Comments on UCD LEHR Superfund Site
Draft Site-Wide Risk Assessment
Dated August 1, 2003

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to
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Volume 1: Human Health Risk Assessment

Overall Comments and Major Problems

The authors of this LEHR site "Risk Assessment" have not adequately and reliably reviewed the PRP reports and comments on the reports by DSCSOC on many of the issues presented in this draft Risk Assessment. This is of significance, since, as discussed below, the draft Risk Assessment contains numerous errors and/or unreliable statements that could have been avoided if the authors of the Risk Assessment had properly reviewed and incorporated past DSCSOC comments on PRP reports. These issues are discussed under "Specific Comments."

Appendix A contains a list of many of the issues of concern that DSCSOC has repeatedly raised about the inadequate LEHR Superfund site investigation that has been conducted thus far. Because of an inadequately conducted site investigation program, in such areas as stormwater runoff, there are significant deficiencies in pertinent data to key pathways for the transport of pollutants from the LEHR site to offsite areas. There are also significant deficiencies in estimating lead exposure to children and in defining constituents of concern (COCs). This Human Health Risk Assessment is significantly deficient with respect to addressing several areas, as presented below.

Mercury Bioaccumulation. LEHR site runoff contains mercury in excess of about 5 ng/L, which would, under worst-case conditions, have the potential to contribute to excessive mercury bioaccumulation in fish, which would represent a threat to human health. These issues have been discussed in detail in the materials that have been provided to the RPMs and PRPs by DSCSOC. This Risk Assessment needs to be expanded to include a proper discussion of mercury, using the latest information available – i.e., the information from the US EPA Region 9 (Phil Woods) that was provided in my recent write-up on this issue.

Chlordane Bioaccumulation. Another significant deficiency that has resulted from inadequate stormwater runoff monitoring is with respect to the potential for chlordane in soils at the LEHR site to be present in stormwater runoff to Putah Creek that can lead to or contribute to excessive chlordane concentrations in Putah Creek fish, which cause the fish to be a threat to human health. DSCSOC has repeatedly pointed out this deficiency and recommended that the chlordane content of Putah Creek fish in the vicinity of the LEHR site be determined.

Unidentified COCs. The Risk Assessment fails to adequately discuss the fact that some samples taken from the LEHR Superfund site water contain substantial amounts of TOC that is

not characterized with respect to individual chemicals or that in combination with other chemicals can be hazardous to humans, aquatic life and wildlife. The full extent of this problem is not known since the PRPs have failed to follow the suggestions of DSCSOC of including TOC in all water sample measurements. Further, there has been no examination of the LEHR site waters, using biological testing procedures, for constituents that could cause cancer, mutations and birth defects. DSCSOC has provided the PRPs and RPMs with references to US EPA (1988) reports that discuss this type of testing. Without it, it is not possible to begin to properly characterize the potential risk to humans of LEHR site polluted waters.

Pica Child. Another major problem is the failure to include information on the pica child, with respect to blood lead levels. As discussed at the RPM meeting, blood lead levels below 10 µg/dL are known to be adverse to children. Further, some children consume more soil, and therefore lead, than what has been assumed in this Risk Assessment. A properly developed Risk Assessment would discuss that there is a potential for a child at the site to have a greater exposure to lead than that presented.

Recommendation:

A discussion of the inadequate studies that have been conducted at the LEHR Superfund site to properly assess the risk of mercury, chlordane, lead, and TOC-uncharacterized hazardous chemicals should be included in this Risk Assessment.

At this time it is not possible to evaluate the significance of the deficiencies in the LEHR site study program and in this Risk Assessment, since information is not available on how the Risk Assessment conclusions will be used in determining site remediation. If a number of the Risk Assessment conclusions are properly considered as having little or no validity and site remediation is not significantly based on the Risk Assessment, then the Risk Assessment can be considered as a document that is a necessary part of a CERCLA Superfund site activity, and it will fill the spot reserved for it on a bookshelf. If, however, major remediation decisions are to be made based on this Risk Assessment, then it will be necessary to conduct the investigations that have been recommended by DSCSOC since the mid-1990s, in order to provide the technical base of information that is needed to develop a reliable risk assessment for human health and the environment.

Problem: How will the Risk Assessment data be used?

