[1]Evaluation also concluded the discharge from the facility was not causing environmental impacts or degradation in water quality that would affect beneficial uses established for Poso Creek water, including agricultural supply, recreation, wildlife preservation, aesthetic enjoyment, and groundwater recharge. In particular, the common present uses for local groundwater, minor stock watering, and agricultural activities, are not affected by site discharges (Meredith/Boli, 1989).

In fact, the Findings cite no evidence of specific risk to human health and the environment from either hazardous or inorganic constituents, because the water quality data are quite "conclusive" that little or no such risk exists. Thus, **the problem is not that the groundwater quality data are inconclusive, but that they do not support the imposition of a more stringent permit requirement as "necessary to protect human health and the environment."**

DTSC Response to Comment 50)

Please see DTSC Response to Comment 16), Comment 30), Comment 32), and Comment 35).

Comment 51)

[2]**2.2.3 Diminishing to Background Levels.** As noted above, during the period of record, concentrations of inorganic waste constituents in impacted site wells have declined and are approaching background concentrations (Figure 1). DTSC apparently came to a similar conclusion in their CME (DTSC, 2002b). Appendix A of the CME consists of the Comprehensive Ground Water Monitoring Evaluation Technical Review of Hydrogeologic Characterization and Ground Water Monitoring Program, CME Checklist. In Item 86 of the checklist, DTSC found that the three impacted site wells in the WWMU, CW10, MW01, and MW06, have shown "*significant*" decreasing concentrations of chloride, iron, magnesium, sodium, sulfate, and TDS since 1980. In Item 88 of the checklist, DTSC identified the reason for the decreasing trends were due to "... cessation of waste disposal activities and closure of the units in the WWMU area." In the CME report, DTSC found the ability of the monitoring program to identify releases was unclear, because the site monitoring parameters did not include organic constituents, such as VOCs and SVOCs, apparently present in waste. As previously stated, when these analytes were added to the sampling regime (for EWMU and WWMU monitoring wells, Poso Creek wells, or NWCCP impacted groundwater), no VOCs or SVOCs were confirmed in groundwater or leachate samples collected during that time.

DTSC Response to Comment 51)

Please see DTSC Response to Comment 30).

Comment 52)

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2.2.4 Refined Data Evaluation Methods. Because DTSC has previously concluded assessing site impact is impaired by the fact that waste constituents are also naturally occurring (DTSC, 2002b), CWM developed a refined geochemical method to differentiate impacted groundwater from background groundwater using ion ratios (Geomatrix, 2006b). The refined method can be used to monitor for potential future releases and to continue assessing the effectiveness of closure construction. On July 22, 2005, a Draft Amended Report of Waste Discharge (AROWD) was submitted to DTSC and RWQCB. That AROWD was finalized and submitted to DTSC and the RWQCB on March 10, 2006 (Geomatrix and GeoChem Applications, 2006). The AROWD presented methods to differentiate background groundwater geochemistry from leachate and impacted groundwater geochemistry. On March 22, 2006, at a meeting at the RWQCB office in Fresno, with DTSC attending, methods for differentiating impacted groundwater from background groundwater were presented and discussed. These methods were incorporated into a Site-Specific Waster Quality Monitoring Plan (SSWQMP) (Geomatrix, 2006b) that the RWQCB had requested be prepared for the site.

Following the meeting at the RWQCB office, in a March 27, 2006, e-mail, DTSC asked CWM to prepare the detailed SSWQMP in accordance with DTSC monitoring guidelines, which calls for an extensive review of the geology, hydrogeology, groundwater impacts, and justification for the groundwater monitoring system. The SSWQMP was submitted to RWQCB and DTSC on July 17, 2006 (Geomatrix, 2006b).

DTSC Response to Comment 52)

Please see DTSC Response to Comment 10).

Comment 53)

2.3 Findings Do Not Support the Recommendations.
The Findings attempt to justify a complete reconstruction of the closure cover, along with a new 30-year post-closure care period (increasing from the current 2018 to 2036) without taking into consideration the findings of a water quality monitoring program that has been accumulating data on the closure cover performance since 1987. While the DTSC dismisses this entire body of data as "inconclusive", their own technical experts have previously used the data to draw significant conclusions regarding groundwater conditions and the effectiveness of closure activities (DTSC, 2002b). In addition, the RWQCB (whose special expertise is water quality), has drawn significant conclusions from the data, writing in the 1999 Waste Discharge Requirements (RWQCB, 1999), *"The closure of the waste management units with waste left in place will protect water quality and the beneficial uses for surface water or groundwater below the site."*

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[1] CWM believes that DTSC has inappropriately excluded from its permit renewal inquiry the principal body of evidence most relevant to the statutorily required determination of what is or is not *"necessary for the protection of human health and the environment."* Therefore, it would be inappropriate for the agency or CWM to move ahead with the onerous recommendations proposed in the Findings, without taking into account the evidence presented by the extensive historical data set for the Facility.

DTSC Response to Comment 53)

Please see DTSC Response to Comment 16), Comment 18), Comment 30), Comment 32), and Comment 35).

Comment 54)

[2] **2.3.1 Post-Closure Care Extension.** The Findings provide no evidence as to why such an extension is necessary to protect human health and the environment.

Page 7: The third paragraph on Page 7 describes why an extension of post-closure care period for 30 years from 2006 is necessary. The first bullet states, *"Disposed hazardous wastes have not likely degraded since the Facility's closure, and will not likely degrade in a 30-year time period from 2006."*

DTSC does not describe or list what hazardous wastes were disposed at the facility. Moreover, as noted above, in dismissing the groundwater quality data, the Findings essentially concede that inorganic impacts, rather than hazardous wastes are the relevant concern at this site. Therefore, the issue of non-degradation of hazardous wastes (or non-degradation of non-hazardous oil field wastes) provides no support for the proposed extension of time.

