Comments on the University of California, Davis, Draft 2003 Comprehensive Annual Water Monitoring Report, Dated May 2004

Comments Submitted by
G. Fred Lee, PhD, DEE
G. Fred Lee & Associates
27298 E. El Macero Drive, El Macero, CA 95618
Ph: (530)753-9630 Fx: (530)753-9956 Em: gfredlee@aol.com
www.gfredlee.com

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General Comment on Data Presentation

In the discussion of the data in this report, typically where concentrations are presented relative to the CRDLs, there is no indication of what the CRDL values are. The proper way to present analytical data of this type relative to a detection limit is to indicate the detection limit in parentheses after the abbreviation "CRDL." As I have discussed in the past, there is a chronic problem at the LEHR site with UCD/DOE using analytical methods that do not have adequate detection limits to determine some constituents of concern at concentrations that are potentially adverse to water quality-beneficial uses.

An adequately prepared monitoring report would include a discussion of the data relative to water quality objectives or other valid basis for evaluating the concentrations relative to potential adverse impacts. UCD's approach of presenting the data relative to detection limits is inadequate and should not be accepted in a credible annual monitoring report. The Executive Summary should be redone, where the detection limits for all concentrations that are below the detection limit are presented. It appears from some of the data that the detection limits that occurred with a particular analysis are different from the listed CRDL. The actual detection limit for each analysis should be presented. Further, a summary of the water quality significance of the concentrations of the measured constituents should be presented in the Executive Summary and in the text.

During the first couple of years after DSCSOC became involved and started providing comments on annual monitoring reports, UCD and its contractors attempted to present information on the interpretation of the water quality data that were presented in the annual monitoring report. However, there were so many errors in the approach used by UCD contractors that were allowed by UCD staff, to indicate that the UCD contractors and staff did not understand water quality issues as they relate to critical concentrations of chemicals in water for various beneficial uses. This situation has now been occurring for at least 15 years. This situation needs to be immediately corrected, so that the annual monitoring reports provide a reliable discussion of the data with respect to water quality implications.

Section 4 Results

Pages 4-2 and 4-3 list the problems with unreliable data. I am concerned that UCD continues to have inadequate sample collection and analysis, so that with each report there are excessive numbers of unreliable data, which represent inadequate sampling and sample handling.

As I have commented in the past, this operation needs to be "tightened up" to eliminate essentially all of these problems.

Page 4-4, under section 4.3.1. IRA Operations, discusses the continued problems with injection well plugging. Year after year UCD has been operating this system without adequately addressing the plugging problems due to failure to properly adjust the calcium carbonate saturation in the injected water to prevent precipitation in the injection well system. UCD should be required to address this problem and eliminate the supersaturation of calcium carbonate that occurs in the waters that are injected into the groundwater system as part of the IRA.

On page 4-6, the Acetone section mentions that acetone is continuing to be found as a contaminant in the analyses of samples, where it is claimed to be a "common laboratory contaminant." UCD needs to "tighten up" on its operations, so that the sample collection and analyses do not result in continuing to detect acetone in the samples due to inadequate sample bottle preparation and handling. The same comment applies to methylene chloride. These kinds of problems can be essentially eliminated with appropriate sample collection and analysis.

Page 4-7, under section 4.3.4. LTPS Irrigation Water Effluent Monitoring, states, *"The effluent concentration measured in July 2003 was 1,170 mg/L, exceeding the discharge standard of 791 mg/L for boron."* The data to back up this text discussion are presented in Table 7, which shows that the concentrations are not measured in "mg/L," but in "µg/L." This is more of the inadequate proofreading that has been chronic with UCD's reports. UCD needs to acquire staff who are knowledgeable in the topic area and will properly review the consultants' reports. This is an example of a chronic problem that has existed at UCD with its consultants and staff, where consultants and staff are used who do not understand the elements of water quality. Anyone with a limited understanding of these topics would know that 1,170 mg/L of boron is an impossible result to obtain for this type of system.