The key issue that needs to be addressed is what will be done with the various risk estimates that have been developed in this draft report, in terms of specifying chemical remediation at the site. The decisions that are made will ultimately have to consider the reliability of the Risk Assessment and all the uncertainties in the approaches that have been used.

An example of what is meant by the position of not being able to properly evaluate the significance of the inadequate site investigation that leads to an inadequate information base to conduct a reliable human health and ecological risk assessment occurs with the issue of modeling when the soil column pollutants will reach the water table and contribute to further groundwater pollution. In addition to the unreliability of estimating the sorption/desorption coefficients repeatedly discussed by DSCSOC in its comments on DOE vadose zone modeling, there is the unreliability of not properly considering wetted front transport of soil/subsurface strata

associated pollutants in estimating their rate of transport to the water table. As it stands now, the rate of transport of pollutants in soils and wastes to groundwater is largely unknown. The Risk Assessment estimates of groundwater pollution by soil column pollutants can be characterized as highly speculative with little technical foundation.

Previously, DSCSOC has stated that, so long as the unsaturated modeling is considered computer game-playing and is not used to influence the need for detailed *ad infinitum* monitoring of the upper few feet of HSU-2 for each area where soil column pollutants are found, then it can be accepted as a computer game and filed with the LEHR CERCLA reports. This monitoring will require a number of additional monitoring wells located upgradient and downgradient of each waste management unit. If, however, the current vadose zone modeling that has been done by UCD and DOE is attempted to be used to modify the groundwater monitoring program that will need to be conducted, then much more reliable modeling of vadose zone transport will need to be conducted, in which wetted front transport of soil column pollutants is included in the modeling to demonstrate the rate at which some of the LEHR site pollutants still in the soil column will be transported to the water table. Also, site-specific determination of binding coefficients of pollutants will need to be made as well as conducting unsaturated monitoring of actual pollutant transport in each of the areas where there is concern about residual pollutants in the LEHR Superfund site soils.

Another significant deficiency in this Risk Assessment is the failure to discuss the human health and ecological impacts in those areas where there has been inadequate groundwater monitoring. Examples of these areas are just down groundwater gradient from many of the waste management units, as well as the spread of pollutants by the UCD IRA.

Recommendation:

These issues need to be discussed in a credible Risk Assessment for the LEHR Superfund site.

Specific Comments

Problem: Inadequate report preparation and proofreading

Examples of Problem:

Page ES-1, second paragraph lists, on the third line, a reference to the US EPA (1999a). In checking the reference list, there is a US EPA (1999) and a US EPA (1999a). The references in the reference list are not listed properly. The first "1999" should have been listed as "1999a."

Page ES-1, last paragraph, first line references "MWH, 2002." That reference is not listed in the reference list.

The referencing of US EPA (2001c) in the reference list is done incorrectly. The reference listing for the first time that particular author and year is mentioned should be listed as "a."

In this same paragraph is a reference to the National Research Council (1994) guidance. This is not listed in the reference list.

There are so many problems with the references that I have stopped reviewing them. As discussed in previous DSCSOC comments, this is a chronic problem with UCD reports on the LEHR Superfund site.

Recommendation:

UCD should be instructed to start over with respect to developing this report, in which it is properly developed with respect to such simple but important things as listing of references.

Problem: Apparent Inconsistent Presentation of "Receptor Population" Status

Examples of Problem:

Table E.2, Page 2 of 7, as the last entry on the page, "Sediment" lists as the receptor population, "Trespasser." I do not understand that anyone who fishes, canoes, or otherwise uses Putah Creek is a "trespasser." Waters of Putah Creek are public waters. This problem shows up in a number of other situations dealing with Putah Creek.

Table E.2, Page 7 of 7, as the top line in the table, for "Sediment," lists an onsite resident child as someone who could be exposed to sediments from Putah Creek, but does not list him/her as a "trespasser." It appears that this table has not been properly developed by UCD and its consultants. There seems to be an inconsistency as to the listing of information pertinent to sediment issues, where in one case, someone exposed is a trespasser, and an onsite resident child is not a trespasser.

Table 1, at several locations beginning on page 7 of the table, has the same problem of classifying anyone fishing in Putah Creek as a "trespasser." This table needs to be carefully reviewed to be sure that it properly and reliably presents the information.

