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Adequacy of Contaminated Soil Clean-Up at the LEHR Site

Dear Julie:

Over the past year, considerable attention has been devoted to removal of radioactive and hazardous wastes from various waste disposal areas at the UCD/DOE LEHR national Superfund site. At the March 23, 1999 RPM meeting, a considerable part of the discussion was devoted to the DOE's review of the confirmation sampling that was done in the southwest trench area to determine the potential need for additional removal of contaminated soil in the vicinity of the waste burial areas. From the information provided, it appears that the potential carcinogens as well as the potentially toxic constituents present in the soils near the southwest trench area are sufficiently low so there is no need for any additional excavation. This conclusion does not necessarily address the nitrate issue which will be addressed in the future.

Inadequate Evaluation of Potential Public Health Hazards in LEHR Site Soils

I am bringing this situation to DSCSOC's attention since the approach that is being used by DOE focuses on human health issues based on physical contact with the contaminated soils where the concern is for absorption, inhalation or ingestion of the soil or soil-associated constituents. Some attention is being given to groundwater contamination by residual constituents in the soils near waste burial areas. This issue continues to be inadequately addressed due to attempts by DOE to use vadose zone modeling approaches which are well-known to be unreliable to predicting transport to groundwater.

As I discussed at the meeting, the human health hazard associated with residual waste-derived constituents that are left in the soils at the LEHR site still does not consider one of the potentially more important pathways by which the public could be exposed to hazardous conditions. This is the pathway of stormwater runoff carrying hazardous constituents to Putah Creek which within the Creek bioaccumulate in fish to excessive concentrations. The two known constituents of greatest concern at this time are mercury and chlordane. While it appears that the mercury and chlordane concentrations in the surface soils after waste burial remediation will be at background, as I understand the situation, there could be elevated concentrations of these constituents at some depth below the surface which could be a significant threat to public health through physical contact with the soils should they be brought to the surface at some time in the future through excavation in the areas. A readily plausible scenario that could develop at the LEHR site is that 25, 50, 100 or more years from now, excavation in the region of the waste burial holes/trenches brings the contaminated soils to the surface. These contaminated soils, then, through stormwater runoff from the area carry the constituents such as mercury or chlordane to Putah Creek. In Putah Creek, the mercury or chlordane are converted to forms that are bioavailable for accumulation within fish or other aquatic organism tissue. This, then, either causes or contributes to excessive concentrations of these

constituents in fish tissue which would represent an increased hazard to the use of the fish as human food. The critical concentrations of both mercury and chlordane as they may bioaccumulate in fish tissue are lower than the concentrations that are a threat through other routes of exposure. I have recently provided DSCSOC with a discussion of these issues.

Another mode of transport of waste constituents to the surface is through plant translocation involving uptake in the roots and the transport up to the environment through leaves and flowers. As you know, for three and a half years I have been trying to get UCD and DOE to investigate this mode of transport at the LEHR site. Thus far, I have been largely unsuccessful, even though this is a well-known pathway that could be contributing to the pollution of Putah Creek by LEHR site wastes in the stormwater runoff and airborne pollen transport from the site.

Need for Use Restrictions on LEHR Site Property

It is now clear that it will never be possible to develop a clean closure of the waste burial areas at the LEHR site, even though all the wastes buried at this site in the waste burial holes and trenches have been removed. There will be known hazardous as well as unknown hazardous constituents in the soils near the waste burial areas that can be a threat to public health and the environment. It will be necessary to impose land use restrictions covering excavation and the growth of deep-rooted plants in the waste burial areas to prevent the transport of residual hazardous chemicals from the soil near the waste burial areas to the surface which then becomes part of the stormwater runoff from the site that, in turn, pollutes Putah Creek. This situation points to the need to have a highly effective *ad infinitum* stormwater runoff monitoring program for the LEHR site that can detect potential problems of this type at any time in the future.

It is my recommendation that DSCSOC adopt the position that any of the waste burial areas must have land use restrictions on activities in these areas that are put in place and for which there is a reliable enforcement mechanism implemented to restrict activities in these areas that could result in bringing subsurface soils that are contaminated by LEHR site wastes to the surface. Also, these use restrictions should require that the University of California, Davis conduct an effective monitoring program to ensure that deep-rooted plants, such as trees and some shrubs, are not allowed to grow in the vicinity of the waste disposal areas where they could pick up residual waste constituents in the soil and translocate these to the surface. Further, the closure of these waste burial areas must include a requirement for reliable stormwater runoff monitoring from these areas that measures the concentrations of potential constituents to the extent possible in the stormwater runoff that could be a threat to human health and/or the environment in Putah Creek. Included within this monitoring program is the requirement for an on-going bioaccumulation monitoring program within Putah Creek conducted by the University of California, Davis to detect any incremental increases in bioaccumulatable hazardous chemicals, such as mercury, and/or chlordane in Putah Creek fish.