DTSC Response to Comment 54)

Please see DTSC Response to Comment 16), Comment 30), Comment 32), and Comment 35).

Comment 55)

[3] **2.3.2 Principal Site Wastes.** It is well documented (EMCON, 1985) that the bulk of the waste disposed of at the Bakersfield Facility was Oil Exploration and Production Wastes (E&P wastes). E&P wastes are specifically exempted from RCRA (40 Code of Federal Regulations, Section 261.4). In addition to the federal rule, DTSC conducted an evaluation E&P wastes and found they are exempted from RCRA. DTSC further concluded that *"the waste streams sampled were not found to be hazardous based on the data obtained and the statistical analysis of that data; however isolated cases are discussed where E&P wastes displayed California hazardous waste characteristic,."* (DTSC, 2002a). This study clearly

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[1] indicates that E&P wastes are generally not considered to be hazardous. Yet without citing any specific sampling or any identification of specific California hazardous compounds, DTSC concludes that *"disposed hazardous wastes have not likely degraded since the Facility's closure,"* and *"will not likely degrade in a 30-year time period from 2006."*

Further, the DTSC cites no evidence for its conclusion that disposed wastes, hazardous or otherwise, will not degrade over a 50-plus year period.

Processes such as hydrolysis, reduction photolysis, photo-oxidation, biodegradation, adsorption, and fixation of metals and other chemicals are all known to "degrade" wastes in the environment.

Additionally, DTSC does not discuss quantities, potential pathways, or evidence of environmental movement of hazardous wastes at the Facility since closure. The fact that no hazardous concentrations of wastes have been detected in groundwater or leachate over the 21-year period of record (1985 through 2006) strongly suggests that a) there was little or no hazardous waste disposed at the site, and b) if there ever were hazardous wastes present in the landfill, they have degraded to the point that they are not a threat to human health and the environment or are being effectively contained by the cover and liner. Thus, the bullet point regarding non-degradation of hazardous wastes is not a finding, but an erroneous assumption without any basis in fact. It therefore provides no support or justification for the proposed extension of the post-closure care period.

DTSC Response to Comment 55)

If CWM wishes to remove all waste material to below waste thresholds, it can follow the same process used at another of CWM facilities, CWM Coalinga. [2] Once a material is classified as a hazardous waste, it remains a waste until it meets the criteria described in CCR title 22 and CWM goes through waste declassification process. CWM appears to be circumventing these regulations by placing the burden on DTSC of proving that the documented hazardous waste buried at the CWM Bakersfield disposal facility is hazardous waste. CWM retains responsibility to manage the waste as waste until the material has been reclassified as nonhazardous.

Accordingly, the DTSC Draft Post-Closure Permit Special Conditions have been modified to allow for the following:

1. Within 60 days of the effective date of the permit, submit a waste declassification notification pursuant to California Code of Regulations, title 22, section 66260.200; or

2. Within 60 days of the effective date of the permit, submit a work plan demonstrating the Facility will meet the closure by removal and decontamination standards of chapter 14 of division 4.5 of the California Code of Regulations, title 22; or

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3. CWM shall follow the Special Conditions of the Draft Post-Closure Permit, which are included in Part V, 3. of the Final Post-Closure Permit.

Additionally, please see DTSC Response to Comment 30), Comment 32), and Comment 35).

Comment 56)

> **2.3.3 Cessation of Care.** The third bullet states, *"The containment system at the Facility has deteriorated since 1991 when it became subject to the postclosure care. If allowed to go unmaintained as a result of cessation of the post-closure period, the deterioration which has occurred during the Facility's first 15-years of post-closure will continue and will likely be considerably more significant. The result of such deterioration would include onsite environmental exposures to the disposed hazardous wastes."*
>
> As noted in the comments to the Executive Summary, the reference to "cessation of post-closure care" is misleading and not factually supported. The permit renewal process is not about cessation of care, but about the terms and conditions applicable during the continuation of post-closure care. The current 30-year post closure care period is not scheduled to end until 2018. Neither CWM nor DTSC has proposed cessation of post closure care. Therefore, the relevant question is whether current site conditions are, and will continue to be, protective of human health and the environment through the current post-closure period. The evidence to date indicates that site conditions do provide the requisite environmental protection.

DTSC Response to Comment 56)

Please see DTSC Response to Comment 31).

Comment 57)

> **2.3.4 Exaggerated Deterioration of the Cover.** As previously noted in these comments, CWM acknowledges that there has been some cracking, animal grazing and burrowing on the landfill cover over the past 19 years. However, the findings report paints an exaggerated picture of extreme disrepair and neglect of the cover, and suggests that site conditions will ultimately lead to exposure of on-site hazardous waste. This is not what the regulatory, monitoring, and engineering inspection records show. The regular monitoring inspections and current site conditions do not indicate significant erosion or other disrepair to the closure cover. The annual independent engineering inspections likewise do not indicate significant erosion or disrepair and do not recommend substantial repairs to any portion of the cover. The regulatory inspections by the RWQCB and by DTSC

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[1] itself have also noted only minor disrepair, which has been promptly repaired when noted.

The statement that the deterioration of the containment system will *"likely be considerably more significant,"* when the post-closure care period ends is an opinion that is not supported by data. The closure cover has withstood some of the most significant rainfall seasons on record with little or no "deterioration" and no *"onsite exposures to the disposed hazardous wastes."* Moreover, as there is little evidence of hazardous waste disposal at the site to begin with, there is minimal risk of exposing hazardous wastes even if the cover were to fall into such disrepair.