Page 4-6, last paragraph again discusses that anyone using Putah Creek for recreational purposes is a "trespasser." It does not appear to me that this is accurate. It certainly is inappropriate.

Recommendation:

Someone who knows the situation should review this and determine if anyone who uses Putah Creek is a "trespasser." If this is an incorrect status, then the terminology should be changed throughout the report.

Problem:

Page 2-4, third paragraph, last sentence, states that, "*With the minimum upstream flows secured, the South Fork of Putah Creek currently flows uninterrupted to the Yolo Bypass.*" Based on my attending a series of Putah Creek information meetings held by the Putah Creek Council this past spring, Putah Creek water does not enter the Yolo Bypass continuously. This needs to be checked. There is a wetlands area outside of Yolo Bypass where the water, except under high flows, accumulates, infiltrates or evaporates.

Recommendation:

The situation on the flow of Putah Creek into Yolo Bypass needs to be evaluated and, if the information presented at the Putah Creek Council meetings was correct, the report needs to be changed to reflect the situation accurately. Note, the area just outside of Yolo Bypass where Putah Creek water accumulates is an area where there could be accumulation of LEHR site pollutants in the sediments.

Problem:

Page 4-1, mid-page, presents a listing of the pathways for movement of pollutants from the LEHR site to offsite locations. As DSCSOC has been pointing out year after year, a potentially significant pathway is missing from this listing, which is the translocation of pollutants in soil, through vegetation, to leaves and flowers, which are released to the surface soils or to the atmosphere.

Recommendation:

The listing on page 4-1 of pathways needs to be expanded to include uptake by plants. The mention of this pathway on page 4-2 should include that plant uptake can lead to disbursement of pollutants to the environment through flowers and leaves, and to the atmosphere.

Problem:

Page 4-3, section 4.3.2 Migration from Groundwater to Surface Water, needs to include the pumping of groundwater that is discharged to the surface, such as through irrigation. There has been spread of some pollutants from the LEHR site through irrigation. This issue has not been addressed at the LEHR site, even though it was mentioned some years ago by DSCSOC as a pathway that needs to be considered/investigated. Further, the statement that the pathway from groundwater to surface water is "considered incomplete" is inappropriate. It has occurred and may still be occurring.

Recommendation:

The report needs to be changed to reflect the fact that HSU-2 groundwater has been pumped to the surface and used for irrigation, which could lead to increased groundwater pollution by LEHR site wastes over that which would have occurred by the groundwater pollution plume created by the LEHR site.

Problem:

Pages 4-3 and 4-4, in section 4.3.6 Inter-HSU Migration, as DSCSOC has repeatedly discussed in the past, there is inadequate information to claim that there is no migration of pollutants from HSU-2 to HSU-4 through HSU-3. A former site hydrogeologist (Parfitt) has indicated that such migration is likely. These issues are discussed in previous DSCSOC comments and below.

Recommendation:

The report needs to be changed to acknowledge that there is a potential for this migration to occur and that further studies need to be conducted to determine whether it has occurred or will occur.

Problem:

Page 4-4, section 4.3.7 Surface Water/Sediment Equilibrium, indicates that equilibrium-partitioning models will be used. As DSCSOC has commented in the past, these models are not reliable in these types of situations, since the actual chemical forms that control the availability of constituents in sediment are not known. For example, it has been well known since the early 1990s that there are several forms of TOC, not just a single form. Each form has its own ability to bind constituents to solid surfaces. To conduct modeling without site-specific investigation of binding capacity for the constituents modeled, as though all TOC associated with a solid surface had the same binding capacity, is technically invalid. This issue is well known in the sediment quality literature. Further, there are a variety of sediment-associated constituents, such as hydrous oxides of iron, that can control partitioning, for which there is no reliable model.

Recommendation:

These issues need to be discussed as part of presenting any results of equilibrium partitioning modeling.

Problem:

Beginning on page 6-10, and continuing for the next several pages, is a summary of the chemical transport and uptake modeling that has been done in this Risk Assessment. It should be understood that the approaches that are used in these models are not necessarily reliable. For example, on page 6-11, top of the page, the concentration in fish tissue should not be estimated based on the equation provided. As discussed in DSCSOC's previous comments, the US EPA abandoned that approach several years ago in developing water quality criteria for chemicals like mercury. It should be understood that all of this modeling is game-playing, with little or no backup, and the modeling results have little or no validity. The models can either overestimate or underestimate the actual situation.