Constituents of Concern

One of the ongoing concerns that DSCSOC has about the University of California, Davis/Department of Energy approach toward the remediation of the UCD/DOE LEHR national Superfund site is the limited approach toward defining constituents of concern. As I have repeatedly pointed out and as is well-known, the approach that is being used at the LEHR site to define constituents of concern is inadequate. It focuses on a limited number of constituents compared to the tens of thousands of constituents that could be present as wastes at the LEHR site that are a threat to public health and/or the environment. Further, it also ignores the degradation and transformation products of the known, as well as unknown, hazardous-deleterious chemicals at the site.

As an example of deleterious chemicals, the Central Valley Regional Water Quality Control Board requires in the Basin Plan that groundwaters are protected from impaired use by taste and odor-producing compounds. As far as I know, there has never been an evaluation of whether the groundwaters at the LEHR site contain taste and odor producing compounds that would impair the use of the waters for domestic or some other purpose.

Duncan Austin has recently brought to my attention a highly significant local problem of the type that has been of concern to me and some others with public health backgrounds on the inadequacies of Superfund and hazardous chemical site investigations in defining the constituents of concern at sites where there is a mixture of chemical constituents at the site. The problem that has surfaced at Aerojet where perchlorate has been found to be a widespread groundwater contaminant associated with Aerojet's mismanagement of its wastewaters is an example of this type. Perchlorate was not known to be a hazardous chemical and is not typically measured in surface or groundwater studies. It is a chemical that is used substantially in some university settings. For example, both my Master's degree and PhD degree work made use of perchlorate as a constituent in the chemical kinetic studies that I conducted in association with this degree work.

While hot perchloric acid solutions can lead to highly violent explosions, cold, even concentrated perchlorate or perchloric acid is highly inert. This property would make it readily transportable in groundwaters. It has recently been found, however, that perchlorate is highly toxic to animals and suspected to be toxic to man. By failing to develop a comprehensive list of constituents of concern at the Aerojet site, the situation has developed where groundwaters containing VOCs were pumped to the surface, air stripped and re-injected. The pumped and re-injected groundwater contained perchlorate. Now according to Duncan, this perchlorate is in municipal water supply wells located several miles from the original source. Could this occur at the LEHR site? Certainly. UCD, like other research institutions, uses a variety of hazardous chemicals for which there is little or no information on the potential impact on public health, groundwater resources and the environment. It is essential in any hazardous chemical site clean-up, such as at the LEHR site where a wide variety of various types of hazardous and detrimental chemicals were used and disposed of improperly as wastes, to recognize that there could readily be significant problems that go undetected which could surface at some time in the future in either private or public water supply wells in the Davis area.

As you know, UCD has been highly derelict in its offsite groundwater investigations. We still do not know how far the pollution plume in HSU-2 has gone and only now almost four years after DSCSOC first raised this issue, is UCD beginning to define the pollution of HSU-4.

I wish to follow up on the recent April 22, 1999 RPM meeting to provide DSCSOC with some comments on some of the issues that were raised that are particularly relevant to DSCSOC/the public's interests.

Modification of the IRA Point of Groundwater Recovery

At a recent RPM meeting D. Austin proposed, and I strongly support, the notion that the IRA as it was developed a year ago involving the pumping of groundwater for chloroform removal is not effective. When Duncan and I suggested that the point of extraction should be changed much closer to the known source of chloroform in order to make the pumping of groundwater more effective, UCD representatives attempted to claim that this would require a CEQA review since the purpose of the IRA was to serve as an effective cutoff for off-site transport of chloroform to adjacent properties' groundwater resources. This is another of the inappropriate approaches that are used by UCD where they ignore the RPMs' and DSCSOC's conclusions and recommendations regarding the potential effectiveness of the IRA in serving as a groundwater remediation approach.

As is well documented in previous DSCSOC discussions of the IRA, the IRA was never considered an effective approach for remediation of contaminated groundwaters with respect to serving as an effective barrier to off-site pollution by the mismanaged campus chloroform waste that were dumped into landfill pits at the LEHR site. As is documented in DSCSOC's correspondence, the IRA was allowed to proceed without DSCSOC's opposition based on the fact that it was an experimental approach that would provide some information on the characteristics of the groundwater system which would eventually have to be managed to remove the chloroform and other constituent pollution. It was never considered a definitive pollution control program but an experimental program that was needed to begin to obtain the information needed to properly characterize the aquifer system that has to be remediated both on-site and off-site.

UCD has been trying to mislead the RPMs and the public into believing that constructing a single well downgradient of a known chloroform source would be an effective on-site as well as off-site groundwater pollution control measure. Even the most elementary understanding of the system would lead someone to conclude that such an approach is highly unlikely to be effective. Now that the IRA has proven to be ineffective as a chloroform removal procedure, DSCSOC should strongly support Duncan Austin's suggested approach of moving the point of removal of chloroform to much nearer the source so that the money spent in pumping the groundwaters and stripping out the chloroform is much more cost-effective than is occurring today.

