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April 11, 2003

Lava Cap Mine ARARs

Via email

David Seter
US EPA

Dear David:

Following up on the two ARAR meetings we have had on the Lava Cap Mine Superfund site concerned with establishing remediation goals, I want to provide some comments on issues that should be understood with respect to the public's perspective on appropriate site remediation and post-closure monitoring and maintenance.

Landfill Containment Issues

Considerable discussion was devoted at the last ARAR meeting to the minimum requirements for containment of the waste tailings at the mine site. In the way of background to my comments on this issue, I wish to point out that, while I was on the faculty at the University of Texas system, I was asked to be an advisor to the California State Water Resources Control Board in developing what was then Chapter 15, now Title 27, regulations governing the landfilling of solid wastes. I worked with the State Board staff to help establish these regulations which, at the time of their adoption in 1984, were the most progressive regulations anywhere in the country in terms of providing for true long-term public health and environmental protection.

While the ARAR discussions focused on Class B versus Class A waste classification approaches, and the minimum requirements for each class, these discussions failed to consider the fact that Chapter 15, now Title 27, has, as its fundamental tenet, a Performance Standard for any waste containment system, which requires, as the minimum for Subtitle D, that the system prevent groundwater pollution by waste-derived constituents for as long as the wastes are a threat. For Subtitle C, there can be no leakage of the waste-associated constituents from the containment system. For years, much to the disappointment of those of us who worked on developing Chapter 15, the Regional Water Quality Control Board staff and Board and, more recently, the State Water Resources Control Board staff and Board have been misinterpreting Chapter 15, now Title 27, to mean that the minimum prescriptive design requirements (for liners, covers, etc.) will achieve the Performance Standard of protecting groundwaters from contamination/pollution for as long as the wastes in the waste management area are a threat. It is obvious, from the original statement of reasons associated with developing Chapter 15, and to anyone who is concerned about providing true long-term public health and environmental protection, that the minimum prescriptive design standards cannot, at all sites and for all types of wastes, comply with the overall Performance Standard set forth in the regulations.

With respect to the Lava Cap Mine remediation approaches, the public will be looking to the US EPA, DTSC, and others, to do a proper evaluation of the ability of whatever containment system, monitoring system, etc., is adopted, to provide, with a very high degree of reliability, containment of the arsenic and, for that matter, other constituents which are a threat to cause groundwater pollution, for as long as they are present in the waste containment system.

As I mentioned at the meeting, as a result of my repeatedly testifying on this issue before the State Water Resources Control Board, I have been able to get the current State Board to recognize that minimum design requirements set forth in Title 27 do not automatically, for all types of wastes at all sites, comply with the overall Performance Standard of protection of groundwater quality, public health and the environment for as long as the wastes in the containment system are a threat. With respect to tailings containing arsenic, these tailings will be a threat to cause groundwater pollution, forever. All the remediation approaches adopted at the Lava Cap Mine Superfund site must reflect an understanding of this time period, and plan accordingly.

“Hazardous” versus “Nonhazardous” Wastes

During the ARARs discussion, it was concluded that whether the wastes are classified as “hazardous” or “nonhazardous” does not impact the character of the cover for the wastes that will be developed. It should be understood (and, again, this is obvious to those who critically analyze the characteristics of a landfill cover of the type allowed today) that these covers can only, at best, keep moisture from entering the landfill for a relatively short period of time after they are installed over the waste area, compared to the period of time that the wastes are a threat. The ability of a cover to prevent moisture from entering the wastes, and thereby generating leachate that can lead to groundwater pollution, is dependent on the integrity of the low-permeability layer of the cover. This layer is often buried beneath a topsoil layer and a drainage layer and, therefore, is not subject to inspection. Obviously, examining the top of the topsoil layer of the cover can tell you little or nothing about the integrity of the low-permeability layer, which is buried several feet below the topsoil layer.

From the public’s perspective, it makes little difference whether the wastes are classified as “hazardous” or “nonhazardous,” since the classification system adopted by the US EPA and the states is highly arbitrary and has little or nothing to do with the real hazards that waste constituents in a landfill represent to cause groundwater pollution by the landfilled wastes. The issue of concern is how the US EPA and eventually DTSC or the County or whoever ultimately inherits the landfills that will be developed at the Lava Cap Mine site will ensure, in perpetuity, that the low-permeability layer of the landfill cover is maintained in such a way as to prevent moisture from entering the landfill and generating arsenic-containing leachate. This issue must be addressed as part of any remediation at the Lava Cap Mine site involving covering of wastes – either an existing waste pile, or in a new landfill.