The statement is made on the bottom of page 7-2, last sentence, *"Thus, actual future concentrations of COPCs in each of the modeled media at the Site are likely to be less than those predicted by the model."* This statement is not reliable. They can be either higher or lower, depending on the model and the constituent. Without site-specific investigations, it is not possible to make this type of evaluation.

Recommendation:

The deficiencies in the modeling need to be properly discussed, so that the readers understand that the site has not been properly investigated to develop the site-specific information needed to properly use models of this type.

Problem:

Page 14-3, section 14.2 Chemicals of Potential Ecological Concern, states as the next to last sentence, *"Sediments are considered a key measure of historic impacts to Putah Creek because they could sequester site-related chemicals."* DSCSOC has previously pointed out that this approach is a technically invalid approach that should not be followed. The statement is true only in downstream areas where there is pooling of the water. It will not apply to the area adjacent to the LEHR site, since during high flood flows, any sediments in these areas would be carried downstream. The historic effects of releases from the LEHR site to Putah Creek could

possibly be reflected in downstream sediments – not the sediments immediately adjacent to the LEHR site.

Recommendation:

Revise the wording to properly reflect the issues of LEHR-site-derived sediment transport and deposition in Putah Creek.

Problem:

Page 14-3, section 14.3 Relevant and Potentially Complete Exposure Pathways, in the second paragraph, last sentence, cites Parfitt, 1996. I find it of interest that when UCD and its consultants want support for a position that they hold, they cite someone. However, Parfitt also pointed out that he thought that HSU-3 would not prevent pollution of HSU-4, due to its hydrogeochemical characteristics. Why was this not cited in discussing this issue? It should have been, especially since it is a more appropriate assessment of the situation, based on the current state of investigation of HSU-3 characteristics.

Recommendation:

As discussed above, the mention of Parfitt's conclusion on the potential for migration of pollutants from HSU-2 to HSU-4 should be discussed.

Problem:

Page 14-4, the top of the page fails to mention that part of the LEHR site stormwater is carried to the UCD wastewater sewerage system and discharged as part of the treatment plant effluent.

Recommendation:

This report should mention that one of the pathways for LEHR site pollutants to leave the site is through the UCD wastewater treatment plant discharge.

Problem:

In Appendix C, Data Useability Worksheets, for Sediment, the statement is made that, *"Despite rather careful planning, a very small population of benthic organisms was insufficient for quantitative analysis for site constituents."* "Careful planning" is a misstatement. There is no question that there are sufficient organisms in the sediments. If a proper approach for their collection were followed, it would have provided sufficient samples. The problem was that UCD set limits on the approach that was to be used, and did not provide sufficient funds that could be devoted to collecting organisms, with the result that an insufficient amount of organisms was collected.

Recommendation:

The report needs to explicitly state that insufficient effort was made to collect organisms in Putah Creek sediments to determine their tissue content.

Problem:

In Appendix C, Data Useability Worksheets, for Water (Groundwater, Surface Water, Storm Water), with respect to sampling of stormwater, as DSCSOC has repeatedly discussed

over the years, UCD has not made a sufficient effort to collect stormwater runoff from the LEHR site, or to properly characterize the runoff. This has resulted in an inadequate database to make a reliable assessment of the risks associated with stormwater runoff from the LEHR site. On this same page, with respect to analytical methods being appropriate for quantitative risk assessment, where it is indicated, *"Yes, the analytical techniques used for water analysis were appropriate for risk assessment purposes,"* this statement is unreliable. As discussed by DSCSOC in comments year after year, there have been chronic problems with the analytical method detection limits for some constituents in stormwater runoff from the LEHR site, especially for mercury and chlordane – two important site constituents.

Recommendation:

The report needs to explicitly state that the analytical methods used for chlordane and mercury did not have sufficient sensitivity to detect these constituents in stormwater runoff at concentrations that represent a potential to cause or contribute to an excessive bioaccumulation problem in Putah Creek fish.