You may recall that at the RPM meeting I asked what were the concentrations of chloroform in the downgradient well from the point of extraction. It was pointed out that they are still well above the critical concentrations that will have to be achieved on-site as well as off-site in order to protect public health from pollution by a regulated carcinogen. DSCSOC should strongly support requiring that UCD immediately plan for moving the extraction point for chloroform removal as part of the IRA so that a new removal well is developed and put into operation during the summer of 1999.

More Effective Groundwater Remediation Needed

UCD should not be allowed to continue its recalcitrant polluter approach of doing the least possible to just get by. It must proceed much more aggressively to begin to effectively remediate the polluted groundwaters, both on-site and off-site. In the four years that DSCSOC has been involved, the UCD L. Vanderhoef administration has done far less than it should have in addressing appropriate public health and environmental protection associated with the LEHR site. The L. Vanderhoef administration continues to treat the public's interests as being of lower priority than some ill-conceived and ill-founded approach toward the appropriate groundwater remediation that should be occurring at the LEHR site.

The UCD L. Vanderhoef administration has been attempting to mislead the RPMs and the public into believing that its IRA would in some mysterious way be an effective approach to cleaning up off-site groundwater pollution. This is the recalcitrant polluter approach that has been followed by UCD in addressing LEHR site issues for the last 12 years. It is my recommendation to DSCSOC that DSCSOC take the necessary action to require the L. Vanderhoef administration start to effectively remediate the off-site groundwater pollution.

It is time for the UCD L. Vanderhoef administration to begin to aggressively move toward cleaning up the off-site groundwater pollution by installing a significant number of pump and treat wells, both on-site and off-site. If the RPMs are not willing to take action to require UCD to begin to effectively clean up off-site groundwater pollution by mismanaged campus waste chloroform, then DSCSOC will need to take action with the heads of the RPM administrations to force this issue. Four years is long enough to continue to call for off-site groundwater pollution control and clean-up. If DSCSOC does not see by the end of September 1999 an effective program in place for off-site groundwater pollution control, then DSCSOC

will need to take action through all avenues to force the implementation of such a program. We can no longer allow the L. Vanderhoef administration's recalcitrant polluter approach to dominate the actions of the RPMs. The public's interests are sufficiently great to require that this issue be addressed immediately. The UCD L. Vanderhoef administration has had four years to act on DSCSOC's requests for off-site groundwater remediation. The UCD L. Vanderhoef administration has done essentially nothing to address this issue. We still do not know the full extent of off-site groundwater pollution in HSU-2, much less HSU-4. As Duncan Austin pointed out, there is need for several more HSU-4 wells to just begin to define the off-site pollution that has been caused by UCD's mismanagement of the campus chloroform wastes. These wells should be in place this summer/fall. DSCSOC cannot allow UCD to continue its one-well-per-year approach, but in fact must admit to the Governor and legislature that its past mismanagement of its campus waste has caused massive groundwater pollution that needs to be immediately addressed.

I was shocked at the April 22, 1999 RPM meeting to hear the UCD L. Vanderhoef administration propose to do no further monitoring of groundwater pollution at Landfill #3. Above all else, this is one of the most significant demonstrations of the recalcitrant polluter approach by this administration that has occurred thus far. To even think that the RPMs and DSCSOC would accept such an approach is totally inappropriate and contrary to the interests of UCD and its consultants. The RPMs and DSCSOC have made it repeatedly clear that the pollution of groundwaters on-site and off-site by Landfill #3 is an issue that has to be addressed. It has not been reliably addressed thus far. There could readily be significant plumes of on-site and off-site groundwater pollution that have not been detected at Landfill #3. To now propose to eliminate the HSU-1 well and not propose to add additional wells to define the on-site and off-site pollution by Landfill #3 is an example of the complete lack of interest in the public's welfare and health by the L. Vanderhoef administration.

Landfill #3 was active while LEHR was active. While Landfills #1 and #2 preceded LEHR, Landfill #3 received LEHR waste. Ralph Virgin pointed out that he repeatedly hauled LEHR waste to Landfill #3 and the UCD Landfill #4 on the west side of the campus. To now propose to fail to properly investigate the pollution of groundwaters by the LEHR and campus waste deposited in Landfill #3 is absurd. This should be brought to the attention of the Governor's office and legislature. L. Vanderhoef needs to immediately instruct his staff that he wants to put a stop to the recalcitrant polluter approach and start to provide for full public health and environmental protection associated with past inadequate and current inadequate campus waste management instead of knowingly allowing these kinds of situations to occur year after year.

Revised Drinking Water MCL for Trihalomethanes

I wish to bring to your attention that as of December 1998, the US Environmental Protection Agency has decreased the drinking water MCL for total trihalomethanes (TTHMs) from 100 : g/L to 80 : g/L. The Agency has also established a maximum contaminant goal for total trihalomethanes of zero based on a projected cancer risk associated with the principal components of total trihalomethanes which include chloroform. Again, as in the past, the MCL of 80 : g/L is not based on a health risk assessment but is a compromise between the need to effectively disinfect drinking water to control diseases and the health risk associated with total trihalomethanes which are projected to have a significant cancer risk.

If there are questions or comments on these issues, please contact me.

Fred