A similar situation exists with respect to developing a monitoring program. The public associated with the Lava Cap Mine site will not accept the typical approach that has been used of throwing a few monitoring wells in the downgradient direction of the groundwaters underlying the site, and calling that a credible monitoring program. Any proposed monitoring system to

evaluate the efficacy of remediation of the existing groundwater pollution and the potential for future pollution to occur must be evaluated with respect to its potential reliability of conforming to RCRA Subtitle C and D and Title 27 requirements of being able to detect leachate-polluted groundwaters when they first reach the point of compliance for groundwater monitoring. This type of evaluation should be presented on the reliability of any proposed monitoring well array to detect polluted groundwaters, for as long as the wastes in a landfill or waste management unit are a threat – i.e., forever. In the case of the Lava Cap Mine site, there should be a sufficient understanding of the groundwater hydrology through the fractured rock strata underlying the landfill so that a reliable prediction can be made of the ability to detect incipient groundwater pollution, as required by RCRA and Title 27, at the point of compliance for groundwater monitoring.

At the last ARARs meeting, there was considerable discussion about whether the wastes are classified as “hazardous” or “nonhazardous.” I have been involved in that issue since the late 1970s. A critical review of how the US EPA developed its initial EP-Tox, and now TCLP, testing procedure for this classification shows that it is an arbitrary approach that has little or no technical base for determining whether a waste material contains hazardous chemicals that are a threat to public health and the environment. With respect to the Lava Cap Mine site, waters taken in the waste pile and in the deposition area both show that arsenic is leachable from these tailings under the conditions that exist at the site at concentrations that are a threat to public health. Therefore, independent of any waste classification system, these tailings have leached and, in the future, will leach arsenic at a sufficient rate and extent to be a threat to groundwater quality. This is not a debatable issue. Therefore, independent of any classification system that might be used to classify the wastes as “hazardous” or “nonhazardous,” the management of the arsenic-containing wastes must reflect that these tailings are a significant threat to surface and groundwater quality, and must be managed accordingly.

Any attempt to develop an approach that uses minimum prescriptive standards for management of the tailings will be met with vigorous public opposition. The public who own or use property in the vicinity of the Lava Cap Mine site and where its tailings are now located is entitled to very high long-term protection of groundwater resources, surface water resources, soils and sediments. The typical approach that is used at many Superfund sites of getting in, doing something, calling it “remediated,” and leaving the public with a mess that will have to be addressed again with further cleanup, will be opposed at the Lava Cap Mine site. While it may not be possible to achieve the level of protection that the public should be entitled to, clearly, as part of developing the management approach for the waste residuals that are left at the site, the US EPA and its consultants will be required to reliably define the magnitude of the risk associated with these residual wastes in any management system that is adopted for remediation of the site.

US EPA Criteria Issues

At the recent ARARs meeting there was discussion about cleaning up water and soils to “background,” which, for arsenic in water, appears to be about 2 µg/L. As I have commented in the past, the US EPA’s 10 µg/L drinking water MCL, which has finally been promulgated in a recent *Federal Register*, was not a risk-based number, but a political value. Two µg/L is still a

high risk, compared to normal allowed risks for drinking water carcinogens. However, it is far more appropriate than 10 µg/L.

There was discussion about the table (Table 1) that was provided by CH2M Hill on arsenic concentrations found above the CTR criteria – in particular, the “human health” water quality goal of 0.018 µg/L. As I indicated at the meeting, I believe that value is inappropriate if it is supposed to be derived from the CTR criteria. The basis for my assessment is that, as part of my work for the Santa Ana Regional Water Quality Control Board in investigating heavy metals in the Orange County Upper Newport Bay watershed, I became aware of the 0.018 µg/L value as a value that was a risk-based value, representing drinking water and bioaccumulation potential of arsenic in aquatic life. This value was present in the US EPA 1999 update of water quality criteria. I subsequently found that that value was not included in the CTR criteria. I discussed this with Phil Woods of the US EPA Region 9, who told me the Agency decided not to include it in the CTR. Therefore, the information provided by CH2M Hill, that the 0.018 µg/L is a CTR criterion value, appears to be in error. As I understand it, the problem with the CH2M Hill approach is that it appears that they relied on a CVRWQCB report by Marshack as a source of information on this issue.

