Comments on Draft
University of California, Davis
2002 Comprehensive Annual Water Monitoring Report
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Comments Submitted by
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Presented below are my comments on the draft University of California, Davis, 2002 Comprehensive Annual Water Monitoring Report, released in May 2003.

Overall Comments

As discussed below under Specific Comments, UCD continues to have significant problems with reliably conducting and presenting the results of its surface and ground water monitoring at the LEHR site.

During the past year, DSCSOC has provided a detailed analysis of the significant deficiencies that exist in the UCD surface water and groundwater monitoring that is done at the LEHR site. Since these issues have not been addressed in the 2002 draft annual monitoring report, the previous comments are incorporated into these comments as ongoing deficiencies in the monitoring that is being done at the LEHR site. These comments were submitted in connection with the review of the adequacy of the site investigation and the existing database. The monitoring deficiencies include inadequate detection limits and surface water runoff monitoring, inadequate monitoring wells upgradient and downgradient from the waste management units, inadequate listing of constituents of concern as monitoring parameters, etc.

As indicated previously, DSCSOC/the public will not support the satisfactory completion of an RI until these significant monitoring deficiencies have been corrected. UCD's approach of claiming that these deficiencies are covered by the US EPA's having approved the revised monitoring program will not change the approach that DSCSOC will take in connection with protecting the public's interests from inadequate investigation/monitoring at the LEHR site.

UCD continues to make a number of unreliable or unjustified statements about the reliability of the monitoring report or the characteristics of the system, such as their statement that the potential for migration of constituents from HSU-2 to HSU-4 does not exist. The monitoring program that has been conducted in HSU-4 and the characterization of HSU-3 does not support such broad, sweeping statements. There could readily be leakage through HSU-2 to HSU-4 that has not yet been detected.

Specific Comments

On page 0-2, first paragraph, the last sentence states that the *"… DDC pilot test system has significantly reduced the mass transfer of chloroform from HSU-1 to HSU-2."* Statements of this type should be backed up by actual calculations of the change in mass transfer – not just changes in concentration. When I examined the text I did not find the backup needed to justify this statement.

On page 0-2, the third and fourth paragraphs mention the six constituents of concern. As discussed previously, TOC should be a constituent of concern, as a surrogate for unknown or uncharacterized pollutants in the UCD waste disposed of at the UCD LEHR Superfund site. This same problem of failing to include the concept of a much broader list of constituents of concern than the list of six mentioned occurs at several other locations in this report.

On page 0-3, in the section 0.2.2 Surface Water and Stormwater Monitoring, the statement is made on concentrations found relative to the CRDL. There has been a chronic problem at the LEHR Superfund site with UCD and DOE using contract laboratories that do not have adequate analytical detection limits for parameters of concern. Any time reference is made to the CRDL, a discussion should also be given as to whether the CRDL is adequate to detect constituents at critical concentrations. The issue is not whether the concentrations are above or below the CRDL. The issue is whether they are above water quality criteria/standards applicable to these waters.

One of the key parameters in the stormwater runoff from the LEHR site is mercury. No mention is made of the mercury analyses that were supposed to have been done years ago with adequate detection limits.

On page 0.5, under section 0.4.2, first paragraph, the statement is made that,

> *"The primary objective of groundwater monitoring is to assess if unexpected changes to the system occur that warrant additional monitoring. The current monitoring program accomplishes this goal."*

DSCSOC does not agree that the primary objective of groundwater monitoring is to assess unexpected change. The primary objective should be to characterize the pollution of groundwaters by the LEHR site and to identify the sources of this pollution. Even though millions of dollars have been spent on groundwater monitoring at the LEHR site, this goal has not yet been accomplished, since the groundwater monitoring system has not been properly developed to measure the releases that have occurred across the various waste management units, as well as the extent of offsite pollution.

Page 5-5, under section 5.2.3 Stormwater Monitoring, shows that another year has passed where inadequate monitoring of stormwater runoff from the LEHR site has been conducted. UCD needs to significantly improve its efforts to sample stormwater runoff from the LEHR site to properly characterize the potential to cause offsite pollution.

Page 5-6, in section 5.3.1 IRA Operations, the first paragraph, last sentence claims that the IRA was designed with a "closed loop" design. This statement is not reliable with respect to its operation. It has been recognized since the beginning that there would be leakage of the reinjected pollutants into the groundwater that would not be collected by the capture of the upstream plume. It has been noted that UCD and its consultants are failing to address this issue in their reports, apparently hoping that the RPMs and DSCSOC will forget that there is additional pollution of the aquifer occurring by the inadequate design of the IRA.

