Comments on 1998 Annual Water Monitoring Report For the Laboratory for Energy-Related Health Research and South Campus Disposal Site,

Prepared by
University of California, Davis and Dames & Moore,
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Comments Prepared by
G. Fred Lee, PhD, DEE
Advisor to the Davis South Campus Superfund Oversight Committee
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OVERALL

The UCD/DOE LEHR National Superfund Site past monitoring programs for both groundwater and surface water pollution has been significantly deficient compared to that needed to properly characterize the extent of pollution by the many thousands of chemicals that UCD disposed of as wastes at the LEHR site. The proposed modification of the surface and groundwater monitoring programs is grossly inadequate compared to that needed to begin to properly characterize the pollution of the site and Putah Creek and to determine the changes in degree of pollution as a result of remediation activities.

DSCSOC agrees that there is need to change the groundwater monitoring program. However, this program should not be reduced as UCD proposes. In fact it should be expanded with the installation of a number of additional wells that will better define the potential for significant pollution at various locations on the LEHR site that have received inadequate attention thus far.

Basically, UCD needs to start over with respect to developing a credible groundwater monitoring program, where each waste management unit is investigated as an individual unit to determine the full range of constituents released from the unit to the groundwaters that are impairing the use of these groundwaters for domestic or other purposes.

The surface water and stormwater runoff monitoring programs need to be significantly strengthened to determine the constituents in the stormwater runoff from the LEHR site that could potentially impact the beneficial uses of Putah Creek. Also the characteristics of Putah Creek waters and aquatic life need to be properly evaluated to determine the public health and adverse impacts that are occurring and the role of LEHR site stormwater runoff associated constituents in causing these impacts.

SPECIFIC COMMENTS

Executive Summary

This report presents the results of the 1998 Annual Water Monitoring Program conducted at the

UCD DOE LEHR national superfund site located on the University of California, Davis campus. Page v states that the LEHR site has been investigated (monitored) for more than nine years, involving collection of over 1,000 water samples and 100,000 analytical results. Someone not familiar with the inadequacies of the LEHR site investigation, might be lead to believe by such a statement that the site's groundwater pollution would be well-characterized. In fact, because of the highly inadequate program that has been conducted, there are substantial aspects of the groundwater pollution at the site which have not begun to be investigated in a meaningful way. For example, there is essentially no understanding of the full degree of pollution that has occurred by inappropriate waste disposal at Landfill no.3. Further, the full extent of HSU-2 off-site pollution by the dumping of campus waste chloroform into a landfill pit in campus landfill no.2 is still not adequately documented. In addition, the pollution of HSU-4 by LEHR site waste is just beginning to be investigated. The facts are that even though large amounts of public funds have been spent in "monitoring" the groundwater pollution by the UCD administration's attempts to use on-site landfills for campus waste disposal, the full extent of groundwater pollution has been inadequately characterized. DSCSOC pointed out these problems when it became active in 1995,. UCD has been highly derelict in failing to aggressively pursue defining the pollution of groundwaters at the LEHR site over the past nine years.

> Page v, under the first bulleted item, states that the
> *"…. levels of chromium, nitrate and TDS are influenced by regional conditions, and, within a regional context, site data are consistent with concentrations found throughout the region."*

The fact that there is regional pollution from natural and cultural activities does not in any way relieve the University of California Davis' L. Vanderhoef administration from the responsibility of cleaning up the polluted groundwaters associated with past waste disposal activities. Past University of California, Davis administrations, including the current administration, have been practicing what was obvious cheaper-than-real cost solid waste and liquid waste disposal through campus managed facilities. While this practice has initially saved the administration-public, who ultimately pays for all waste disposal at UCD, a few dollars, it is now going to cost the public many tens of millions of dollars to clean up the polluted groundwaters associated with the mismanagement of campus waste. As has been discussed previously, the public, potentially impacted by the University of California, Davis' mismanagement of campus wastes at the LEHR site, expects and will do everything it can to ensure that each of the waste management units at the LEHR site are properly investigated with respect to pollution of groundwaters by the mismanagement of wastes at the site. Whether elevated chromium, TDS or nitrate occurs at other locations in the region is not a relevant factor to the ultimate clean-up of pollution by each waste management unit. As pointed out previously by DSCSOC, the average concentrations of constituents in the greater Davis area is not a relevant issue in determining site investigation and remediation. A comparison between upgradient and downgradient concentrations of constituents across each of the waste management units is the approach that must be used to determine whether the waste management unit has been and continues to cause pollution of groundwaters and establishes the clean-up goals for the groundwaters polluted by the waste management unit.

In this first bulleted item, no mention is made of the other "constituents of concern." This is another of the UCD L. Vanderhoef administration's attempt to fail to address the full range of constituents present in the wastes that have or could pollute groundwaters. Such constituents as dissolved organic carbon are primary constituents of concern that have to be investigated in the groundwaters associated with each of the waste management units in accord with complying with the Central Valley Regional Water Quality Control Board's requirements for groundwater clean-up.

Page v, the fifth bulleted item states,

"Chemical and aquatic toxicity testing results for storm water runoff samples collected through 1998 indicate that no releases of Site COCs have occurred in 2 years of monitoring, and no acute toxicity effects have been demonstrated for storm water runoff."

What should have been said at the same time is that many of the constituents of concern could readily be present in stormwater runoff and cause aquatic life toxicity, which would not have been detected by the monitoring program that has been conducted. The deficiencies in this monitoring program have been discussed in detail by DSCSOC since 1995. As of yet the program has not been adequately modified to address these issues.

Page v, the last bulleted item states,

"*Storm water runoff is the most direct pathway for site impacts to reach Putah Creek.*"

Stormwater runoff at the LEHR site occurs through direct surface runoff and through stormwater discharges to the campus sewerage system, which then discharges LEHR site stormwater associated constituents through the University of California, Davis campus wastewater treatment plant. Both of these pathways have to be considered.

No mention is made in this list of bulleted items about the bioaccumulation issue. This is more of the biased, unreliable reporting that the University of California, Davis L. Vanderhoef administration has been practicing for years, where, by failing to discuss the issues that are well-known to be potentially significant, such as mercury and chlordane pollution of Putah Creek from the LEHR site, is an attempt to mislead the readers of the UCD reports into believing that this is not a problem. It is a potentially significant problem that UCD L. Vanderhoef administration continues to try to avoid addressing.

Through DSCSOC's efforts, it was found, with the assistance of ATSDR and the US EPA Region 9, that there is significant pollution of Putah Creek fish by mercury, there could be significant pollution of Putah Creek fish by chlordane, both of which could be derived in part from the LEHR site. The stormwater runoff monitoring program that has been conducted associated with the LEHR site is grossly inadequate to detect concentrations of both mercury and chlordane, as well as other constituents that could bioaccumulate in Putah Creek fish to excessive levels representing health hazards to those who use the fish as food, as well as higher trophic level organisms such as birds and terrestrial animals. There could also be toxicity due to chromium, where chromium VI in the stormwater runoff above 0.5 ∶g/L could be toxic to zooplankton in Putah Creek. This would not have been detected by the monitoring program that has been conducted at the LEHR site. A review of the original RI for this site shows that the UCD/DOE staff

and their consultants, Dames & Moore, did not understand basic elements of water quality investigation in designing the surface water monitoring program. They confused the relationships between aquatic life toxicity and bioaccumulation of constituents, claiming that one could be used to predict another. Those with even the most elementary understanding of these issues know that such claims are in error.