DTSC Response to Comment 57)

Please see DTSC Response to Comment 16), Comment 18), Comment 32), and Comment 35).

Comment 58)

[2] **2.3.5 Exaggerated Consequences.** The fourth bullet again states that there has been *"long-term neglect of post-closure care."* This is a misrepresentation of the record. Although some minor repairs need to be made with regard to animal burrows and surficial cracks, the scenario presented by DTSC, *"this deterioration leading to hazardous wastes washing from the Facility into Poso Creek which could impact several downstream environmental receptors,"* is not substantiated by any data in the record. Once again, it is unclear what hazardous waste DTSC is referring to, since the site has primarily oil field (E&P) wastes and monitoring data indicates no hazardous constituents in leachate or groundwater. Additionally, no evidence exists that this type of extreme deterioration has occurred during the first 19 years of closure, or would occur under a similar maintenance regime going forward. Moreover, DTSC provides no conceptual model of the type of cover failure it posits, and gives no indication of where the presumed hazardous waste would be "washing from" or what specific threat it would pose to downstream receptors.

The final statement, that *"Poso Creek's final discharge point is furthermore the Kern National Wildlife Refuge"*, while not untrue, does not fully account for the flow regime of Poso Creek. Poso Creek is an intermittent and ephemeral stream whose discharge rarely reaches the valley floor and even more rarely is able to make its way 30 miles across a flat valley to the Kern Wildlife Refuge. The North Kern Water Storage District (NKWSD) provided tabulated daily flows for Poso Creek at Highway 99 (about 12 miles west of the Bakersfield Facility) for the years 1983 through 2005 (Dana Munn, NKWSD, personal communication, August 2006). During the period of record (8,395 days), no surface flow was recorded at the Highway 99 station on 7,354 days or 88 percent of the time. No surface flow reached Highway 99 in 13 of the 23 years of record, and fewer than

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40 days of flow were recorded in 2 additional years. Based on a conversation with Mr. Dana Munn, of the NKWSD (personal communication, August 2006), in order for the surface water to make it across the valley, the flow volume has to be greater than about 200 cubic feet per second (cfs) west of Highway 99. During 1984, 1986, 1995, and 1996, flow in Poso Creek at Highway 99 exceeded 200 cfs for 2 to 7 days. During 1983, 1997, and 1998, flow in Poso Creek at Highway 99 exceeded 200 cfs for 86, 27, and 104 days respectively. Based on the tabulated data, water flowing in Poso Creek potentially reached the Kern National Wildlife Refuge on 238 of the 8395 days during 1983 through 2005 or less than 3 percent of the time.

Based on data from the California Department of Fish and Game, the area of the Poso Creek watershed east of Granite Road is 263 square miles. The surface area of the former active Facility is about 0.24 square miles. If one assumes equal precipitation, infiltration, and runoff for the watershed area and the site area, then the ratio of the watershed area to the Facility area can be used to evaluate potential contribution of flow to Poso Creek. For every cubic foot of flow contributed by the Facility to Poso Creek, approximately 1,095 cubic feet of flow is contributed from the remaining portion of the watershed area. This implies potential attenuation of three orders of magnitude for water originating from the Facility. As a worst case evaluation, if the contribution of flow to Poso Creek from the Facility is assumed to have the same concentrations of constituents (arsenic, cadmium, copper, nickel, selenium, and zinc) as leachate from the P02 LCRS (Attachment 1), then with an attenuation of 1,000 to 1, the concentration of waste constituents would be less than their respective reporting limits and remain substantially less than their respective STLCs. Arsenic occurs naturally in Poso Creek alluvium groundwater at a concentration similar to the concentration in leachate (Attachment I). The scenario of hazardous concentrations of waste constituents flowing from the Facility to Kern National Wildlife Refuge is ill founded. The Findings make erroneous and/or unsupported statements about the condition of the cover, the nature of the disposed wastes and the status of Poso Creek, and then assume catastrophic events and consequences based on those erroneous or exaggerated "facts." This is not an appropriate basis on which to found substantive modifications to the post-closure permit, especially not where the costs of tens of millions of dollars would be wholly disproportionate to the environmental benefits, if any to be gained.

DTSC Response to Comment 58)

Please see DTSC Response to Comment 16), Comment 32), Comment 35), and Comment 55).

Comment 59)

3.0 FINDINGS SECTION 3 -- FACILITY BACKGROUND
3.1 Eastern and Western Waste Management Units

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Page 8: In paragraph 3, DTSC states, *"During the winter and spring months, Poso Creek downstream of the Facility is withdrawn through numerous appropriate [sic] water rights for several uses."* This is true, but should be qualified to note that these appropriative water rights are only available when the water is present in the creek, which as discussed above, seldom occurs west of Highway 99. Moreover, as previously noted, the water quality data indicates that the Facility poses no demonstrable threat to groundwater quality or to the cited water rights.

DTSC Response to Comment 59)

Based on information provided by the State Water Resources Control Board, Division of Water Rights, DTSC understands there are at least thirteen locations east of Highway 99 downstream of the Chemical Waste Management Bakersfield facility where water rights on Poso Creek have been issued. DTSC is also aware of the intermittent flow regime of Poso Creek as is indicated in the findings report. It is however DTSC responsibility to consider the potential long-term environmental risks of facilities under the Department's oversight.