Volume 2: Ecological Risk Assessment

Since the Ecological Risk Assessment contains much of the same wording in many sections as the Human Health Risk Assessment, I will not repeat the comments on those sections where it is a duplicate. The Human Health Risk Assessment comments apply to the Ecological Risk Assessment in many areas.

Problem: Incorrect Terminology

As DSCSOC has commented repeatedly, UCD and its consultants, including those who prepared the draft Ecological Risk Assessment, misuse the term "chemistry." What they are discussing is chemical characteristics. There is no "chemistry" – kinetics and thermodynamics of the reactions that control the chemical characteristics – considered in this Ecological Risk Assessment.

Recommendation:

Change all reference to "chemistry" to "chemical characteristics."

Problem: Incorrect Statements on Toxicity Test Adequacy

Another error that is made at several locations in this Ecological Risk Assessment is the statement that if the toxicity tests show no toxicity, the waters are nontoxic. Those who are familiar with how toxicity tests are conducted know that they do not have the sensitivity to reliably assess low-level chronic toxicity. This kind of situation is evidenced by the fact that the US EPA, as part of developing its water quality criteria, includes chronic "safe" concentrations that are considerably less than the values that can be measured in the toxicity test.

Recommendation:

The statements that failure to observe toxicity in toxicity tests indicates a lack of toxicity need to be removed and replaced by a proper discussion of this issue.

Problem:

Page 2-6, last bulleted item in the list, it was not the Regional Water Quality Control Board's studies on Putah Creek sediments conducted by Slotton, et al. Slotton, et al. (1999) examined fish and other aquatic life for mercury. They were supported by UCD.

Recommendation:

The reference to the RWQCB conducting the Putah Creek sediment studies should be deleted.

Problem:

Page 3-5, in section 3.2.7 Data Adequacy, states, *"The risk assessment analytical program for the Site represents a broad suite of analyses that cover all chemicals that might be reasonably expected to be present at elevated levels at the Site as a result of historical operations."* That statement is not appropriate. As DSCSOC has repeatedly pointed out, a very limited number of chemicals have been analyzed for, compared to the potential arena of chemicals that could be present in LEHR site wastes.

Recommendation:

This statement should be followed by a discussion of the fact that there could be many chemicals that could be adverse to terrestrial and aquatic life that have not been adequately examined for at the LEHR site and in stormwater runoff from this site.

Problem:

Page 5-2, section 5.1.3 Exposure Equations, under Aquatic Receptors, the second bullet indicates that the exposure to sediment-associated constituents will be assessed through milligrams of the constituent per kilogram of sediment. This is well known to be an unreliable approach. What has to be done, if it is going to done correctly, is to measure the concentrations of the toxic available forms of the constituent in the sediments – not total. As DSCSOC has discussed and as is well known in the literature, there is no relationship between the total concentration of constituents in sediments and their impacts on invertebrates or other forms of aquatic life.

Recommendation:

A statement should be added that acknowledges that the total concentration of a constituent in sediments is not a reliable indicator of its toxicity or potential for bioaccumulation.

Problem:

Page 5-5, in section 5.1.6 Bioaccumulation Models, as discussed in the Human Health Risk Assessment comments, these models have limited reliability when applied without specific tuning to the area, which is the case for their use at the LEHR site.

Recommendation:

A statement about the unreliability of these models without site-specific tuning needs to be included in this report.

Problem:

Page 5-8, in section 5.2.2 Sources of Toxicity Data, lists, as the second bullet, *"Aquatic Invertebrate Communities – Water quality standards from the California Toxics Rule (US EPA 2000)."* As I discussed at the last RPM meeting, the authors of the Risk Assessment do not understand that the US EPA water quality criteria, such as the CTR, do not necessarily properly evaluate the impacts of a chemical on all of the forms of aquatic life pertinent to a properly conducted LEHR site risk assessment. An example of this type of situation is chromium-VI. The US EPA reports in its criteria documents that chromium-VI is toxic to zooplankton at concentrations well below those of the chronic criterion that the US EPA has established. Detailed information has been provided to the RPMs and PRPs on the chromium-VI issue. Chromium-VI is not an isolated case. In order to use the US EPA criteria as a basis for judging potential impacts, it is necessary to review and understand how each of the criteria were developed, to determine whether there is a proper incorporation of the toxicity data into the criterion value.