Page vi, first paragraph states that,

"Many of the wells installed for this program are in areas with low to non-detectable concentrations of the Site COCs."

First, as repeatedly pointed out by DSCSOC, the site COCs are not yet adequately defined. There are thousands of chemical that have been disposed of at the LEHR site, all of which could be potential pollutants for groundwaters.

With respect to attempting to use past conditions and monitoring results to predict the future, the understanding of the groundwater hydrology at the LEHR site is still inadequate compared to that needed to ultimately begin to properly characterize the degree of groundwater pollution, much less its remediation. This has been recently demonstrated by the IRA, where the concentrations of chloroform in their recovery well have decreased significantly to the point where the well is becoming largely ineffective in removing significant amounts of chloroform. A much better understanding of the site hydrology is needed before it can be assumed that any past monitoring results will predict future conditions.

Even though it was agreed four years ago that a site groundwater model is needed and UCD was instructed by the RPMs to develop such a model, thus far UCD has not complied with the RMPs and DSCSOC's request. Without such a model the monitoring program is largely a hodge-podged collection of wells without any real systematic assessment of the existing groundwater pollution and how this pollution will change upon pumping of groundwaters for removal of constituents.

Page vi, end of first paragraph, states,

"To accomplish this objective, monitoring data only from wells located in the area of the majority of the mass are needed.

That statement is inappropriate with respect to the wells needed to characterize the extent of groundwater pollution and the impacts of remediation on this pollution. A far more comprehensive monitoring well array that is specifically designed to investigate each waste management unit's pollution of groundwaters with appropriately developed upstream and downstream wells that define not only what is released as the groundwater passes under the unit, but also the full extent of the pollution in the pollution plume developed by the unit's release of waste to groundwaters.

Page vi, under the third paragraph, states,

"The proposed Water Monitoring Program includes the following:

- *existing IRA groundwater monitoring program;"*

The implication is that there is no need to monitor many of the other HSU-1 and HSU-2 wells unless they are part of the IRA groundwater monitoring program. Before such an approach can be adopted, there

needs to be a critical evaluation of the existing data and a reliable groundwater model of the site developed and evaluated.

Page vi, in the last paragraph, states,

"The objectives of the proposed storm/surface water monitoring program are to monitor storm water runoff from the Site to Putah Creek and assess the presence of storm water constituents that could be present in runoff from the Site. Monitoring of storm water will continue for one additional rain season with sample collection occurring during two separate rainfall events."

This approach is grossly inadequate from several perspectives. First, UCD and its consultants, as well as DOE, have not yet begun to develop a credible stormwater runoff monitoring program, even though samples have been collected now for many years. The significant technical problems with the program were pointed out in 1995 by DSCSOC. Only now, through repeated comments, is UCD beginning to correct the significant deficiencies in the stormwater monitoring program.

To contemplate only surface stormwater monitoring for one more year is absurd. The site is in transition through remediation, and even if there was an adequate database on the characteristics of stormwater runoff from the site, which there is not, there will be need to monitor stormwater runoff from the LEHR site for at least three to five years after the site has been completely stabilized after the remediation actions have taken place.

Page vi, last paragraph, and first paragraph on page vii, indicates that the UCD L. Vanderhoef administration is attempting to continue to try to determine the impacts of stormwater runoff from the LEHR site on Putah Creek beneficial uses through a grossly inadequate monitoring program. A much more comprehensive monitoring program would have to be conducted to be able to use "statistical" analyses as proposed to detect changes in concentrations of constituents, as well as their **impacts** on the beneficial uses of Putah Creek.

Again, there is no discussion of bioaccumulation issues which for mercury and chlordane are key issues associated with the LEHR site that have to be properly addressed in future monitoring. As another example, there has been grossly inadequate monitoring of the potential of vegetation which has roots into the wastes to translocate hazardous and deleterious substances found below ground surface to the surface which could become part of the stormwater runoff to Putah Creek. Detailed discussions, including two refereed professional papers and a comprehensive report have been prepared by DSCSOC and published on the deficiencies in the current surface water monitoring program at the LEHR site. Thus far UCD is continuing to largely ignore the guidance that has been provided on how surface water monitoring associated with stormwater runoff events from the LEHR site should be conducted to protect public health and the environment from mercury, chlordane and other constituents in LEHR site wastes and soils.

Page vii and viii summarize the 1998 water monitoring data. This summary, however, leaves out the significant information gaps that are well-known to exist in this monitoring program, that have been

discussed in repeated comments that have been provided by DSCSOC and, again, in the comments on this Executive Summary.

Comments on Report Main Body

Beginning on Page 1 is the formal report for the 1998 Annual Water Monitoring Program. The comments presented below do not necessarily repeat the same comments that would be applicable to the report as were applicable to the Executive Summary of the report. With few exceptions, the comments made on the Executive Summary are applicable to the main body of the report. UCD and its consultants as part of developing this report have in some instances presented unreliable and in some cases distorted information on the evolution of the LEHR site monitoring program. This appears to be an attempt to rewrite history to cover up the significant problems that have and continue to exist in the LEHR site monitoring program that is needed to properly characterize the pollution of soils, groundwater and surface water by UCD campus wastes.

Page 1, second paragraph, UCD refers to the *Final Revised Field Sampling Plan* (Dames & Moore, 1998a). As indicated in previous correspondence, that monitoring plan was never approved by the RPMs. It was adopted by UCD, where the RPMs made some informal comments on the plan. The plan, however, was never reviewed by the RPMs and approved by them. Further, UCD attempted to circumvent DSCSOC's comments on the plan by failing to respond to the detailed comments made on the initial version of the plan. UCD did not make the revised version of the plan that was sent to the RPMs available to DSCSOC for their review. This kind of situation reflects the fundamental problems that have existed throughout the investigations of the LEHR site, where there has been little or no accountability associated with the monitoring program. Year after year the UCD or DOE contractor has been allowed to turn in a data report which is not critically reviewed by the RPMs and contains obvious significant errors that are allowed to remain in the data report that is made public. Even when these errors are pointed out by DSCSOC for several annual reports, the RPM's have not required that UCD/DOE correct the report or at least incorporate an errata sheet into the report that is placed in public record to list the significant errors that are contained in the report.

Page 1, third paragraph, lists the objectives for the water monitoring program that were developed in 1994. It is now 1999 and a number of these objectives have still not been achieved. Some, such as the proper characterization of the groundwater pollution by waste management units under the first bulleted item, have not even been started except for one well with respect to Landfill no.3.

The statement in the second bulleted item, *"…to address chronic toxicity effects…"* has not been initiated yet. There has been no chronic toxicity monitoring at the site, even though this was a so-called objective set forth in 1994.

Page 3, last paragraph, states,
"The South Fork of Putah Creek also receives treated effluent from the UC Davis Waste

Water Treatment Plant via an outfall pipeline upstream of the Site."