Comment 60)

Page 9: In paragraph 5, DTSC lists waste received by MP Oil between 1973 and 1980; "*...cannery wastes, oil scrubber wastes, oil field drilling mud waste, oil tank bottoms, and various other oil containing waste materials*". None of the listed wastes are hazardous wastes under federal RCRA or California law.

DTSC Response to Comment 60)

Please see DTSC Response to Comment 30) and Comment 55).

Comment 61)

3.2 Leachate collection and removal systems (LCRS).
Page 10: In paragraph 3, DTSC states, *"Both the EWMU and WWMU utilize LCRS. Collection and removal of leachate within the EWMU is accomplished through drainage beneath surface impoundments into leachate sumps, while leachate emanating from the WWMU is collected and removed through groundwater drainage into a detention pond known as the North West Canyon (NWC) Sump."*

The Northwest Canyon Collection Point. The Findings report misidentifies and mischaracterizes the NWCCP. The NWCCP is incorrectly referred to in the Findings as the "North West Canyon Sump." The NWCCP is not a sump, per the definition of "sump" included in Title 22, as it is neither lined nor does it collect hazardous waste. The DTSC statement is also inaccurate in its reference to "leachate", as the affected groundwater collected in the NWCCP is not leachate, but a mixture of perched groundwater of meteoric origin and residual inorganic-

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impacted groundwater. For example leachate collected in the Pond P02 LCRS typically has a TDS concentration of about 100,000 milligrams per liter (mg/L), while impacted groundwater for the last few years from the NWCCP typically has TDS values of about 30,000 mg/L (Geomatrix, 2006a).

The source of the misunderstanding regarding liquid in the NWCCP may be the fact that permit conditions require liquid removed from the NWCCP be managed in the same manner as leachate from the Facility LCRSs is managed. In the semi-annual monitoring reports, a leachate volume data table is used to report the volume of liquid transported from the site. The table included the volume of extracted groundwater from the NWCCP, but did not specify that the NWCCP water volume was not leachate but instead affected groundwater. Page 6-4 of the Permit Renewal Application (CWM, 2005) specifically states that the NWCCP is not a leachate collection system. CCR Title 22 §66260.10 defines a LCRS as follows:

> *"Leachate collection and removal system/leak detection system (LCRS/LCS)" means the liner system component that immediately underlies the uppermost liner of a waste management unit, and that serves both: (a) as a leachate collection and removal system (LCRS), by collecting and conveying leachate to a sump for disposal; and (b) as a leak detection system (LDS), by enabling the discharger to determine when the uppermost liner is leaking, by virtue of the leachate flow rate through the uppermost liner's exceeding the action leakage rate."*

The WWMU consists of former lined and unlined waste ponds, landfills, and spreading areas. The WWMU lined cells were not constructed with leachate collection systems underlying the liners. Waste was stabilized and solidified in the former ponds, landfills, and spreading areas and covered during closure. CWM would be pleased to further review with DTSC the historic documents available to clarify any misconceptions regarding the remedial activities and hydrology of the Northwest Canyon.

DTSC Response to Comment 61)

Please see DTSC Response to Comment 15).

Comment 62)

History and Function of the NWCCP. The following provides a brief history of the NWCCP. Most of the information described was collected during closure construction (1986 through 1987). The information provided below was reported in Waste Distribution Exploration, Volume II (EMCON, 1988b), Closure and Post-Closure Plans (EMCON, 1985), and Closure Construction Report (EMCON, 1988a). Drawing 1 in EMCON, 1988b, illustrates the Northwest Canyon features discussed in the following paragraphs. The following is composited and

paraphrased from the above references in order to provide a more complete picture of the NWCCP.

The Northwest Canyon is an alluvial drainage channel located north and northwest of the WWMU. The Northwest Canyon area was impacted by migration of scrubber waste from impoundments operated by MP Oil along the northern boundary of the northwest portion of the active facility. Scrubber waste apparently seeped from the unlined impoundments and flowed northwest along a surface drainage to the Northwest Canyon. Scrubber wastes then flowed down the Northwest Canyon and across Round Mountain Road for some unspecified amount of time. MP Oil subsequently abandoned the unlined waste impoundments and constructed nine small check dams in the Northwest Canyon and constructed a pumping system to return the scrubber waste that accumulated behind the check dams to the site. Scrubber waste reportedly remained behind the uppermost check dams (1 and 2) for approximately 1 year.

An investigation (EMCON, 1988b) found that alluvium, fill, and the upper 2 to 5 feet of Round Mountain Silt was saturated with a "brown liquid" in the affected portion of the Northwest Canyon behind Dam 1. Fluid was observed within gypsum filled fractures immediately below the saturated Round Mountain Silt. No fluid was encountered within alluvium or Round Mountain Silt down stream of check Dam 1.

Analysis of the fluid and impacted soil upstream of Dam 1 indicated the liquid waste was primarily scrubber waste. The soil samples contained abundant fine white crystals that were apparently sodium sulfate salts. Samples were also checked for selected priority pollutants. Metals detected were present at concentrations less than STLC (<STLC = non-hazardous). Total petroleum hydrocarbons detected were less than 20 parts per million. Chlorinated pesticides and herbicides were not detected.

The extent of residual contamination was found to be limited to alluvium and bedrock upstream of Dams 1 and 2. Relatively minor residual waste was found behind Dams 3 through 9. The investigation also found that scrubber waste was present as bank storage within older alluvium and Round Mountain Silt adjacent to and underlying the Northwest Canyon behind Dam 1. Seeps of scrubber waste were identified in test pits located upstream from Dam 1. Seeps were identified at the contact between alluvium and the underlying finegrained Round Mountain Silt. At the base of some test pits, small seeps also developed along fractures in the Round Mountain Silt.

