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December 17, 2015

Ms. Jane Hedges  
Nuclear Waste Program Manager  
Department of Ecology  
Richland Nuclear Waste Office  
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RE: **Omnibus Risk Review Committee Report**

Dear Ms. Hedges:

You have asked me to address the following discussion from a report entitled, "A Review of the Use of Risk-Informed Management in the Cleanup Program for Former Defense Nuclear Sites," Omnibus Risk Review Committee (August 2015) (Report):

For sites being remediated under CERCLA, CERCLA Section 120(a) provides that federal facilities cleanups are required to meet procedural and substantive cleanup standards, including more stringent state standards, to the same extent as sites remediated by private responsible parties. Accordingly, DOE sites are not required to meet state ARARs that are not being applied at other remediation sites in the state. Additionally, CERCLA provides for an ARAR waiver where there is evidence that a state requirement is not being consistently applied at other sites in the state. However, *the Committee found at least one example, regarding groundwater cleanup, where a Washington state groundwater restoration requirement being applied as an ARAR at Hanford appeared to be more onerous than cleanup requirements being applied to groundwater at a site being remediated by private parties.* At Hanford, a state requirement deemed to be an ARAR--that virtually all groundwater, no matter how contaminated, be restored to drinking water quality--is one of the rationales for requiring that contaminated groundwater at the 100 Area be cleaned up to achieve drinking water standards. *However, this state groundwater restoration requirement has not been applied to contaminated groundwater under waste piles (in a "waste management area") at the private party-financed cleanup of the Holden Mine*

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*federal facility site, where a recent ROD decided not to require cleanup of such groundwater at all.*

This suggests that the state groundwater restoration requirement may not be applicable under CERCLA Section 120 at Hanford and/or that a waiver from the state requirement may be justified. *We would urge the Task Force, if it is established, to look further into the matter and evaluate whether other high-cost state requirements being applied at Hanford are being similarly applied at other sites;* EPA and DOE can do so in any event. Indeed, the Committee believes that where high-cost state ARARs are being urged for adoption at DOE sites, DOE and EPA should, should [sic] as a matter of course, investigate whether the more stringent state requirement asserted to be an ARAR is being applied to cleanups elsewhere in the state and take appropriate action based on what it finds.

Report at 58–59 (emphasis added).

As you know, for more than 16 years, I have been one of the primary attorneys representing the State of Washington on matters related to cleanup of the Hanford Nuclear Reservation. Since 1999, I have also served as the State's assigned attorney for matters related to cleanup of the Holden Mine Site. As such, I am uniquely qualified to address the above discussion.

As described below, the Report fails to acknowledge the extensive groundwater containment and treatment remedy selected for the Holden Mine Site. More specifically, it fails to focus on the relevant point of comparison between the Holden Mine and Hanford actions: how the respective actions address a flow of contaminated groundwater into surface water that threatens aquatic life. When this relevant point of comparison is evaluated, there is no basis for the Report's suggestion that MTCA's requirements have been applied any less stringently at the Holden Mine Site versus Hanford.

Holden Mine Site Remedy:

The Holden Mine Site is a remote inactive mine site in the Cascade Mountains of north central Washington, surrounded on three sides by a designated Wilderness Area. There is no direct road access to the Site and no outside utilities serve the Site.<sup>1</sup>

The Site features include approximately 8.5 million tons of mine tailings deposited in three "piles" directly abutting Railroad Creek, which drains the mountain valley in which the Site is located. Groundwater contaminated both by these tailings piles and releases of acid mine

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<sup>1</sup> The Site is typically reached by a 40-mile boat trip up Lake Chelan, followed by traveling a 12-mile gravel road that begins at the lake and ends at the Site. The only regular electricity at the Site is generated from a small hydropower turbine located on a tributary to Railroad Creek.

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drainage (AMD) from the mine's inner workings has flowed into Railroad Creek. This flow into surface water is at concentrations above state and federal surface water cleanup levels established for the protection of aquatic life. Aside from a limited area of groundwater immediately below, and coextensive with, the footprint of the tailings piles, groundwater at the Site is not contaminated above cleanup levels established for the protection of human health.

Cleanup of the Site is being undertaken both under CERCLA and MTCA. The Site is located on a mix of private property and federally-owned land administered by the United States Forest Service. MTCA applies directly to the private property. In addition, because the Site is not listed on CERCLA's National Priorities List (NPL), MTCA also applies directly to the federally-owned portions of the Site. *See* 42 U.S.C. § 9620(a)(4) (waiving sovereign immunity for federal facilities not listed on the NPL).

Since the early stages of the cleanup process, the State has asserted jurisdiction over the cleanup under MTCA, together with assertion of cleanup jurisdiction under CERCLA by the Forest Service and Environmental Protection Agency. Collectively, the three entities (the Agencies) have worked together in developing the Site remedy, including jointly issuing an administrative order to the primary private potentially responsible person under both CERCLA and MTCA authority and issuing a Record of Decision (ROD) that serves as both a CERCLA and MTCA final remedy decision.