While that statement is true, it is deficient in that it does not mention that there is another half dozen or more discharges from UCD to Putah Creek upstream of that site which contribute wastes or excess irrigation water to the Creek. All of these are adding constituents to the Creek which could impair the beneficial uses of the Creek.

The last sentence of that paragraph states,

"Seasonal runoff from UC Davis portions of the Site enters the South Fork at two locations;...."

There is need to mention in this discussion that stormwater runoff enters Putah Creek via the campus Waste Water Treatment Plant discharges that occur, where these discharges could add constituents from the LEHR site which would not normally be present there. Further, the increased flow due to LEHR site stormwater could effect the ability of this overloaded waste water treatment plant to adequately treat the campus waste. These issue, while discussed repeatedly over the past several years in DSCSOC's comments, still have not been investigated. In fact, because of DSCSOC pointing out in 1995 that the monitoring of the campus waste water treatment plant associated with the LEHR site studies revealed that the campus waste water treatment plant was discharging ammonia at toxic levels, lead to UCD convincing DOE to stop monitoring for ammonia so that it would not reveal the violations of the NPDES permit that UCD has with the Central Valley Regional Water Quality Control Board.

Page 5, first paragraph, third line again misrepresents the constituents of concern. These are some of the constituents of concern, not all of them.

Page 5, third paragraph, second sentence, states,

"From these data, the Site COCs have been well established."

That is not true. The primary known constituents of concern have been well established. The other constituents of concern have not even begun to have been investigated adequately. To assume that out of the thousands of chemicals that UCD disposed of at the LEHR site as part of campus waste only resulted in six constituents of concern in the groundwater is inappropriate and strongly contrary to the public's interest. UCD has consistently attempted to mislead those who read its reports on groundwater characteristics to believe that only chloroform and associated "VOCs" chromium, nitrate, TDS, tritium and carbon-14 are the constituents of concern in the groundwaters. There is TOC, possible taste and odor compounds, a variety of constituents within TDS and other yet unidentified constituents, all of which will need to be investigated as part of the site investigation and remediation.

On Page 7 of Appendix A, in the first paragraph there is a discussion of total organic carbon data collected in 1998, which states,

"Concentrations reported in 1998 varied and mostly ranged from 1 to 15 mg/L. As with nitrate as nitrogen, reported TOC concentrations are generally higher for samples collected from HSU-1 wells than for samples collected from HSU-2 or HSU-4 wells. In addition, concentrations for samples collected from wells UCD1-10, UCD1-12 and UCD1-13, which

are downgradient of waste burial areas, are often the highest reported on the site."

This kind of data should have been presented and discussed. TOC is the surrogate for thousands of chemicals which need to be evaluated with respect to their potential to be adverse to the beneficial uses of groundwater. To ignore this issue, as UCD has done in the past and attempts to continue to do, is more of the recalcitrant polluter approach, where the UCD L. Vanderhoef administration, through its staff, is attempting to mislead the public and others into believing that the limited number of COCs that UCD has defined but has not been accepted by the RPMs and DSCSOC are all the constituents that need to be of concern at the LEHR Superfund site.

Page 5, last paragraph, discusses the "Hydropunch" investigations. A number of the Hydropunch investigations only address certain locations within the aquifer and do not properly sample the vertical profiles within the HSU-2. As DSCSOC has reported previously, UCD must be required to present a credible discussion of the Hydropunch data and its limitations in adequately describing both on-site and especially off-site groundwater pollution that has occurred from mismanagement of wastes at the LEHR site. Such a critical review will show that a substantial increase in the numbers of monitoring wells that sample within each of the waterbearing strata which are samples over several years is needed to verify that the Hydropunch data is a reliable assessment of the groundwater pollution that is occurring at a particular location.

Page 6, in the first paragraph mention is made about an irrigation well causing cross-contamination between HSU-2 and HSU-4. It is important to continue to realize that the evidence is quite strong that the natural permeability of the clay layer between HSU-2 and HSU-4 could allow transport of chloroform through it without a well connection, which would pollute HSU-4. This issue has still not been addressed, even though it was pointed out five years ago by a DOE consultant.

While this paragraph describes the HSU-4 investigations as "important expansions," which were initiated in 1997, they are still only in the initial phase of HSU-4 investigation. This will have to be greatly expanded, where UCD has to stop dragging its feet in doing a proper investigation of HSU-4.

The last paragraph on Page 6 and top paragraph on Page 7 states,

"This goal has been accomplished based on the current understanding of the distribution of the principal mass of COCs in groundwater as illustrated on Figures 7 through 24."

This is another of the misstatements that prevail throughout this report, where first this is only selected COCs, second there are masses of COCs that have not been investigated yet such as associated with Landfill no.3 and some of the other waste management units. The same problem occurs on Page 7, the last sentence of paragraph 4, where it is stated,

"Based on this assessment, it appears that the location of the main mass of chloroform has been established."

That is chloroform from one of the locations where it has been found. According to the UCD dump tender for Landfill no.3, liquid wastes were also dumped in a pit at Landfill no.3. These have not been investigated yet.

Page 7, first sentence, last paragraph states,

"Based on the good understanding of the VOC source area, it is concluded that the principal mass of chloroform on-site within HSU-1 and HSU-2 is adequately delineated."

That is an overstatement of the situation that exists today. Substantial additional investigation will be needed to be able to make that statement reliably.

Page 9, second paragraph under Nitrate, states,

"Nitrate concentrations reported in HSU-2 wells are within the same range as City of Davis water supply wells (Dames & Moore, 1999).

This reference is provided as support for the fact that the groundwater nitrate that is related to pollution of the groundwaters by UCD's mismanagement of its campus wastes is not significantly different than the pollution of groundwaters off-site by other activities. I do not recall any credible discussion of these issues in any UCD-Dames & Moore report, much less one that has a 1999 date on it. Where is that report? From my familiarity with the City of Davis groundwater wells nitrate data, I believe that a critical review of this data will show that this statement is misleading.

Bottom of Page 10, the last paragraph states,

"Because of the adequate delineation of chromium within HSU-1, together with the lack of a relationship between site waste disposal and the occurrence of chromium in site groundwater, additional delineation of the extent of chromium does not appear warranted."

I do not agree with this assessment. Even if the chromium is due to natural sources, UCD is still responsible for it as owner of the property.

Page 11 lists a number of bulleted items which attempt to summarize issues. These bulleted items present an inadequate discussion of issues such as the extent of groundwater pollution by waste management units at the site. An examination of the various figures upon which the conclusions that adequate delineation of groundwater pollution has occurred shows that there is a lot of speculation about contours of various constituents. Error bars - ranges of values should have been placed at each of the well point concentrations that were used so that those who examine the figures showing the contours have some idea of just how variable the concentrations were at that point.