Page 4-7, under section 4.3.5. LTPS Soil Analytical Results, the last paragraph states,

> *"Several immobile constituent concentrations in LTPS soil increased between 2000 and 2003, including pH, total nitrogen, sulfate and zinc. Several other mobile constituents in soil decreased between 2000 and 2003, including barium, chloride, nitrate-N and ammonia-N."*

This kind of statement is not technically valid. Sulfate tends to be mobile in soil and groundwater. Total nitrogen is made up of mobile components and non-mobile components.

The first sentence on page 4-8 states, *"These soil results support the conclusion that the use of treated IRA effluent had little if any effects on soil quality between 2000 and 2003."* However, the continued buildup of sulfate in the soils can ultimately be adverse to terrestrial plant growth. Further, the sampling of the soils is not adequate to detect problems.

Page 4-8, section 4.3.6. Groundwater Monitoring Beneath the LTPS states that, *"These groundwater data show that no discernable increase in any primary COC or other metal constituent concentration is increasing over time."* In the relatively short period of time that this

system has been operated, would a discernable increase in concentrations of these constituents be expected? What is the estimated travel time of water between where it is added to the surface and where it reaches the groundwater table? Are the monitoring wells that are used screened in such a way as to detect an increase in concentration when the constituents first reach the water table? These issues need to be discussed.

As I have discussed in the past, the approach that is being used to monitor for potential problems associated with the land irrigation of the IRA effluent is not adequate to detect these problems before significant problems occur. Vadose zone monitoring should be conducted under the irrigation area at several locations, to determine if constituents of potential concern are migrating from the soil to the groundwaters. If properly designed, this approach can serve as an early warning system of potential problems. The current approach is unreliable for this purpose.

Section 5 Assessment of Monitoring Programs

The next-to-last sentence on page 5-5 states that, "*The advantages of the LTPS include a practical treatment alternative to reverse osmosis for water with slight increases of TDS and nitrate-N.*" In previous UCD documents there were claims that there would be no increase in TDS associated with this method of disposal of the polluted groundwaters. As I have pointed out, that statement was obviously incorrect, since it is not possible to conduct irrigated agriculture in California without leading to groundwater pollution by TDS and nitrate.

Section 7 References

It appears to me that there are references listed here that were not used in the text. If this is the case, they should be separated as "Additional Sources of Information."

Tables

Table 2 lists the constituents that have been analyzed at various sampling locations. It does not, however, provide information on what is included within the metals analyses, anions, cations, etc. Information should be provided on these parameters so that a reviewer of the table can understand what is meant by the various categories. What could be done is to reference Table 4.

Table 4, under metals, does not indicate the units that were used to report hexavalent chromium.

Examination of Table 7 shows that the effluent discharge standard for nitrate-N is 27.4 mg/L. That value seems high. A reference should have been given on this table to the source of the standards for each of these constituents.

Table 11 contains a number of NDs (non-detects), where there is no indication given as to what the detection limits were that were used for this determination. This is inappropriate data presentation. Detection limits should be provided for each ND. Table 11 also uses the term "NC," without defining it. All terms in a table of this type must be defined, in a footnote to the table.

Appendix D

Appendix D contains a table for "Metals – Stormwater," which lists the CRDL for arsenic as 3 µg/L. That number needs to be decreased to no more than 2 µg/L because of the potential health effects of arsenic. The same table lists the CRDL for mercury as 0.2 µg/L. This value, as I have discussed in the past, is much too high. It should be decreased by a factor of 100, in order to detect mercury at critical levels. It is of interest to find that the mercury concentration in LD-01 on 2/12/2003 was 82 ng/L, which is above the CTR criterion of 50 ng/L. This should have been noted and discussed.

Upon examination of Appendix D, I do not find the aquatic life toxicity data that were supposed to have been collected on the stormwater samples.

Overall

Overall, this report, like previous annual monitoring reports produced by UCD, falls far short of being a credible presentation and discussion of monitoring data. This report should be rejected, and UCD should be told to redo it.

I believe that all of the comments presented which point out deficiencies in the draft 2003 Annual Monitoring Report have been made by me on previous reports. Year after year UCD continues to allow its contractors and staff to fail to develop credible monitoring reports where the data are presented in a technically valid, appropriate manner and are discussed with respect to their implications on water quality. This report should be returned to UCD to be redrafted.