Early in the remedial investigation/feasibility study process, the Agencies agreed that it was not practicable to remove and relocate the 8.5 million tons of tailings from the Site, nor was it practicable (or even possible) to completely halt the flow of AMD contaminating groundwater from the inner mine workings. Halting the flow of contaminated groundwater into Railroad Creek, however, remained a key remedial goal.

These factors shaped the remedy decision for the Site, which has three principal components as related to groundwater. The first is that with respect to meeting cleanup levels *established for the protection of human health only*, groundwater within the footprint of the tailings piles would be designated as being within the "Waste Management Area" established for permanent closure-in-place of the tailings piles. As such, it would not be subject to remedial requirements other than containment (e.g., ongoing pump-and-treat) in order to protect human health.<sup>2</sup> *See* USDA Forest Service, *Record of Decision, Holden Mine Site, Chelan County, Washington* (January 2012) (Holden Mine ROD) at 1-3.

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<sup>2</sup> CERCLA's National Contingency Plan provides that "remediation levels" for groundwater is "should generally be attained throughout the contaminated plume, *or at and beyond the edge of the waste management area when waste is left in place.*" 55 Fed. Reg. 8666, 8713 (Mar. 8, 1990) (emphasis added). The "waste management area" designation is a CERCLA concept. No similar designation appears in MTCA, although as further described below, MTCA addresses the same concept (designating a defined area where cleanup levels will not be attained, together with a defined point at which they will be attained) through use of a "conditional point of compliance."

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The second is that for meeting cleanup levels *established for the protection of surface water aquatic life*, such cleanup levels must be met at a point of compliance established before groundwater enters surface water; specifically, “before the portion of the hyporheic zone that supports aquatic life, including fish spawning and benthic macroinvertebrates to be protective of aquatic life, and not simply in the surface water column after dilution has occurred.” *Id.* at 1-4.

The third is that in order to prevent further migration of contaminants in groundwater, as well as facilitate meeting the surface water protection cleanup levels at the point of compliance referenced above, an extensive groundwater containment, collection, and treatment infrastructure would be required. *Id.* at 1-3, 1-4, 2-103 to 2-106.

This infrastructure includes constructing subsurface barrier walls between the tailings piles and the creek to intercept and contain contaminated groundwater before it enters the creek. These walls (which are being built in two phases) extend as much as 90 feet below ground surface and may, at maximum build-out, extend approximately one mile in total length. Groundwater from behind the walls will be collected in trenches and transported together with discharge from the main mine portal to a water treatment plant. There, the contaminated groundwater will be treated to meet surface water cleanup levels for the protection of aquatic life before being discharged to Railroad Creek. *Id.*

Given this, the Report is grossly inaccurate in asserting that the Holden Mine ROD “*decided not to require cleanup of [contaminated] groundwater at all.*” Report at 59 (emphasis added). To the contrary, an extensive—and expensive—groundwater containment and treatment remedy is being implemented. The scope of this remedy is all the more remarkable in light of the Site’s remote location and logistical constraints.

## MTCA’s Groundwater Cleanup Requirements:

The Holden Mine Site remedy is driven by MTCA’s groundwater cleanup requirements.

MTCA requires groundwater cleanup levels to be based on “estimates of the highest beneficial use,” with “use of groundwater as a source of drinking water” being the presumed highest beneficial use at most sites. WAC 173-340-720(1)(a). Further, MTCA’s remedy selection criteria favor “permanent groundwater cleanup actions” that result in cleanup levels being achieved throughout a contaminated plume. WAC 173-340-360(2)(c), -720(8).

This does not mean that MTCA mandates the complete cleanup of groundwater at all locations and in all situations, at any cost. Instead, it requires that groundwater remedies (and all other remedies) be “permanent . . . to the maximum extent practicable.” WAC 173-340-360(2)(b)(i), (2)(c). MTCA defines “practicable” to mean:

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[C]apable of being designed, constructed and implemented in a reliable and effective manner including consideration of cost. When considering cost under this analysis, an alternative shall not be considered practicable if the incremental costs of the alternative are disproportionate to the incremental degree of benefits provided by the alternative over other lower cost alternatives.

WAC 173-340-200.

As noted above, the Agencies determined that it is not “practicable” to permanently clean up the Holden Mine Site’s groundwater, given that it is not practicable to completely stop ongoing source inputs from the tailings piles and AMD drainage. Under MTCA, this shifts the focus to a set of criteria for “nonpermanent” groundwater remedies.

MTCA provides that in any “nonpermanent” groundwater cleanup action, the containment of contaminated groundwater through barriers or hydraulic controls (e.g., pumping) must be implemented “to the maximum extent practicable.” WAC 173-340-360(2)(c)(ii)(B). Cleanup actions cannot rely primarily on dilution and dispersion unless “the incremental costs of any active remedial measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion.” WAC 173-340-360(2)(g); *see also* WAC 173-340-370(7)(a) (similarly limiting the circumstances in which “natural attenuation” can be relied upon in remedies).