The plots of concentration vs. time show extreme variability in some parameters indicating that there is very poor characterization of what is happening at that point and that the idealized contours may not represent the actual situation

These bulleted items are highly misleading with respect to what is known about the pollution of groundwaters by Landfill no.3. The failure to discuss this issue is more of the deliberate misleading information that UCD L. Vanderhoef administration is perpetrating on the public and the RPMs with respect to the adequacy of investigating the LEHR site. UCD should be required to prepare a proper discussion of the current degree of understanding of groundwater pollution at the LEHR site by each waste management unit including the former waste water treatment plant that managed its sludge in such a way

as to possibly lead to groundwater pollution. Further, UCD should be required to define the additional studies needed to reliably fill the information gaps for on-site and off-site pollution of HSU-2 and HSU-4.

Page 12, first paragraph under Surface Water and Storm Water Monitoring Program mentions that the recommendations of the RPMs have been incorporated into monitoring activities. It does not mention that the UCD and DOE have largely ignored the recommendations of DSCSOC, which have pointed out the highly significant deficiencies in the stormwater and surface water monitoring that have been conducted at this site.

Page 12, under Evolution of Surface Water and Storm Water Monitoring Program, states,

"Surface water monitoring commenced at the Site to identify potential impacts from the Site and surrounding areas on the South Fork of Putah Creek and the influence from the South Fork of Putah Creek to groundwater elevations on-site. Surface water monitoring was conducted quarterly beginning in November 1990 and continued through 1998. Storm water monitoring was initiated to establish the presence of site constituents in storm water runoff."

The objective of the stormwater monitoring program should have been to evaluate the impact of the constituents in the stormwater runoff on the beneficial uses of Putah Creek not just the measurement of concentrations of selected chemicals as has been done.

The discussion on the bottom of Page 12 and top of Page 13 of how the stormwater monitoring program has evolved at the LEHR site is an inadequate discussion of what has actually happened since 1995 when the DSCSOC became involved. The facts are that shortly after the DSCSOC became involved and took the first site tour of the site, Julie Roth and I went to see the stormwater discharge points for the LEHR site. We were shown the discharge point by the sump pump on Old Davis Road. We also asked to see Landfill no.3 and observed the ditch cut through the top of Landfill no.3 exposing wastes. We asked whether stormwater passed through this ditch into Putah Creek and were told by LEHR site remediation personnel that no stormwater passed through that ditch into the Creek. It was obvious at the time that the person providing the guidance did not understand the stormwater runoff situation at the site.

A couple of years later the RPMs conducted a tour of the site where Duncan Austin found yet another stormwater discharge point from the LEHR site to Putah Creek. Further, in reviewing the stormwater discharge from the site, initially UCD representatives claimed that there was stormwater discharged to the UCD sanitary sewer system which discharged LEHR site stormwater associated constituents to the campus Waste Water Treatment Plant. Subsequently UCD representatives claimed that there was no stormwater discharge from the LEHR site to the campus Waste Water Treatment Plant sewerage system. Subsequent to that claim it was found that there has been and continues to be stormwater discharged from the LEHR site to the campus sewerage system. There has been no monitoring of these discharges of either hazardous chemicals or flow. There could be constituents present in the LEHR site's stormwater runoff that goes to the campus sewerage system which represent loads of hazardous constituents that may not be removed in the overloaded sewage treatment plant. Further, the additional

flow may be aggravating the adverse impacts of the overloaded campus sewage treatment plant on Putah Creek water quality. Throughout this period DOE and UCD have repeatedly refused to follow DSCSOC's suggestions of conducting a proper stormwater monitoring program that would reliably characterize the discharges of hazardous chemicals from the LEHR site to Putah Creek.

Because of the repeated denial by LEHR site consultants and UCD staff that there was LEHR site-derived stormwater entering Putah Creek through the ditch cut through the top of Landfill no.3, DSCSOC took photographs of this discharge during a stormwater runoff event and thereby documented that there were in fact stormwater discharges through the ditch that had been in contact with waste with each major stormwater runoff. This is obvious upon examination of the plumbing (pipes and valves) associated with the ditch to Putah Creek. For many years these discharges have washed the exposed wastes that UCD exposed as part of developing a drainage ditch through the top of hazardous waste Landfill no3. It took three years from the time that this issue was first reported until UCD L. Vanderhoef administration took action to begin to protect the public from waste-derived constituents due to UCD's mismanagement of its stormwater runoff from the south part of the campus and part of the LEHR site.

Page 12, the last paragraph, last sentence states,

"Most radiological parameters were eliminated from surface water locations PCU and STPO, as were semivolatiles from all three surface water monitoring locations, after historical monitoring results yielded no significant detections of these constituents."

This elimination may have been inappropriate since the RPMs have been allowing UCD and DOE to conduct monitoring programs with inadequate detection limits to assess whether constituents in the stormwater runoff were present at concentrations that could be adverse to the beneficial uses of Putah Creek. It became clear, upon reviewing the data reports developed by UCD and DOE, that none of the consultants that UCD and DOE have used, as well as their own staff, understood the basic elements of evaluating water quality impacts of hazardous and deleterious chemicals on surface water beneficial uses. Those responsible for monitoring and developing reports were not even aware of the US EPA water quality criteria for protection of aquatic life and the necessary concentrations that must be detected to determine whether a constituent like chlordane or mercury, or for that matter many other constituents, are present in stormwater runoff to surface waters which could be adverse to aquatic life and other beneficial uses of the waterbody.

Page 13 indicates that this report only addresses UCD areas of responsibility. When will DOE's area of responsibility for stormwater runoff be reported on so that the total site stormwater runoff, including that that is discharged through the campus sewerage system is reviewed?

Page 13, last paragraph states,

"Data collected in 1996 through 1998 from storm water runoff locations LFU #1 and LFU #3 on the Site do not indicate that associated chemical releases to Putah Creek are occurring (Table 3)."

This is more of the highly distorted, deliberate attempts, by UCD L. Vanderhoef administration through its

staff and consultants to distort the information that is readily available and well known on this issue. DSCSOC and the RPMs have pointed out repeatedly that such statements can not be made with any reliability so long as the detection limits on the analytical methods that are used are not adequate to detect the constituents of concern at potentially hazardous levels. These issues have been discussed in detail by DSCSOC. The UCD L. Vanderhoef administration continues its recalcitrant polluter approach of attempting to deliberately distort information made available to the public.

Page 14, first paragraph states that changes in the upstream vs. downstream monitoring that has been done of Putah Creek shows that they can be related to existing conditions or releases from the campus sewage treatment plant. As documented by DSCSOC, the monitoring program that has been conducted on Putah Creek has been essentially a waste of public funds. It is an inadequate program compared to that needed to properly characterize the impacts of LEHR site stormwater runoff that have occurred directly to the Creek or through the sewage treatment plant.