I wish to bring to your attention that the US EPA, in November 2002, has issued its revised and updated water quality criteria (US EPA, “National Recommended Water Quality Criteria: 2002,” EPA-822-R-02-047, November 2002.) A check of these criteria shows that the April 1999 National Recommended Water Quality Criteria – Correction value of 0.018 µg/L is the November 2002 “Human Health for Consumption of Water + Organism” value for arsenic. This is an update by the Agency of arsenic criteria. Since the US EPA water quality criteria are often used by the CVRWQCB to judge excessive concentrations of pollutants in wastewater effluent, it is possible that this value could become applicable to treatment plant discharges for the Lava Cap Mine site. This is an issue that will need additional attention in establishing the discharge limits for arsenic from the wastewater treatment plants that will be constructed at the Lava Cap Mine site.

From an overall perspective, on behalf of the public, I would recommend that 2 µg/L (or a properly established background level) be the cleanup objective for water, and that this value be based on total arsenic, not dissolved arsenic. The justification for using total arsenic is that particulate arsenic associated with tailings has been found, under the conditions that exist in the Lava Cap Mine area, to be at least partially leachable.

Stormwater Runoff Issues

In several sets of comments and again at the recent ARARs meeting, I have raised the issue about stormwater runoff being an issue that still has not been adequately addressed in the site investigation, and apparently is still not being adequately addressed. I am still greatly concerned that the US EPA has not yet established a credible stormwater runoff monitoring program for the Lava Cap Mine Superfund site. Before a ROD can be developed for various waste management units at the Lava Cap Mine site that would be acceptable to the public, a proper stormwater runoff water quality monitoring program will have to be conducted.

One of the issues that I raised at the last ARARs meeting is stormwater runoff associated with OU-1, the mine and tailings area. I have found that RPMs for several Superfund sites do not give adequate attention to stormwater runoff issues. This has led to my publishing two peer-reviewed papers on this issue, which were based on the UCD/DOE LEHR site problem. These papers,

Lee, G. F. and Jones-Lee, A., "Stormwater Runoff Water Quality Evaluation and Management Program for Hazardous Chemical Sites: Development Issues," Superfund Risk Assessment in Soil Contamination Studies: Third Volume, ASTM STP 1338, American Society for Testing and Materials, pp. 84-98, (1998), and

Lee, G. F. and Jones-Lee, A., "Evaluation of Surface Water Quality Impacts of Hazardous Chemical Sites," *Remediation*, 2:87-118, (1999),

are available from my website, www.gfredlee.com, in the Hazardous Chemical/Superfund section. As it stands now, I may have to add a supplement to these papers which includes a discussion of the Lava Cap Mine site stormwater runoff monitoring situation.

The OU-1 will likely be a landfill of some type. Landfills have special requirements with respect to stormwater runoff monitoring. These need to be considered as part of developing the treatment unit for water discharges from the OU-1. There could readily be sufficient concentrations of arsenic in the runoff waters from this area to violate the discharge limits. This, in turn, could require, under the NPDES permit or equivalent that will likely be issued for stormwater runoff, treatment to prevent exceedance of the cleanup requirements.

Another aspect of stormwater runoff from the OU-1 area that I raised at the previous ARARs meeting is the potential for the so-called "background" in the OU-1 area to be elevated because of dust-blown tailings being carried over the countryside in that area. This elevated arsenic in the area just outside of OU-1 could contribute to elevated arsenic in stormwater runoff that is a direct result of the former mining and ore processing activities. From my point of view, I am still unclear as to whether a "background" surface soil arsenic concentration has been adequately established. This issue needs to be addressed.

Groundwater Discharges to Little Clipper Creek

One of the issues that I raised at the last ARARs meeting that will need to be addressed is whether groundwaters containing arsenic above "background" – i.e., those that are not impacted by tailings or the mine – are discharged to Little Clipper Creek. If they are, and it is near the OU-1 area, then it may be desirable, as part of siting of the treatment works for the groundwater discharges at the mine, and in springs, to accommodate a pump-and-treat system, where the groundwaters that are discharged to Little Clipper Creek are collected and treated.

If there are questions about these comments, please contact me. Please pass them on to your colleagues within your agency, since I do not have their email addresses.

G. Fred Lee