A risk assessment included in the Final Hydrogeologic Characterization Report (EMCON, 1989), and previewed in the Waste Distribution Exploration, Volume I (EMCON, 1986), found that residual contaminants left in place would not pose a significant threat to beneficial uses of groundwater or surface water near the site.

Based on results of the investigation, protocols were developed to close the Northwest Canyon (EMCON, 1988b). Impacted soil from behind Dam 2 and waste saturated alluvium and Round Mountain Silt from behind Dam 1 were excavated. The original grade of the canyon was reestablished using fill material and a collection point (approximately 20 by 30 by 10 feet deep) was constructed in the Dam-1 area (NWCCP) to collect residual scrubber waste that might seep from the canyon walls. Additionally, to facilitate collection of seepage in the Dam-1 area, two sub-drain pipes were installed to move groundwater toward the NWCCP. The liquid collected in the NWCCP is disposed in the same manner as leachate evacuated from LCRSs in the EWMU.

DTSC Response to Comment 62)

Please see DTSC Response to Comment 15).

Comment 63)

NWCCP is Not for Leachate Collection. The NWCCP was not constructed as a leachate collection point for the WWMU nor is there a natural or engineered liner to focus leachate potentially generated in the WWMU to the NWCCP. The NWCCP was constructed to remediate local non-hazardous waste (scrubber waste) impact in the Northwest Canyon and to mitigate continued migration toward Poso Creek. Since site closure in 1987, impact in Poso Creek alluvium has attenuated to background conditions (by 1991). Although no additional impact to Poso Creek Alluvium has been observed since 1991, impacted groundwater continues to accumulate in the NWCCP and is pumped out as needed. Thus, the NWCCP effectively operates as a large-diameter extraction well; however, because the "well" is open, it will collect meteoric water (rainfall and possibly surface runoff) as well as perched groundwater. It is not a leachate collection point as the Findings assert.

DTSC Response to Comment 63)

Please see DTSC Response to Comment 15).

Comment 64)

5.2.1 LCRS for the EWMU

Page 10: In paragraph 5, DTSC states, *"The sand layer drains residual leachate and rainwater infiltration through the closure cover towards 4-inch PVC pipes..."*

The CWM's data indicates minimal rainwater infiltration of the cover. This issue is addressed in detail in Comments to Section 5.5 of the Findings.

DTSC Response to Comment 64)

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1 Comment noted.

Comment 65)

3.2.2 Leachate Collection and Removal System for the WWMU
Page 11: In paragraph 1, DTSC states, *"The NWC Sump is used to capture releases from ponds A, B, C, D, and E, shown in Figure 5 (CWM, 2005). It is also understood by DTSC that this system will additionally capture leachate impacted groundwater which may emanate from ponds P-1W, P-2W, P-3W, and landfill B-1W, which were constructed in the same locations as the older ponds in Figure 5. Figure 9 shows these disposal areas superimposed on each other."*

According to EMCON (1988b), the ponds that contributed to the release to the Northwest Canyon were actually ponds A, B, and C shown on Figure 4 of the Findings. Given the topographic grade at the site, a release from the ponds to which DTSC refers on Figure 5 of the Findings would likely move toward the Central Drainage and away from the Northwest Canyon; however, detection monitoring well MW-2, in the Central Drainage, has not detected an indication of a release over its period of record (1985 to present).

Additionally as discussed in Section 3.2, above, the NWCCP was not constructed as a leachate collection point for the WWMU. The closure construction plan, closure construction report, and waste distribution studies reported by EMCON during the late 1980's clearly describe the NWCCP as a remediation system to collect local residual scrubber waste and impacted groundwater in the Northwest Canyon.

DTSC Response to Comment 65)

Please see DTSC Response to Comment 15).

Comment 66)

2 **3.3 CWM Bakersfield Closure Cover**
Page 11: Paragraph 4, last sentence states, *"For comparison, a diagram of a cover system meeting the performance standards of the California Code of Regulations Title 22 is shown in Figure 11."*

3.3.1 Closure Cover Meets Performance Standards. The cover diagram proposed in the Findings represents only one of many options that may be approved to meet the standards of CCR Title 22. The closure performance standard for CCR Title 22 is given in §66264.111.

"The owner or operator shall close the facility in a manner that:

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a) minimizes the need for further maintenance;

b) controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to the ground or surface waters or the atmosphere."

The current closure cover meets this standard in that it has required minimum maintenance over the post-closure care period, and it has eliminated postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to the environment. Despite DTSC assertions to the contrary, the cover has performed as required, as evidenced by the lack of any new releases detected in the water quality monitoring system and continued reduction of concentrations of monitoring parameters in impacted monitoring wells toward background conditions.

DTSC Response to Comment 66)

Please see DTSC Response to Comment 16) and Comment 18).

Comment 67)

4.0 FINDINGS SECTION 4 – NEED TO EXTEND THE POST-CLOSURE PERIOD
Page 12: The DTSC asserts a series of unsupported bullet-points as the basis for an extension of the post-closure care period for 30-years from 2006.