Page 14, first full paragraph, presents more of the distorted information that UCD L. Vanderhoef perpetrates through its staff and consultants with respect to the excessive bioaccumulation of hazardous chemicals in fish that could be derived in part from the LEHR site. While this paragraph contains a statement,

> *"More recently, the Agency for Toxic Substances and Disease Registry (ATSDR) conducted studies in fish in the South Fork Putah Creek near the LEHR/SCDS site which address both public health and bioaccumulation affects (ATSDR, 1998). These studies concluded that concentrations of lead and mercury in certain fish species were elevated, but there was no apparent correlation between the location and lead or mercury levels."*

That statement is an inadequate characterization of the information available. ATSDR pointed out specifically in the 1997 studies that under low flow conditions it appeared that discharges to Putah Creek in the vicinity of the LEHR site were responsible for the elevated mercury and lead.. Further, during these studies, fish taken from the area of UCD discharges of the campus waste waters contained radioactive mercury which almost certainly came from UCD. The 1998 studies were conducted under higher flow conditions which allowed the fish to migrate. The above quoted section is another example of the very great difficulty that UCD L. Vanderhoef administration staff and their consultants have in reliably reporting on issues. Virtually every time, when there is a situation which might show that UCD is in some way endangering the health and welfare of the public, UCD L. Vanderhoef administration distorts the information to try to provide unreliable information to the public. This has been documented year after year and is again documented on Page 14 with respect to the ATSDR studies.

Page 14, second paragraph, last sentence states,

> *"Based on these findings, no independent action by UC Davis is warranted unless further health consultation reports or site releases indicate a connection with the South Campus Disposal Site."*

Such an approach represents a significantly deficient assessment of the information available on approaches that should be used. Until such time as an adequate ongoing program of reliable monitoring of stormwater

runoff, both direct and through the campus sewage treatment plant, has been conducted for a number of years and the impacts of this runoff on the beneficial uses of Putah Creek have been conducted for several years, it will not be possible to make any assessment of the magnitude of the problem that could be occurring now due to inadequate control of stormwater runoff constituents from the LEHR site, as well as from the campus Waste Water Treatment Plant discharges. As has been discussed in detail by DSCSOC in its reports over the past several years, due to the inadequate monitoring LEHR site stormwater runoff could readily be contributing to the excessive mercury that has been found in Putah Creek fish and could be contributing to yet inadequately investigated chlorinated hydrocarbon pesticides that could be present in Putah Creek fish.

As part of a UCD L. Vanderhoef administration deliberate attempt to distort information on issues, the statement is made on Page 14 in paragraph 2,

> *"These studies provide bioaccumulation data for fish and wildlife in waters both upstream and adjacent to the Site. A 1991 report issued by the California Department of Fish and Game suggests levels greater than 20 parts per million of organochlorine pesticides and mercury in wildlife at Lake Berryessa, California (E. E. Littrell, 1991)."*

This is an attempt to divert attention from the issues of concern namely, whether UCD LEHR site and campus waste waters are contributing to excessive mercury that bioaccumulates in Putah Creek fish. Until such time as an adequate investigation has been done to define the magnitude of the contribution from LEHR site and the campus waste waters, it is not possible to rule out that there is a significant contribution. While unknown to UCD and DOE and their contractors at the time that it was first revealed by DSCSOC in 1995, in the 1980s the US EPA defined through their development of water quality criteria the levels of such constituents as chlordane and mercury in water that could bioaccumulate to excessive levels in fish that would be a health hazard to humans who use the fish as food. UCD continues to ignore this situation claiming that based on the use of inadequate analytical procedures it has no responsibility to define what effects UCD stormwater runoff and wastewater discharges contribute to the excessive bioaccumulation of hazardous chemicals that have been identified in Putah Creek. Just because there are other sources of these chemicals in Putah Creek fish does not mean that the LEHR site and the campus waste waters are not aggravating this situation. Water pollution control regulations do not require that a source of the constituent has to be solely responsible for the problem. All it has to do is to contribute to the problem. The contribution of LEHR site stormwater runoff to these problems has not yet been defined because of the recalcitrant approach that the UCD L. Vanderhoef administration has followed in investigating the LEHR site stormwater runoff impacts.

Page 14, third paragraph states,

> *"The extensive data set for surface water monitoring has provided a clear understanding of the quality of water in the South Fork of Putah Creek near the Site."*

The first bulleted item states,

> *"Constituents reported consistently in the surface water adjacent to the Site cannot be attributed to influences caused by Site activities."*

That statement is not true. An inadequate investigation has been conducted to make that statement.

The next bulleted item states,

"Sporadically reported constituents could not be confirmed for surface water."

That statement has to be defined as to what the authors of the report mean by what constituents, and what is "sporadically."

The next bulleted item states,

"Two locations exist for storm water runoff from the SCDS."

That statement is not true. There are four locations for stormwater runoff and discharge from the LEHR site.

The last bulleted item states,

"Storm events occasionally do not generate enough volume for the current suite of chemical parameters."

This is because of inadequate approaches being used in the sampling program by the UCD staff. Clearly there is sufficient volume in stormwater runoff from the site if adequately sampled to conduct the analyses that should be done. The kind of situation that has been documented by DSCSOC, where stormwater runoff through the wastes on Landfill no.3 was photographed occurring at a substantial rate, yet on that same day UCD staff claimed at an RPM meeting that there was no stormwater runoff occurring that day. The problem was that the UCD staff examined the site early in the morning instead of late in the afternoon. If they had done their job responsibly they would have seen the stormwater runoff occurring at the site and could have readily sampled it.

Page 15, first paragraph, item 4.0 Proposed Groundwater, Surface Water and Stormwater Monitoring Programs states,

"This section presents the proposed revised water monitoring program. Revisions to the program are based on the assessment of the groundwater, surface water and storm water monitoring programs presented in Section 3."

As documented herein, the assessment provided in Section 3 is inadequate and, in some instances, unreliable. Therefore, it can be expected that the proposed groundwater, surface water and stormwater monitoring presented in this section is also unreliable.

Page 15, section 4.1 Proposed Groundwater Monitoring Program states,

"Based on the assessment of the current groundwater monitoring program, continued groundwater monitoring should be based primarily on the existing IRA groundwater monitoring program, which substantially duplicates the current quarterly program, supplemented with additions based on needs of the ongoing HSU-4 investigation."

As has been documented in these comments, there is substantial need for a greatly expanded groundwater monitoring programs beyond the IRA groundwater monitoring program to define the pollution of groundwaters by other waste management units, the full extent of HSU-2 off-site pollution and the full extent of HSU-4 pollution.

Basically, UCD needs to start over with respect to defining the pollution which is occurring at the LEHR site where each waste management unit is monitored to define the pollution by wastes deposited at the location of the waste management unit. A waste management unit centered monitoring program needs to be developed that targets each waste management unit as a source of groundwater pollutants and defines the extent of the pollution that has occurred and is occurring now.

The statement about radiological COCs, tritium and carbon-14 sources being well-defined applies only to certain waste management units and does not apply to others. Until a proper monitoring program is conducted, it cannot be certain that there are not other areas where tritium, carbon-14 and other radiological wastes have been deposited at the site which have lead to groundwater pollution.

The statement in the last paragraph on Page 15 and the first paragraph of Page 16 about the impacts of nitrate and TDS on HSU-2 justifying the ability to define remedial actions is highly inappropriate. The nitrate and TDS, as well as TOC and other constituent pollution of groundwaters, is only begun to be investigated. It has not been adequately defined.

One of the deficiencies of the presentation of information by UCD is the failure to provide information on the TOC data that has been collected. Is there any evidence for elevated TOC in the groundwaters associated with the LEHR site? If so, what is this evidence, or is this another situation where UCD fails to report information, since it might show that there is a problem that has to be addressed?