Further, MTCA requires that whenever it is not practicable to achieve cleanup levels throughout a contaminated plume (i.e., the “standard” point of compliance), a “conditional” point of compliance for achieving these levels must be established that is “as close as practicable to the source of hazardous substances.” WAC 173-340-720(8)(c). Where a site abuts surface water, and groundwater cleanup levels are established for the protection of surface water, additional conditional point of compliance requirements apply, including that “all known available and reasonable methods of treatment” be provided and that no “mixing zone” be allowed for groundwater discharging into surface water. WAC 173-340-720(8)(d)(i).

The Holden Mine groundwater remedy is based on a full evaluation of these requirements. *See* Holden Mine ROD at 2-94 to 2-95; Agencies’ Supplemental Feasibility Study, Appendix D. The Agencies determined it was practicable to implement the chosen remedy of barrier walls, groundwater collection, and groundwater treatment. The conditional point of compliance for meeting surface water cleanup levels was selected at a point before groundwater enters surface water based on the Agencies’ determination that it is practicable to meet cleanup levels at this point.

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Comparison With Hanford Actions:

While offering few specifics, the Report mentions various groundwater cleanup actions at Hanford. *See generally* Report at 53–59. The Report singles out MTCA, however, as “a primary basis for selection” of “a very extensive excavation remedy” to remove chromium from the Hanford 100-Area, “assertedly to protect salmon in the Columbia River.” Report at 54–55. Later, in the passage quoted above, the Report also suggests that the Holden Mine Site cleanup stands out as an example of MTCA ARARs “not being consistently applied” between Hanford and other sites in the state. *Id.* at 58. It specifically alleges inconsistency between MTCA’s regulatory bias toward permanently restoring groundwater to its highest beneficial use and the decision at Holden to include groundwater within a “waste management area.” *See id.* at 58–59.

With respect to chromium excavation in the Hanford 100-Area, there is no inconsistency with the Holden Mine remedy in terms of ARARs application. As the Report identifies, the stated remediation goal for the 100-C-7 waste site is to remove soil contaminated with hexavalent chromium “before more of the chromium could be spread to the underlying groundwater and eventually drain into the Columbia River less than one mile away.” *Id.* at 54–55 n.72. The Report identifies that this excavation was selected as a response action based on the conclusion that “Removing the source of contamination before it migrates to the aquifer *is a more conservative and more cost effective alternative than pumping and treating groundwater.*” *Id.* (quoting Thomas C. Post et al., *The 100-C-7 Remediation Project: An Overview of One of DOE’s Largest Remediation Projects*, presented at WM2013 Conference, Arizona, Feb. 24–28, 2013, available at <http://www.wmsym.org/archives/2013/papers/13260.pdf>) (emphasis added).

At Holden Mine and in the Hanford example above, sources of hazardous substances have contaminated groundwater that flows into surface water at concentrations that threaten aquatic life. Thus, the relevant point of comparison is with how the respective cleanup actions address this flow of contaminated groundwater into surface water. Under MTCA, the first question is whether a permanent groundwater remedy is practicable. If the answer to this question is no, then MTCA requires containment and treatment of the groundwater to the “maximum extent practicable” in order to prevent the flow of contaminated groundwater into surface water.

In the Hanford case, the determination was made that removal of the source—which could pave the way to a permanent remedy—was practicable, and indeed a more cost effective approach than a long-term pump-and-treat or other groundwater containment approach.<sup>3</sup> At Holden, such source elimination was determined to *not* be practicable, leading to the construction of an

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<sup>3</sup> In addition to direct cleanup action costs, the potential for ongoing liability for natural resource damages under CERCLA should be factored into any evaluation of cleanup costs versus benefits in the “risk based” manner recommended by the Report. The Hanford Reach is a critical salmon spawning area valued by both state and tribal natural resource trustees.

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extensive groundwater containment, collection, and treatment system that has not been required at Hanford. MTCA's requirements have been consistently applied in both cases.

With respect to the alleged dichotomy between MTCA's goal of restoring groundwater to its highest beneficial use as a drinking water source and the decision to include groundwater within a "waste management area" at the Holden Mine Site, there is again no inconsistency. Again, the threshold inquiry is whether cleanup to drinking water standards is "practicable." At Holden, the answer was "no" for the limited area of groundwater exceeding drinking water standards, which happens to be coextensive with the tailings piles. At Hanford, the Report gives no examples of such determinations even having been made in the context of a final ROD. There is nothing I am aware of, however, to suggest that MTCA's requirements will be applied any more stringently at Hanford.

Thank you for the opportunity to address this issue. I hope my analysis is useful.

Sincerely,



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AAF:def