlantic Richfield's geostatistics experts generally dispute EPA's and DEQ's conclusion that the "existing data is insufficient" to differentiate naturally occurring arsenic from smelter-related arsenic. As discussed below and in more detail in the attached analysis, the CDM Report and EPA's and DEQ's conclusions drawn therefrom are fundamentally flawed in significant and material respects and may not be relied upon to expand the scope of the ARWW&S OU remedy. Moreover, Atlantic Richfield's interpretive analysis, which is grounded in sound scientific principles and methods, demonstrates a clear geographical distinction in the majority of the DWAOC between mining-related arsenic concentrations and those that are naturally occurring.

DISCUSSION

A. <u>Summary of Technical Responses to the CDM Report</u>

The CDM Report suffers from several significant and foundational flaws. As summarized below, and described in more detail in the enclosed Technical Memorandum and Response, the CDM Report generally mischaracterizes or ignores the nature of the data gathered by MBMG as well as Atlantic Richfield's interpretation of that data. Reliance on the CDM Report to affect or change the scope of remedial action would be unsupportable for the following technical reasons.

1) The CDM Report's Biased Data Interpretation

Notwithstanding the fact that the geostatistical classifications performed by Atlantic Richfield were all statistically significant, the CDM Report ignores critical geothermal constituents and their chemistry in their entirety. This is a fundamental bias of the report that renders its conclusions unreliable.

2) The CDM Report Incorrectly and Inconsistently Interprets Key Data

The CDM Report's statement that, "Groundwater arsenic concentrations varied across the site in a fairly predictable manner, at least for concentrations above about 20 µg/L" is incorrect and not supported by the data. *See* CDM Report at 2-1 to 2-2. Further, the report's implication that arsenic exceedances above 20 ug/L throughout the ARWW&S are related to former smelter emissions is also incorrect and not supported by the data.

3) The CDM Report Mischaracterizes Differentiating Sources of Sulfur Dioxide

The CDM Report misrepresents and artificially characterizes the δ34S range for "smelter fallout and abiotic sulfide." The upper δ34S limit in the CDM Report is unjustified and falsely represents the actual data and the report provides no supportable rationale for extending the range. As a result, the report's conclusion that "[i]n general it is not possible to differentiate between sulfur dioxide fallout from smelters and other industries from leaching of abiotically-formed sulfides" is not accurate, reflective of the data, and should not be relied upon for purposes of evaluating groundwater chemistry in the Anaconda area.

4) The CDM Report Ignores Fundamental Geothermal Tracer Constituent Data

Many other groundwater constituents besides δ34S are associated with geothermal activity (and arsenic sourcing). These include suites of hydrothermal metals, REE, and anions (W, Cs, Rb, Li, B, F, Pd, Tl, Hg, As, etc.; Barnes, 1974). The CDM Report does not consider this available MBMG data. In fact, the CDM Report did not evaluate a single geothermal indicator from the MBMG core analyses, the core leachate analyses, the soil leachate analyses, the hot geothermal vent water from the known geyser mounds, or the ARWW&S groundwater itself. The leachate results show strong correlations between the classic geothermal indicators (W, Rb, Cs) and arsenic in the Powell Vista (MS) core and the Fairmont (FR) and Crackerville (SH) cores. This is a fundamental flaw of the CDM Report.

5) The CDM Report has Significant Flaws in Assessing Arsenic Trends at Depth

The CDM Report utilizes leachate arsenic concentrations measured on the upper six inches of surface soil to assess arsenic trends at depth. This method is technically suspect and has no bearing on the actual downward flux of arsenic. The CDM Report's soil analysis failed to include basic soil mineralogical analysis, measurements of soil surface area, determination of ion exchange capacity, soil pH measurements, or selective extraction determinations, among others. For these reasons, the report's

conclusions regarding the origin of arsenic in ARWW&S OU groundwater are not technically supportable.

6) There is no Supportable Rationale in the CDM Report for Expanding the Boundary of the DWAOC

There is overwhelming evidence of extensive hydrothermal alteration (with natural arsenic mineralization) reported by MBMG in their Crackerville (SH) and Fairmont (FR) research cores. Based on this evidence and the other technical inadequacies in the CDM Report discussed above there is no justification for expanding the southeastern boundary of the domestic well program—especially into and beyond the known Fairmont and Crackerville geothermally-impacted areas.

For these reasons, and as more fully explained in the attached analysis, the CDM Report is not technically sound and does not reliably dispute the conclusions that are drawn from Atlantic Richfield's interpretive analysis. Accordingly, and as discussed below, under well-established case law, Atlantic Richfield's liability for response costs at the ARWW&S OU should be limited only to a proportional share of response costs for certain mining-related arsenic in a specific geographic area.

B. <u>Legal Analysis</u>

Under CERCLA, EPA "shall not provide for a removal or remedial action . . . in response to a release or threat of release of a naturally occurring substance in its unaltered form, or altered solely through naturally occurring processes or phenomena, from a location where it is naturally found." 42 U.S.C. 9604(a)(3)(A) (emphasis added). Courts have construed this exemption narrowly. *See e.g., U.S. v. Iron Mountain Mines, Inc.*, 812 F.Supp. 1528, 1548 (E.D.Ca. 1993). However, while CERCLA liability is generally not dependent upon the quantity of hazardous substance released, *see U.S. v. United Nuclear Corp.*, 814 F.Supp. 1552, 1557-58 (D.N.M. 1992), a party should not be held responsible for response costs where the remedial action does not address concentrations above background levels. *See* U.S. v. Alcan Aluminum Corp., 990 F.2d 711, 722 (2d Cir. 1993) ("[A] defendant [may] escape payment where its pollutants did not contribute more than background contamination . . . ."); *see also, Mid Valley Bank v. North Valley Bank*, 764 F.Supp. 1377, 1386 (E.D.Ca. 1991) (acknowledging that naturally occurring substances at levels above background could be relevant to "whether a hazardous substance which triggers CERCLA liability was released at the facility").