Page 16, first full paragraph, the statement,

"Additional delineation of chromium in site groundwater does not appear warranted."

is not appropriate. Any pollution of groundwaters by chromium, whether natural or waste-derived, is the responsibility of UCD.

Page 16, third paragraph, the statement,

"....the extent of the principal mass of COCs has been assessed...."

is inadequate since the full extent of all COCs has not been investigated.

Page 16, the five listed items are inadequate for a future program until all of the waste management units including Landfill no.3 have been properly investigated. The RPMs should instruct UCD to address the issue of the broader range of constituents of concern. This issue has been repeatedly raised by DSCSOC and the RPMs. The UCD L. Vanderhoef administration, through its staff, continues to ignore the issue. This issue can no longer by ignored and UCD must be required to do a proper evaluation of hazardous chemicals that could be present in groundwaters that are not now adequately or reliably investigated for COCs. DSCSOC has provided guidance on how this type of study should be done in its previous correspondence.

Page 18, the COC's listed under the bulleted items and in subsequent paragraphs are not adequate to address the issue of concern with respect to UCD's mismanagement of its campus wastes at the LEHR

site that have lead to groundwater pollution.

Page 18, next to the last paragraph, lists the field parameters. One of the field parameters that should be included is dissolved oxygen in the groundwaters. This is a much more reliable indicator of factors that influence the transport of constituents than oxidation reduction potential.

Page 19 discusses the data quality objectives. While to someone who has not reviewed the data reports might conclude that the data quality review that takes place at the LEHR site will result in data reports with high reliability, in fact DSCSOC has repeatedly documented the poor quality that the UCD/DOE and their consultants have presented in their data reports. This same problem occurs repeatedly in other LEHR site reports where data is presented with improper units and other essential information needed for its interpretation. Unfortunately these reports are allowed by the RPMs to stand as reliable reports where there is no requirement that UCD and DOE correct the obvious errors that are in them. This is one of the most significant deficiencies in how the RPMs are administering the investigation of this site.

Page 20, first full paragraph, section 4.2 Proposed Surface Water and Storm Water Monitoring Program states as the last sentence,

> *"The monitoring of chemical parameters presented in the Table 6 will be continued for another year as part of the IRA monitoring program to further supplement the data set for storm water runoff."*

There is no relationship between the IRA monitoring program and the stormwater monitoring program. The IRA was acknowledged by the RPMs and DSCSOC to be a short-term experimental program designed to investigate the feasibility of using groundwater extraction as a means of removing certain pollutants from the groundwater. The stormwater runoff and surface water monitoring of Putah Creek will, as DSCSOC has outlined previously, have to continue for at least five years after the site has been completely remediated and stabilized in order to ensure that the remediation program does not mobilize constituents which become a threat to Putah Creek water quality through stormwater runoff from the site.

The information presented in Table 6 is inadequate to judge the adequacy of the proposed surface water monitoring and stormwater monitoring. Specific analytical procedures and detection limits must be specified for each of the parameters that will be analyzed in this program. Further a reliable comparison should be made for the detection limits of the analytical methods that are proposed to be used and the regulatory and known adverse impact limits/concentrations that have been established for the constituents being measured.

It is essential that the surface water monitoring be integrated with the stormwater monitoring to evaluate the impacts of stormwater runoff constituents on Putah Creek water quality. The current approach is grossly inadequate to assess whether stormwater runoff derived constituents are adversely impacting the beneficial uses of Putah Creek.

Page 20, second full paragraph states that the sampling of stormwater runoff will continue through 1999. The sampling of stormwater must continue for at least five years until the site is well stabilized.

Page 20, the last paragraph states that stormwater monitoring will be conducted twice a year. It should be conducted three times a year. Once with the first major runoff event, once in mid-winter, and once toward late winter or early spring.

Page 21, the first line indicates that the sampling of stormwater runoff will occur at LFU #1 and LFU #3. There is need to integrate the DOE monitoring with this so that a complete package is reviewed, not this piecemeal approach that is being used now.

Page 21, the end of the first paragraph states,

"Testing of surface water will be conducted only if a chemical release through site runoff is identified, or aquatic toxicity testing indicates potential harmful affects on freshwater life."

This is obviously not an adequate approach. As has been documented in previous discussions on the deficiencies in the UCD-DOE stormwater monitoring program, there can readily be no toxicity in a stormwater runoff event and have insufficient concentrations of constituents, especially in light of the inadequate analytical methods that are used, and yet there can be adverse impacts to aquatic life and human health in downstream Putah Creek waters caused by LEHR site stormwater runoff associated constituents.

Page 21, second paragraph states,

"Based on previous sampling events, storm water events will not necessarily produce enough runoff to evaluate all of the constituents of concern."

If this occurs then they need to sample another runoff event or stay at the sampling site long enough so that sufficient volume is collected. If this continues to occur then the approach for sampling should be modified so that sufficient volume will accumulate at the runoff location so that it can be reliably assessed. These are trivial issues to carry out and should be required of UCD.

There is no discussion in this revised sampling plan about bioaccumulation of the two hazardous chemicals of greatest concern at the LEHR site, namely chlordane and mercury. Both of these could readily be present in stormwater runoff from the site at concentrations that contribute to the excessive concentrations in Putah Creek fish that are a hazard to those who use the fish as food. The issue of reliably monitoring excessive bioaccumulation of mercury and chlordane must be a part of this monitoring program.

Page 21, section 4.2.1 Sampling Locations, states in the first paragraph,

"Sampling locations for surface water and storm water have included areas that are not influenced by the South Campus Disposal Site. [i.e., LEHR national Superfund site.] *These unrelated monitoring locations include STPO for surface water and the lift station for storm water."*

Again, UCD is providing unreliable information. The UCD south campus Superfund site discharges stormwater to the campus sewage treatment plant, which is under order from the Regional Board to improve the quality of its effluent. While the UCD L. Vanderhoef administration, through legal action, is trying to continue its recalcitrant polluter approach of not following the normal procedures of providing adequate treatment of its wastes before discharge by appealing Regional Board requirements, these appeals have not been successful and will not likely be successful based on the fact that the exemptions that the UCD L. Vanderhoef administration is trying to gain through the appeals are standard practice throughout the US under Clean Water Act requirements set forth by the US EPA.

The discussion in this paragraph about the Weiss (1998) report adequately addressing the DOE areas is inappropriate. The Weiss (1998) report was far from adequate in addressing these issues. UCD and DOE must be required to develop a single discussion of stormwater runoff and discharges from the LEHR site, and this should be made public for review.

This paragraph attempts to portray the NPDES permit issued by the Regional Water Quality Control Board as providing adequate protection of public health and the environment of Putah Creek from discharges through the UCD campus Waste Water Treatment Plant. It is well-known that NPDES permits, as they were issued, are based on unreliable information provided by UCD to the Regional Board and are inadequate to address the kinds of pollutants that can be present in stormwater runoff from a Superfund site that is discharged to the campus sewerage system**.