As discussed in previous DSCSOC comments to the RPMs and PRPs, the CTR criteria have been superseded by the US EPA's (2002) National Recommended Water Quality Criteria: 2002 for aquatic life. However, even the US EPA's (2002) criteria document does not properly incorporate chromium-VI impacts on zooplankton.

Recommendation:

It is recommended that any use of US EPA criteria in this Ecological Risk Assessment as a basis for an assessment of potential impacts to a certain form of aquatic life include UCD's critical review of the background criterion documents to determine the forms of aquatic life that are adequately covered by the criteria. With respect to chromium-VI, the Risk Assessment must explicitly state that the US EPA chronic criterion for chromium-VI does not protect zooplankton, and that inadequate sensitivity was used by the PRPs in the stormwater runoff monitoring to determine if chromium-VI was present above approximately 0.5 µg/L, which is known to be toxic to certain forms of common zooplankton.

The US EPA (2002) recommended criteria values should be used to make risk estimates, where the values are based on toxicity to all of the key forms of aquatic life.

Problem:

The third bullet on page 5-8, *"Sediment-Associated Invertebrate Communities – Threshold Effects Levels (TELs) (McDonald* [sic] *et al. 2000)."* As discussed previously and as is well known among the technical community who work on the impacts of sediment-associated constituents on aquatic life, the MacDonald values or Long and Morgan co-occurrence values are not reliable for predicting impacts, or even for screening sediments for potential adverse impacts to aquatic life as part of a regulatory program. This issue has been discussed in detail in reports that I have prepared for the State Water Resources Control Board that are available from my website as,

> Lee, G. F., and Jones-Lee, A. "Unreliability of Sediment Co-Occurrence-Based Approaches for Evaluating Aquatic Sediment Quality," Excerpts from Lee, G. F. and Jones-Lee, A., "Organochlorine Pesticide, PCB and Dioxin/Furan Excessive

Bioaccumulation Management Guidance," California Water Institute Report TP 02-06 to the California Water Resources Control Board/Central Valley Regional Water Quality Control Board, 170 pp, California State University Fresno, Fresno, CA, December 2002, updated August (2003). http://www.gfredlee.com/unrelSedCooccur.pdf

Lee, G. F., "Comments on the Unreliability of the SWRCB Workplan for Developing Sediment Quality Objectives," Submitted to Arthur G. Baggett, Jr., Chairman, State Water Resources Control Board by G. Fred Lee & Associates, El Macero, CA, May 20 (2003). http://www.gfredlee.com/baggett5-20-03.pdf

Lee, G. F., "Comments on SWRCB Sediment Quality Advisory Committee Kickoff Meeting for the SWRCB Program to Develop Sediment Quality Objectives for Enclosed Bays and Estuaries in California, Held on July 29, 2003," Comments submitted to the State Water Resources Control Board by G. Fred Lee & Associates, El Macero, CA (2003). Available from gfredlee@aol.com.

The importance of using a reliable screening value is demonstrated in Figure 4-2, where the screening value determines whether the constituent is considered for further review. If the concentrations found are less than the screening value, the constituent is no longer considered. Screening values are not developed that properly consider the wide variety of factors such as additive and synergistic effects that affect how a chemical impacts aquatic and terrestrial life.

Recommendation:

All use of MacDonald or similar values or other so-called sediment quality guidelines should be removed from this report. The report should state that the investigations conducted on Putah Creek sediments, as potentially impacted by LEHR site stormwater runoff, did not include assessing whether the sediments were toxic, and, if toxic, whether toxic constituents could have been derived from the LEHR site. They also did not include assessing whether the Putah Creek sediments contained constituents that were potentially bioaccumulatable in the food web, that could be adverse to humans who use edible organisms as food or to higher-trophic-level organisms and, if found, whether the constituents in the sediments were bioavailable to the food web. The US EPA (2000) has standard sediment toxicity tests using *Hyalella azteca* and bioaccumulation tests using *Lumbriculus variegatus* that can be used for this purpose.