Moreover, both traditional tort law and modern environmental law provide a defense where the harm is reasonably capable of apportionment. Under tort law, "damages for harm are to be apportioned among two or more causes where (a) there are distinct harms, or (b) there is a reasonable basis for determining the contribution of each cause to a single harm." Restatement (Second) of Torts §§ 433A, 481 (emphasis added); *see also Burlington Northern & Santa Fe Ry. V. United States*, 556 U.S. 599, 613-15, 619 (2009) ("Congress intended the scope of liability [under CERCLA] to 'be determined from traditional and evolving principles of common law.'"). For example, in *Iron Mountain Mines*, the court acknowledged the availability of a divisibility of harm argument under § 104(a)(3) where there is evidence of distinct naturally occurring vs. non-naturally occurring substances. *Iron Mountain Mines*,

812 F.Supp. at 1548-49 ("[w]hile one may infer from [the defendant's] evidence that some AMD is naturally released from the mine, no evidence establishes that the proportion of that natural release may be measured so as to prevent or diminish liability on the grounds stated in the [divisibility of harm] defense.")

Here, EPA's authority to recover response costs from Atlantic Richfield for response actions at the ARWW&S OU is limited in several key respects. First, EPA may not recover response costs from Atlantic Richfield for remedial actions that address solely naturally occurring arsenic—even where such concentrations exceed background levels. EPA and DEQ acknowledge that some arsenic in the groundwater at the ARWW&S Operable Unit is unrelated to mining and is likely present in groundwater from hydrothermal influences or weathering of arsenic minerals. *See* EPA Letter to Mr. Thun, Feb. 17, 2014 ("[W]e concur that mineralized rock may contribute to arsenic exceedances in the Crackerville and English Gulch areas"). Atlantic Richfield's interpretive analysis confirms this and identifies distinct areas within the ARWW&S OU where the arsenic concentrations are attributable solely to naturally occurring sources (outside the areas proximate to the waste management areas and at depth below the shallow aquifer zone). Atlantic Richfield's interpretive analysis also establishes that arsenic concentrations further than 6 miles from the smelter stack cannot be attributed to mining-related activities. For the reasons noted above, nothing in the CDM Report reliably disputes these conclusions. Thus, for these areas, EPA is precluded under CERCLA § 104(a)(3) and the NCP from taking response or seeking to recover any response costs from Atlantic Richfield for any response actions to abate potential exposures to naturally-occurring arsenic concentrations.

Second, even in the shallow aquifer zone within 6 miles from the stack, where the arsenic concentrations are "mixed" (*i.e.*, some naturally occurring, some attributable to mining-related activity), Atlantic Richfield should only be responsible for its proportional share of mining-related arsenic above the MCL.[1] As noted in the interpretive analysis, there are four mining-related areas contributing mining-related arsenic to groundwater in the ARWW&S OU. Three of these, however, are confined to defined waste management areas where use of groundwater for domestic supply is prohibited. The fourth is due to aerial deposition, the limits of which are described above. Even in areas where aerial deposition contributes to arsenic concentrations above the MCL, a portion of the arsenic concentration is due to naturally occurring sources (weathering of arsenic minerals, hydrothermal fluids or other) caused by the widespread and pervasive geothermal influences throughout the ARWW&S OU. Accordingly, in these "aerial deposition" areas, a reasonable basis likely exists for apportioning Atlantic Richfield's liability according to the ratio of mining-related arsenic (if any) to naturally-occurring arsenic. At a minimum, EPA and DEQ should accept further evidence of such ratios to apportion liability, consistent with CERCLA law.

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[1] Montana DNRC (§ 36.21.654, Admin. Rules Mt.) requires that new water supply well casings be sealed to a minimum depth of 25 feet bgs. Given that smelter-related arsenic impacts are generally limited to the top 35 feet of aquifer, the zone of interest related to any "mixed" signature for new or more recently installed wells is limited to 10 feet (interval between 25 and 35 feet bgs) of the shallow aquifer.

CONCLUSION

As described herein, Atlantic Richfield's potential liability for response costs at the ARWW&S OU is limited in several key respects. First, EPA cannot recover response costs for any response action taken to abate a naturally-occurring substance. Second, based on data from the site, the mining-related arsenic—and therefore the area of the site for which EPA may take response actions under the NCP and seek to recover response costs from Atlantic Richfield—is confined to the shallow aquifer zone within 6 miles of the smelter stack. Finally, within an area so defined, Atlantic Richfield should be responsible only for its proportional share of mining-related arsenic and only where arsenic concentrations exceed the MCL. These conclusions are drawn from scientifically sound analyses in Atlantic Richfield's interpretive analysis and application of well-established CERCLA law. Nothing in the CDM Report reliably disputes these conclusions, for the reasons discussed above.

Atlantic Richfield looks forward to working with EPA and DEQ to reach an equitable resolution in this matter that is supported both technically and legally. In the meantime, please direct any questions or inquiries to the undersigned.

Sincerely,

William J. Duffy
for
DAVIS GRAHAM & STUBBS LLP

cc: Joel Chavez
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