Page 22, the first full paragraph presents an unreliable approach toward adequately determining whether chemical impacts are occurring associated with stormwater runoff from the LEHR site. The impacts of stormwater runoff cannot be reliably assessed by comparing associated constituents to the background concentrations. This approach reflects a continuing lack of understanding of proper water quality evaluation. Those familiar with these issues know that the approach that is proposed is obviously unreliable since the impact of constituents on the beneficial uses of the water body is not related to the analytical data that is generated from the kinds of measurements that have or are proposed to be made. An example of this kind of situation is chromium. As DSCSOC has repeatedly documented, UCD has been allowed by the Central Valley Regional Water Quality Control Board to conduct wastewater discharges and stormwater runoff monitoring using what have been well-known since the mid 1980s, based on US EPA water quality criteria documents, to be inadequate analytical methods for measurement of the potential impacts of chromium. UCD is dumping polluted groundwater chromium through its campus sewerage system to Putah Creek associated with the discharge of pump-and-treat groundwaters from the massive groundwater pollution plume associated with the UCD Landfill no.4 located on the west campus. Typically, the concentrations of chromium found in Putah Creek are less than the inadequate detection limits used by UCD, which normally are about 10 ：g/L. However, chromium VI is well-documented to be toxic to aquatic life at 0.5 ：g/L.

Similar kinds of problems occur with mercury and chlordane. The analytical methods that are used by UCD are not adequate to measure mercury and chlordane in upstream Putah Creek and stormwater

runoff, as well as wastewater discharges, at levels that can bioaccumulate to excessive levels in fish. UCD stormwater runoff from the LEHR site, as well as its discharges to the campus sewage treatment plant collection system, could readily be contributing to the excessive bioaccumulation by both mercury and chlordane within Putah Creek fish. UCD's proposed approach for detecting this problem is obviously inadequate.

Page 22, the last sentence in the first full paragraph states,

"Chronic toxicity results will be used to determine if runoff has the potential to cause adverse affects on aquatic species."

Chronic toxicity testing does not measure all of the kinds of problems that can occur with chemicals from the LEHR site. As has been documented, there can readily be excessive bioaccumulation that will not be detected by chronic toxicity testing that can be adverse to aquatic life as well as those who use the fish as food.

Page 22, section 4.2.2 Primary Constituents for Site Runoff states,

"The analytical program for storm water includes both chemical specific testing and aquatic toxicity evaluations. Chemical testing of storm water has provided evaluation of the presence of storm water constituents in site runoff."

That statement is false. The inadequate procedures that have been used and the inadequate sampling that has been done has not properly characterized the chemical characteristics of stormwater runoff from the LEHR site. The aquatic toxicity testing evaluated acute toxic effects for stormwater runoff on fathead minnows. UCD, over the objections of DSCSOC, has been allowed to use acute toxicity testing using insensitive species and procedures to assess situations that could be adverse to aquatic life. The aquatic toxicity testing that has been done by UCD is a well-known waste of public funds in addressing issues of concern to the public.

Page 22, third paragraph states,

"Chemical and aquatic toxicity testing results for seasonal runoff in 1997 and 1998 indicate that no releases of site COCs have occurred in LFU #1 or LFU #3, and no acute toxicity effects have been demonstrated for storm water runoff."

What should have been said is that with the inadequate stormwater monitoring program no acute toxicity has been found, and the chemical monitoring program based on inadequate sensitivity of analytical procedures for some of the constituents of concern at the LEHR site have failed to detect whether there is sufficient concentrations to be contributing to well-known water quality problems that occur in Putah Creek.

Page 22, fourth paragraph states,

"Impacts to Putah Creek from storm water constituents will be assessed based on the calculated background levels."

As discussed above, and as obvious, this approach is not reliable and cannot be used to assess the potential impacts of stormwater runoff associated constituents on the beneficial uses of Putah Creek. Specific

evaluations of excessive concentrations relative to those that could be adverse to the beneficial uses of Putah Creek must be assessed independent of any background issues.

Page 22, last paragraph, the statistical procedures that were used is largely gobeldy-gook with respect to reliably detecting impacts of stormwater runoff from the LEHR site. That approach has no validity and will not be accepted by DSCSOC as an appropriate method of assessing potential impacts of mercury, chlordane or other constituents from the LEHR site stormwater runoff.

Page 23, first full paragraph states,

"Continued evaluation of surface water on a quarterly basis is not necessary since the objective of the monitoring is to determine if storm water runoff is contributing to toxicity in the creek."

As DSCSOC has been pointing out since 1995, this quarterly monitoring of Putah Creek has been a waste of public funds. To expect to see impacts of stormwater runoff associated constituents from the LEHR site based on a monitoring program of Putah Creek that is not tied to stormwater runoff events is, at best, naive. Even those with the most elementary understanding of water quality issues should understand that the adverse impacts of LEHR site runoff associated constituents, except for bioaccumulation, will not likely persist for long periods of time. These are event-based situations that must be sampled accordingly.

Page 23, the second full paragraph states,

"The rationale for replacing acute toxicity analyses with chronic toxicity testing has been discussed above. The basis for eliminating hexavalent chromium analysis in favor of total chromium analyses was presented in Section 3.1.2."

Again, this shows a lack will

life toxicity at the point of discharge and downstream of the LEHR site.

Page 24, the first paragraph proposes to use a comparison of calculated toxicity units for each sample so that stormwaters and surface waters are compared to assess significant increases in toxicity. While this approach can be used, what must be done as a minimum is to determine whether the stormwater runoff from the LEHR site, in 100 percent, i.e., in no dilution, is toxic, and then assess the magnitude of the toxicity through a dilution series. The dilutions should be conducted with standard reference water, not upstream Putah Creek water. It should be understood that there could be appreciable toxicity associated with LEHR site stormwater runoff which would impact the beneficial uses of Putah Creek which would not be detected by the procedures that UCD proposes to use. The calculated TUc (toxic unit chronic) approach is not very sensitive to detecting increases in aquatic life toxicity unless a very large number of dilutions of the stormwater runoff toxicity tests and background waters are conducted.

The proposed approach of allowing two rounds of sampling and analysis to indicate significant increases in toxicity in Putah Creek is inappropriate. A single toxic event is enough to be adverse to the beneficial uses of Putah Creek. Toxicity from stormwater runoff from the LEHR site is likely to be highly variable. Each measurement should be considered on its own merit for potential impacts on the beneficial uses of the Creek. Basically, the aquatic life toxicity testing approaches that are proposed are still significantly deficient for assessing the impacts of Putah Creek stormwater runoff on the beneficial uses of the Creek.

UCD should be required by the RPMs to start over, where they obtain competent assistance in how to properly assess the impacts of stormwater runoff on the beneficial uses of Putah Creek. The information provided by DSCSOC has provided detailed guidance on these issues. Thus far, UCD L. Vanderhoef administration, through its staff, have chosen to ignore these recommendations with the result that they have been and now are proposing to continue to waste large amounts of public funds with the repeated review of obviously inappropriate procedures. Rather than addressing these issues correctly the first time when problems are pointed out, as was done in 1995, the UCD L. Vanderhoef administration is persisting with the recalcitrant polluter approach of failing to address the stormwater runoff water quality impact issues in a meaningful way.