• *Disposed hazardous wastes have not likely degraded since the Facility's closure, and will not likely degrade in a 30-year time period from 2006.*

• *The burden of costs associated with maintaining the Facility will default to the California taxpayers should post-closure care be allowed to cease.*

• *The closure cover (aka containment system) at the Facility has deteriorated since 1991 when it became subject to the first postclosure permit. If any cessation of the post-closure period were allowed, the deterioration of the closure cover which has occurred over the first 15-years of post-closure will continue and will likely be considerably more significant. The result of such deterioration would include onsite and potentially offsite environmental exposures to the disposed hazardous wastes.*

• *If post-closure care were to cease, this deterioration will likely result in hazardous wastes washing from the Facility into Poso Creek which could impact several downstream environmental receptors. Poso Creek's final discharge point is the Kern National Wildlife Refuge which provides habitat for a number of aquatic species, migrating birds, shorebirds, marsh and water fowl, upland*

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[1] *species, and the endangered Buena Vista Lake shrew, San Joaquin kit fox and blunt-nosed leopard lizard.*

These bullets are identical to those listed in the Executive Summary of the Findings. CWM's detailed response to this list of bullet points is presented in Section 1.0 of these Comments.

Regulatory Standard. The bulleted Findings clearly are unsubstantiated. The DTSC has not met its own regulatory standard for a finding, supported by substantal evidence, that the proposed extension of the post-closure care period is "*necessary to protect human health and the environment.*" Unless the DTSC can make such an evidence-based finding, consistent with the requirements of CCR Title 22 §66264.117, then no extension of post-closure care is justified.

DTSC Response to Comment 67)

Please see DTSC Response to Comment 16), Comment 18), Comment 30), Comment 32), Comment 35), and Comment 55).

Comment 68)

[2] **3.0 FACILITY CONDITIONS EVALUATION**
5.1 Closure Cover Performance Standards
Page 16: In the first paragraph, second sentence, DTSC states, *"The primary objective of a containment system is to isolate wastes from exposure to humans and the environment for an indefinite period into the future."*

5.1.1 Objective is Protection of Human Health and the Environment. The cited statement regarding the "primary objective" of containment is not supported in CCR Title 22. The objective of containment is not isolation of wastes from exposure to humans and the environment, but as cited in CCR Title 22 §66264.111, to control, minimize, or eliminate the post-closure escape of wastes to the extent necessary to protect human health and the environment.

DTSC Response to Comment 68)

Please see DTSC Response to Comment 16).

Comment 69)

[3] **5.1.2 Indefinite Period.** Additionally, CCR Title 22 does not say that isolation is necessary for an indefinite period into the future. Rather, it says in CCR Title 22 §66264.117 that post-closure care shall continue for 30 years after closure or for a shorter period, if it can be demonstrated that the reduced period is sufficient to protect human health and the environment, or for a longer period if it can be demonstrated that an extended period is necessary to protect human health and the

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[1] environment. The only longer requirement is a design life parameter of 100 years for the closure cover to prevent downward movement of water into the closed facility, which is clearly an engineering design life standard and not a maintenance period requirement.

DTSC Response to Comment 69)

Please see DTSC Response to Comment 16), Comment 18), Comment 32), Comment 35), and Comment 55).

Comment 70)

[2] **5.1.3 Containment System Integrity**
Page 16: Paragraph 1, sentence 5, DTSC states, *"It has been shown that despite efforts to successfully contain land disposal units, up to 86% of the solid waste disposal facilities in the state of California have leaked waste materials outside of their containment units, including the Facility (SWRCB, 1995)."*

5.1.4 Site Specific Data. The Findings report cites this statement about landfills generally, and then attempts to encompass the Facility in its conclusions, despite site-specific information to the contrary. The general comment suggests that landfill containment units often leak. However, it neglects to clarify that to the extent that the Bakersfield Facility has actually *"leaked waste materials,"* it only did so prior to 1980 from unlined (but permitted) portions of the Facility that had no containment feature. In 1985, a release of inorganic constituents comprising sodium, sulfate, and TDS, which was identified as primarily scrubber waste, was discovered in groundwater at the northern and southern margins of the WWMU. The release was attributed to the infiltration of scrubber wastes from permitted, unlined disposal ponds along the northern ridge and from wet-weather ponds along the southern portion of the site. The release likely occurred prior to 1980, as those ponds were not used by CWM. The general statement has no bearing on the status of this closed Facility, which no longer contains liquid wastes, is lined in the EWMU, covered by a closure cover designed to meet CCR Title 22 standards, and has been approved by the RWQCB, DHS, and USEPA. Further, the Findings present no monitoring evidence to suggest new releases since closure construction was completed. To the contrary, the groundwater monitoring results to date indicate that no releases have occurred to the groundwater from the EWMU and no new releases have occurred to the groundwater from the WWMU (Geomatrix, 2006b). In fact, the impacts to groundwater from the initial pre-closure release from the WWMU have been attenuating with time (Geomatrix, 2006b), indicating that the cover and closure activities have been effective in isolating the remaining waste in the WWMU. Therefore, the generalized reference to California landfills is contradicted by detailed site-specific data, and has no bearing on the status or condition of the Facility.

DTSC Response to Comment 70)

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Please see DTSC Response to Comment 16), Comment 18), Comment 30), Comment 32), Comment 35), and Comment 40).