Page 5-7, second paragraph states in the third sentence,

> *"This result indicates that the current, lower pumping rate is sufficient to prevent offsite migration of contaminants consistent with the results presented in the 2001 Annual Water Monitoring Report."*

Again, UCD's presentation of this issue is misleading, in that there are reintroduced pollutants by the IRA which are escaping recapture and, ultimately, will go offsite. These pollutants will have to be removed by an expanded pump-and-treat system.

On page 5-7, fourth paragraph and elsewhere, mention is made that *"… the Berryessa system cannot be used when other upstream users are drawing water off the line for irrigation."* This is the first time that I recall hearing of this problem. This is a water rights issue that should have been thoroughly investigated by UCD as part of considering the use of Berryessa water. This is more of the inadequate planning, design and operation of the IRA system that has been a chronic problem with it since it was first proposed. These problems do not speak well for a pump-and-treat system of a similar design.

On page 5-8, fourth paragraph, second sentence states,

> "*The IRA system has otherwise proven capable of achieving all effluent discharge standards for irrigation."*

It remains to be seen whether significant problems are going to occur with the proposed irrigation system. As discussed in previous correspondence, UCD and its consultants have made significant errors in their estimates of the ability of this system to prevent groundwater pollution. It is well known that essentially all irrigation systems in the Central Valley eventually lead to groundwater pollution. This is an inevitable consequence of irrigation in the Central Valley.

On page 5-9, the first paragraph indicates that the groundwaters underlying the LTPS will be monitored. As I have discussed previously, if pollution shows up in the groundwaters underlying the LTPS, then there will be a significant problem trying to correct it. What should be done is to initiate a vadose zone early warning monitoring system to detect if pollutants added to the soil or created because of irrigation are moving through the vadose zone to cause groundwater pollution underlying the area.

Section 6 Data Characterization and Spatial Variability Analysis focuses on statistical manipulation of the chromium, nitrate and TDS data. The statistical approach that UCD has

introduced into this annual monitoring report, for review of groundwater data, in which the median data for all wells is calculated over time, is not a reliable approach when it is known that the concentration of constituents in a particular well at a particular sampling time depends on the water table elevation. The data for this analysis should have been normalized based on water table elevation.

As discussed previously by DSCSOC and by Susan Timm, the reliable way to determine if UCD disposal of hazardous chemicals at the LEHR site is responsible for elevated concentrations of TDS, chromium and other pollutants is by installing an appropriate number of upgradient and downgradient waste management unit monitoring wells, just upgradient and just downgradient of the unit. This will likely require several wells on each side of the unit. The exact number will be determined based on the variability of the groundwater composition in the area and the potential plumes that could occur just downgradient of the waste management unit. These monitoring wells should be designed to measure the concentrations of pollutants of concern, including TOC, in the uppermost part of the aquifer for HSU-2, and at about mid-depth in HSU-2.

This would require nested monitoring wells to detect any plumes generated by waste in a waste management unit that are denser than the groundwaters underlying the waste management unit into which the pollutants enter. This multiple well approach is necessary because of the fact that UCD practiced somewhat selective waste disposal in various parts of a waste management unit. As discussed in previous correspondence beginning in 1995, this will lead to plumes of pollutants that are of limited dimension compared to the overall plume generated by the unit. While the overall mean of the plumes may not show elevated chromium at a particular location, specific plumes generated by areas which received chromium would show that chromium has been derived from UCD's past waste disposal practices.

From an overall perspective, section 6 on statistical manipulation of selected data has shown little or nothing that is relevant to understanding whether TDS, chromium and nitrate are derived from waste management units. This is the issue that needs to be addressed – not the approach that was used in this data analysis.

Table 2 contains data for acute toxicity. Based on the references provided in this table on page 2 of 2, it appears that the methods used to determine acute toxicity are not the current US EPA recommended approach. The method used should be based on

> Lewis, P. A.; Klemm, D. J.; Lazarchack, J. M.; Norberg-King, T.; Peltier, W. H. and Heber, M. A., "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms," Environmental Monitoring Systems Laboratory, Cincinnati, OH; Environmental Research Laboratory, Duluth, MN; Region 4, Environmental Services Division, Athens, GA; Office of Water, Washington, D. C.; Environmental Monitoring Systems, Cincinnati, OH; Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, OH (1994).

Examination of Table 11 shows that there are no units specified on the water table elevation.