Page 25, under Data Reporting, third paragraph. Again the comparison to background conditions is inappropriate for assessing impacts of LEHR site derived constituents on the beneficial uses of Putah Creek. This approach must be supplemented by a proper evaluation of impacts using traditional approaches. These approaches may require investigation of aquatic organism assemblages in Putah Creek relative to Putah Creek habitat characteristics.

If the background concentrations of constituents in Putah Creek above the LEHR site violate basin plan objectives, such as toxicity, then UCD will, in accord with conventional Clean Water Act requirements, not be allowed to discharge any toxicity or constituents which contribute to toxicity, such as chromium VI, at concentrations above about 0.5 ：g/L.

Beginning with Figure 6, and for several pages, there are plots of concentrations of various constituents in surface waters. As has been pointed out in the past, such plots, which present averages for a year, should not be presented in this way. The key information that has to be considered is the variability within each of these averages to determine whether there is any significant change between years. This is an inadequate presentation of data that requires that UCD redo this report to present the information appropriately.

Assuming that the data is presented reliably, and that the averages are representative of the conditions, this data shows that there is excessive chromium in Putah Creek compared to its toxicity to zooplankton, and that the chloroform concentrations, especially recently, are well above those that could readily pollute groundwaters through Putah Creek recharge of groundwaters.

Figure 27 presents the Proposed Monitoring Well Network. This network is inadequate compared to the monitoring well network that will be needed to define the extent of groundwater pollution on-site and off-site by existing waste management units.

Figure 28 presents Statistical Test Selection Flow Chart. This approach is not a reliable approach for addressing the potential impacts of stormwater runoff associated constituents from the LEHR site on the beneficial uses of Putah Creek.

Comments on Appendix A, 1998 Annual Water Monitoring Results for the LEHR/SCDS Environmental Restoration, Davis, California (National Superfund Site)

Page 1, the sampling was performed in accordance with procedures and detailed in the site specific revised field sampling plan, Dames & Moore (1998a). It is my understanding, based on RPM comments, that that field sampling plan was never approved by the RPMs. Further UCD manipulated the release of the revised version of that plan to preclude DSCSOC reviewing it.

Page 4 and 5 report the hydraulic gradient for HSU-2 and HSU-4. In order that the public and others who are not familiar with these units can understand this issue, the estimated groundwater velocities should be reported. Typically, reports of this type contain this information.

Page 8, mentions in the second paragraph that manganese was reported above the contract required detection limit. Evidently this is what is meant by CRDL in the tables of data.

Throughout this section there is repeated reference to the contract detection limits. As has been repeatedly pointed out, these contract detection limits were established inappropriately without public review and the detection limit needed to detect constituents that are at potentially significant concentrations. The established CRDLs for the analyses of several parameters is inadequate and, as DSCSOC has pointed out in the past, needs to be immediately changed to appropriate detection limits. With few exceptions, analytical methods are available that are accepted by the US EPA to determine the constituents at critical

concentrations and should be used. Failing to use such methods can represent a substantial waste of public money and inadequate investigation of the site.

The bottom of Page 8 and top of Page 9 discusses the finding of chlorinated hydrocarbon pesticides in groundwaters at measurable concentrations of concern. This is indicative of the potential for a wide variety of unregulated constituents that are present in UCD's wastes that were deposited at the LEHR site or that have been formed through transformation of wastes that were deposited at this site being a threat to groundwater quality.

Page 14, and elsewhere, lists chlorides with an "s." As has been pointed previously, this is inappropriate nomenclature. It is chloride, not chlorides.

Page 15, under Calcium is more of the sloppy reporting that has prevailed through UCD, and for that matter DOE, data reports where the units on calcium are clearly not milligrams per liter as reported; they are micrograms per liter. The same situation applies to magnesium.

It should be noted that this kind of sloppy data reporting has been brought to the attention of UCD/DOE and their consultants repeatedly over the past four years. It is still occurring UCD and its contractor Dames & Moore still have no one on their staff who is involved and responsible for the LEHR site investigation who has an elementary understanding of data reporting for chemical constituents and assessing the impacts. Over the past half a dozen years every data report presented by UCD or DOE through Dames & Moore has contained significant sloppy reporting, such as occur on Page 15. It should be obvious to anyone reviewing the data that there cannot be 31,000 mg/L of calcium in a sample, or 39,000 mg/L magnesium, or 7,000 mg/L potassium, etc., especially in light of the fact that under the total dissolved solids discussion on the same page there is only 330 mg/L. The RPMs should insist that UCD get somebody associated with this project who understands the elements of reporting chemical data and ensure that this is done reliably in the future and that all past data reports which contain sloppy presentation of data of this type are corrected so that those who try to use this data in the future know that the data were reported in error.

Page 17, under Chromium, lists the detection limit as <6.5 ：g/L. As has been pointed out, this is an inadequate detection limit since hexavalent chromium can be toxic to aquatic life at 0.5 ：g/L.

Page 29, the listing of References on this page is not properly done. A proper reference provides sufficient information so that someone else reading the reference could find the reference. These references need to be expanded to include the source of the information.

Comments on Appendix B

Appendix B, the unnumbered table for pesticides lists the concentrations of chlordane in stormwater runoff during 1998 as less than 0.050 to 0.053 ：g/L. The US EPA (1987) water quality criterion for

chlordane is 0.0043 ：g/L. This criterion value is for the protection of aquatic life. For human health protection through bioaccumulation, the criterion value is for 1 in 1 million cancer risks. Therefore, in 1998 as in past years, UCD has been using an inadequate analytical procedure to measure chlordane in stormwater runoff from the LEHR site. There could readily be chlordane bioaccumulation or, for that matter, even toxic effects to aquatic life from chlordane in stormwater runoff that would not be detected by the analytical procedures that have been used. These issues were pointed out in DSCSOC's initial review of the data at the LEHR site. They have continued over the past four years, where all the chlordane measurements that have been done on surface waters has been a waste of money because they did not use the analytical methods necessary to detect potential problems in accord with US EPA water quality criteria.

A similar problem occurs for mercury. The detection limit that was used during 1998, Appendix B Metals, was less than 0.1 ：g/L. The current US EPA criterion, which was adopted in 1987 for mercury, is 12 ng/L. Again, as has been discussed in previous DSCSOC comments on the inadequate stormwater monitoring program that UCD and DOE have been conducting at the LEHR site, there is a major discrepancy between being able to detect potential mercury problems associated with stormwater runoff from the LEHR site based on the US EPA water quality criterion for mercury that was adopted in 1986. There could readily be mercury present in the stormwater runoff from the LEHR site that is contributing to the excessive mercury in the Putah Creek fish that has not been detected by the stormwater runoff monitoring program.

The same kind of problem occurs with hexavalent chromium, where detection limit of 4 ：g/L was used. Hexavalent chromium is toxic to certain forms of zooplankton at 0.5 ：g/L.

The same kinds of problems exist for the 1998 surface water monitoring data. Inadequate detection limits were used for chlordane, for mercury, and for chromium VI.