Comment 71)

[1]Page 17: Paragraph 2. DTSC indicates that the closure should meet an *"accepted standard for design of hazardous waste covers"* and represents Figure 11 as *"taken from the USEPA seminar publication Design and Construction of RCRA/CERCLA Final Covers (USEPA, 1991)."* However, Figure 11 is heavily edited from the original USEPA publication, including the caption, which has been changed from *"Figure 1-2. EPA-recommended landfill cover with options"* (USEPA, 1991b) to read, *"Figure 11. A RCRA Subtitle C hazardous waste disposal closure cover."*

Landfill Design Standard is Non-Prescriptive. Certainly, the EPA Figure 1-2 as presented in the 1991 (USEPA, 1991b) document is an accepted design for landfill covers. However, the DTSC has modified the EPA "recommendation" to represent it as the prescriptive design applicable to the Bakersfield Facility. The 1991 USEPA document also presents other cover options including a "Figure 1.1-EPA-recommended landfill cover design" and a "Chapter 5 Alternative Cover Designs." A variety of additional landfill cover designs are "acceptable" as described in the guidance document, Alternative Final Landfill Covers (ITRC, 2003). DTSC should not extrapolate prescriptive construction criteria from the regulatory performance criteria of CCR Title 22 that the Bakersfield Facility was closed under. Imposition of a prescriptive standard for closure cover design at the Bakersfield Facility is beyond the intent of CCR Title 22, §67211 or of any subsequent DTSC regulation. Moreover, DHS approved the cover installed in 1989. The agency cannot justify requiring an essentially new cover, unless substantial evidence shows that a new cover is necessary to protect human health or the environment. The Findings provide no such evidence.

DTSC Response to Comment 71)

Figure 11 was adopted from the USEPA 1991 document *Seminar Publications Design and Construction of RCRA/CERCLA Final Covers* and was clearly referenced. The edits to Figure 11 from the original include:

- Metric to English unit conversions.
- A note reading: "Current design standard for geomembrane is 60-mil".
- A figure title which includes a reference to the source document.

[2]Figure 11 illustrates what DTSC considers the defacto components of a cover meeting title 22, section 66264.310 requirements. These components include: a low hydraulic conductivity layer consisting of 24 inches of compacted clay and a geomembrane of a minimum thickness of 60 mil, a drainage layer, a biotic barrier layer, and a top soil layer of at least 24 inches. However, covers using alternative components to that shown in

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Figure 11 may also be acceptable if it can be demonstrated that they are equivalent in their ability to prevent moisture from penetrating though the cover system.

Additionally, the DTSC Draft Post-Closure Permit Special Conditions have been modified to allow for the following:

1. Within 60 days of the effective date of the permit, submit a waste declassification notification pursuant to California Code of Regulations, title 22, section 66260.200; or

2. Within 60 days of the effective date of the permit, submit a work plan demonstrating the Facility will meet the closure by removal and decontamination standards of chapter 14 of division 4.5 of the California Code of Regulations, title 22; or

3. CWM shall follow the Special Conditions of the Draft Post-Closure Permit, which are included in Part V, 3. of the Final Post-Closure Permit.

Cover repair or reconstruction is required only under the above alternative number 3.

Comment 72)

> **3.2 CWM Bakersfield Post-Closure Annual Inspection Report**
> CWM acknowledges that cracks and animal burrows were observed during the July 1989 and December 1990 inspections. The statements within the section however are misleading. For example, nowhere in the report is it documented that cracks or animal burrows extended through the clay liner and into the waste material.
>
> In the second paragraph, DTSC states: *"Seven of these cracks and/or burrows were determined to extend through the clay liner."* CWMs review of this report did not find any documentation stating that a burrow or crack extended through the clay liner and into waste material. It was noted in the June 1991 Inspection Report (Golder, 1991) that *"...of the few burrows which did go into the clay liner, none extended below the clay into the waste material."*
>
> In the third paragraph of this section, DTSC states that "*...these cracks commonly penetrated through the vegetative and clay layers and many extended to the bottom of the clay layer (i.e. to the waste material)*". The statement within the June 1991 Inspection Report reads as follows: *"Manual excavation...revealed that the cracks commonly penetrate through the vegetative soil cover into the clay cover, and many appear* (emphasis added) *to extend to the bottom of the clay cover."*
>
> In the last sentence of the section, DTSC notes the importance of ongoing maintenance. CWM agrees with this statement and in fact, Appendix C of this

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This statement is confusing. This is different from what is in the permit. There are too many disqualifiers that can be applied at what appears to be DTSC discretion "Fig. 11 may be acceptable... if they are equivalent..." Define "acceptable", define "equivalent".

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Number: 3 Author: PPerley Subject: Highlight Date: 7/12/2007 6:38:10 PM

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June 1991 Inspection Report is the CWM "Bakersfield Facility Closure Cap Repair" report (Cap Report) dated February 26, 1991. The Cap Report states:

• *Fifty to seventy-five burrows were dug up by hand, with shovels, and a backhoe. These burrows did not penetrate the clay cap and were subsequently filled back in and hand compacted.*

• *Three burrows were found on slopes that penetrate the clay... These were all repaired using Method A...*

• *One burrow was found that penetrated the clay at the top to the drain next to P-6. It was repaired using Method A.*

• *One burrow was found on the flat area on the west side of P-2 that penetrated the clay. It was repaired using Method A.*

• *Sixteen wells or risers that have protective stands around them had wire mesh installed between the clay cap and the vegetative top soil...*

• *Three rises that had been identified as previously having digging around them had the top soil and clay visually inspected for signs of burrowing and then removed. No evidence of damage to the clay was observed and they were repaired*

...

[1] Although DTSC states that many of the cracks extended to the bottom of the clay layer, the Cap Repair report does not confirm this observation. In fact, the Cap Report indicates that CWM implemented corrective actions to remedy the situation.

This section should be revised to accurately reflect what was stated in the Inspection Report and its Appendixes (Golder, 1991).

DTSC Response to Comment 72)

The 1991 Golder Associates report, *Bakersfield Facility Post-Closure Inspection*, states "Manual excavation (using pick and shovel) of several of these cracks revealed that the cracks commonly penetrate though the vegetative soil cover into the clay cover, and many appear to extend to the bottom of the clay cover. [2] These cracks are up to ¾ inch wide at the surface and as much as ½ inch wide at the top of the clay layer."