Appendix A, on page 5 of 11, the CRDL for arsenic is listed as 3. It should be decreased to 1. It is likely that arsenic will be regulated at about 2 µg/L. In the same table, chromium has a CRDL of 10. According to US EPA documents, chromium-VI is toxic to zooplankton at a fraction of a microgram per liter. This same table has the CRDL for mercury as 0.2 µg/L. This value should be decreased to about 5 ng/L.

Appendix A, page 5 of 11 shows that chromium in the effluent from the treatment unit is in the range of 20 to 25 µg/L. This is of concern with respect to polluting groundwaters and surface waters in the land application part of the IRA.

Appendix A, page 7 of 11 lists TOC at about 1 mg/L in the influent to the treatment unit. This is high for groundwater and could indicate appreciable pollution by organics that are not being considered as constituents of concern at this time. TOC should be analyzed in every sample – not just a few, as has been done.

Appendix B, page 1 of 1 presents dissolved oxygen data, where some of the data are at 0.2 mg/L (although the units are not shown). There needs to be a discussion as to why the data show 15 mg/L one time and 0.2 mg/L the next, for the same well.

Appendix B, page 1 of 5 shows that the DO in these samples (again assuming that the units are mg/L) is quite low. This shows an appreciable oxygen demand in the groundwater. Because of these data, all well samples should have down bore hole DO measurements made. This is a more meaningful data than ORP, which is subject to many interferences. The failure of UCD to make the DO measurements on most of the groundwater samples is a significant deficiency in the 2001 and 2002 monitoring.

Appendix B, page 66 of 85 presents data on TOC, where only certain wells have been analyzed. As discussed previously, all of them should be analyzed for TOC. There is a listing in this table for Nitrite, Nitrate-Nonspecific. What does “nonspecific” mean, and what are the units? This same problem occurs in other tables.

Appendix B, page 67 of 85 shows that some of the groundwaters have high TOC. There is a substantial possibility that these groundwaters are polluted by waste from the LEHR site.

Appendix B, page 2 of 5 (Metals – Stormwater) indicates that mercury was present in a stormwater runoff sample at 0.549 µg/L. This is a violation of the California Toxics Rule, which allows mercury to be present at 0.05 µg/L. Why did UCD not discuss this high mercury level in its presentation of the data? This is another example of inappropriate reporting on the part of UCD in its annual report.

I am concerned about the arsenic levels of almost 7 µg/L in stormwater runoff from the LEHR site, especially when at another US EPA Superfund site located in California the cleanup objective for arsenic in stormwater runoff is likely to be established at 2 µg/L.

Appendix B, page 4 of 5 (Pesticides, PCBs – Stormwater) shows that inadequate analytical detection limits are used for various pesticides in stormwater runoff from the LEHR site, as has been discussed since 1995 when DSCSOC first became involved. In light of this situation, the fish in Putah Creek need to be examined for the organochlorines to see if they contain excessive concentrations. If they do, then work needs to be done to determine if these are being contributed to by runoff from the LEHR site. The Lee and Jones-Lee (2002) report discusses in detail the approach that should be followed.

> 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). http://www.gfredlee.com/OClTMDLRpt12-11-02.pdf

Under stormwater monitoring, there is no toxicity data presented. The stormwater monitoring during 2001 and 2002 was extremely poorly done. There were storms that could have been monitored if UCD were serious about doing a credible job of monitoring. It appears now that there is need for RPMs to require that UCD support an independent monitoring of stormwater runoff from the LEHR site. UCD still has not properly monitored stormwater runoff from the LEHR site, even though this issue was raised from the time the first monitoring data were made available to DSCSOC in 1995 and has been raised annually since then. As indicated previously, before a satisfactory RI for the LEHR site can be supported by the public, it will be necessary to have several years of reliable stormwater runoff monitoring data from the LEHR site.

Appendix D lists nitrate data without making clear what the units are. This is more of the sloppy reporting that has been chronic with UCD in presenting annual monitoring reports. Any future tabulation of the type presented in Appendix D should include DO and TOC.

Overall, the UCD LEHR annual monitoring report for 2002 has many of the same deficiencies that DSCSOC has been commenting on for eight years. There is need for someone who understands water quality data and who will reliably report on it, to present annual monitoring reports for the LEHR site.

I have also examined the Quarterly Water Monitoring Report for Summer 2002, LEHR/SCDS Environmental Restoration, Davis, California, dated April 2003, and find that there is nothing presented in this summer 2002 quarterly report that is not covered more adequately in the 2002 annual report.