Problem:

Page 21-1, in section 21.2 Chemicals of Potential Ecological Concern, in the second paragraph states, *"Due to the sprinkler irrigation typically used in the area, the VOCs were assumed to volatilize during irrigation and were not identified as COPECs."* It appears that those who wrote this have not checked into the irrigation methods used on the property to the east of the LEHR Superfund site. Since 1995 I have had the opportunity to examine these areas periodically, and I find that the irrigation is typically either flood or ridge-and-furrow, not sprinkler. In previous DSCSOC comments, I pointed out that there is a potential for VOCs pumped from groundwaters to be spread further by infiltrating groundwater associated with irrigation. There are also tailwater ponds associated with offsite irrigation, where the water can stand for appreciable periods of time. This water would have some mixture of groundwater pollutants that are part of the irrigation water used at the site.

Recommendation:

Correct the error on the use of sprinkler irrigation and discuss that the use of irrigation water that is polluted by LEHR site waste has caused some undefined spread of pollution to areas beyond those that have been polluted by the LEHR site groundwater pollution plume.

Problem:

A significant deficiency exists with respect to this Ecological Risk Assessment, in failing to address the potential for chemicals present in the groundwaters that are pumped as part of the IRA system to the surface, VOC-stripped, and then either reinjected or spread on land in the land disposal system, to lead to hazardous conditions for soil invertebrates and terrestrial life in the areas receiving the inadequately treated wastewaters. When I have visited the area, I have seen large numbers of rabbits in this region. This is an area that needs to be considered in a properly conducted risk assessment for the LEHR site. It has been mentioned in the past by DSCSOC as an issue that needs to be addressed, but is ignored in this draft Risk Assessment.

Recommendation:

As DSCSOC has suggested in the past, a comprehensive monitoring program of the soils and vegetation that receive the IRA water that cannot be reinjected, needs to be conducted.

Problem:

Page 24-1, section 24.0 Far-Ranging Species, does not mention mountain lions, which have been sighted in the Putah Creek area.

Recommendation:

Mention mountain lions as a far-ranging species.

Problem:

The discussion in section 5 devoted to attempting to characterize distribution coefficients, transport, etc., is, at best, superficial, and is likely without any significant validity. As DSCSOC has repeatedly discussed, in order to use this approach, it requires detailed site-specific investigation. Such investigations were not conducted, with the result that, at this time, there is little known about the actual distribution, fate and transport of constituents in water, either to groundwater or in stormwater runoff or in Putah Creek. Those who wrote this section have largely ignored key issues that have to be addressed in a meaningful risk assessment for the aquatic chemistry of constituents associated with the LEHR site.

Recommendation:

Properly discuss the serious limitations of the modeling effort without site-specific investigations to properly tune the model to the conditions being modeled.

References

US EPA, “Biological Test Methods,” Proc. Symposium on “Waste Testing & Quality Assurance, Volumes I and II,” US Environmental Protection Agency, Washington, D. C., July (1988).

US EPA, "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates," Second Edition, U.S. Environmental Protection Agency, EPA/600/R-99/064, Washington, D.C. (2000).

US EPA, "National Recommended Water Quality Criteria: 2002," EPA-822-R-02-047, US Environmental Protection Agency, Washington, D.C., November (2002).

Appendix A
DSCSOC Issues of Concern with Respect to LEHR Superfund Site Investigation

The issues raised by DSCSOC in its comments over the years that have not been adequately addressed include but are not limited to the following:

- problems in properly defining Constituents of Concern,
- inadequate stormwater runoff monitoring,
- inadequate evaluation of the impacts of pollutants in LEHR stormwater runoff on Putah Creek water quality,
- failure to address translocation of pollutants from the subsurface soil to the surface via vegetation,
- inadequate definition of the role of each LEHR waste management unit in impacting groundwater quality,
- failure to require that DO and TOC measurements be made in all groundwater monitoring,
- failure to define the full extent of off-site groundwater pollution by the LEHR site,
- unreliable statements made by UCD and DOE contractors in their draft reports,
- failure to correct errors in annual monitoring reports,
- inadequate treatment and operation of the IRA groundwater demonstration project,
- failure to adequately consider potential impacts of IRA land disposal of partially treated polluted groundwater to groundwater quality and terrestrial life.

These issues will need to be adequately addressed before the public/DSCSOC can support that the LEHR Superfund Site is adequately investigated.