[3] Drawing No 1 of the Golder report also shows that 21 locations in the Eastern Waste Management Unit required repairs due to cracking or animal burrowing activity. The report shows that seven of these locations required repairs to the clay layer.

The Golder report does state "[4] It was noted that of the few burrows which did go into the clay liner, none extended below the clay into the waste material". The associated text has been revised to reflect this statement. DTSC believes the summarization of the Golder report is otherwise accurately reflected in the findings document.

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The cracks did not penetrate the clay

Number: 3 Author: pperley Subject: Comment on Text Date: 7/13/2007 3:52:28 PM
This indicates good maintenance; CWM is now doing the same.

Number: 4 Author: pperley Subject: Comment on Text Date: 7/13/2007 3:53:01 PM
So the integrity of the liner was not impacted.

Comment 73)

5.3 Current Inspection
CWM acknowledges that cattle have been present from time to time on the facility. However, the locations of photographs in Figures 18 and 19 are not noted and therefore it cannot be determined where on the Facility the cattle are located or whether the cattle are on ground that is underlain by undisturbed natural materials or on the vegetative cover and underlying clay cover itself. Nowhere in the Findings does DTSC indicate the location of the included photographs. Consequently, one must speculate as to their location. Examination of the photographs strongly suggests that these photos were collected on the flat decks of the cover. It is not apparent if the photographs reflect conditions on the sides or margins of the cover. Furthermore, DTSC has not described the physical location, characteristics, or extent of the cracks to support their Finding of significant disrepair.

DTSC Response to Comment 73)

[1]Cattle within the Chemical Waste Management Bakersfield facility have free range of all portions of the disposal site.

The findings report provides the following information regarding cracking identified in the closure cover on October 25, 2005: "Cracking in the closure cover was also observed during this inspection. Cracking was evident in the EWMU, while holes were more evident in the WWMU. [2]Based on visual observation only, these cracks appeared to be contained in the vegetative layer of the cover. Figure 20 and Figure 21 show examples of larger cracks that were observed during this inspection." The locations of some of the cracks are identified in the captions of photographs included in the figures section of the findings report.

Comment 74)

[3]**5.4 CWM Bakersfield Evaluation of Landfill Cover Performance**
The DTSC's Findings question the integrity of the cover, based on assumptions regarding the water content of the clay cover at the time of the construction. However, a detailed review of the construction data indicates that the cover was constructed in accordance with relevant DHS guidelines. CWM experts reviewed the references in GeoSyntec's *Chemical Waste Management Bakersfield Facility Evaluation of Landfill Cover Performance* (GeoSyntec 2000). As noted by DTSC this report was an initial evaluation of leachate production and cover performance during the El Nino season of 1998. It appears that GeoSyntec conducted a cursory review of the files to reach their conclusions. CWM experts used the GeoSyntec report to evaluate the conclusion reached by DTSC. After a detailed review of the design standards, construction quality assurance data, and field data, CWM's experts have developed a more complete picture of the performance of the cover.

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In summary, the cover was installed as designed; however, the specifications were inconsistent with the laboratory testing and analyses used to develop the design. The DHS was notified of the field modifications made to the specifications that were consistent with the intent of the design and laboratory testing during the construction (which is a standard practice) and DHS approved these modifications when the closure permit was issued. A discussion of the work performed during the installation of the cover is discussed below. The data support the conclusion that the cover met design specifications.

DTSC Response to Comment 74)

The information DTSC has which indicate the CWM Bakersfield closure cover does not meet the regulatory requirements of the California Code of Regulations, title 22, section 66264.310 is more central to DTSC than other supplemental information, such as the water content of the clay cover at closure. The California Code of Regulations, title 22, section 66264.310 require closure cover placement and assessment based on the following:

- prevents downward entry of water into closed disposal areas for a period of at least 100 years;
- functions with a minimum maintenance;
- promotes drainage and minimizes erosion;
- accommodates settling and subsidence;
- accommodates lateral and vertical shear forces generated by the maximum credible earthquake;
- has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present;
- conforms to the provisions of subsections (e) through (r) of section 66264.228, which outlines additional criteria for closure cover layers, grading, runoff control, and construction and maintenance.

Based on historic leachate removal data, the CWM Bakersfield closure cover has not prevented downward entry of water and does not meet applicable requirements.

Comment 75)

3.4.1 Clay Liner Hydraulic Conductivity. The purpose of the clay liner in the cover at the CWM Bakersfield Facility is to impede the migration of water into the waste. The clay layer is constructed to a pre-determined maximum hydraulic conductivity. Because it is not practical to conduct hydraulic conductivity tests to control moisture content on a day-to-day basis, during construction, surrogates for determining hydraulic conductivity, field density, and moisture content, are typically measured in the field. An accepted engineering practice is to determine the minimum field density and moisture content of a compacted clay that will meet the maximum hydraulic conductivity requirement. Acceptable field density and moisture content standards account for slight deviations from "optimal" so as to allow for field variations of compaction that will still meet the hydraulic

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DTSC refers to this comment for many future comments. It is critical to note that the agency does not consider what was presented in the comment. The agency does not review the technical data. The agency does not allow for repair of the cover, only replacement. DTSC states that the cover has failed throughout the facility without demonstrating where the specific points of failure are located.

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[1]onductivity requirement. During construction, field density and moisture content tests are performed at a relatively high frequency. Undisturbed (Shelby Tube) samples are obtained at a lower frequency than density and moisture content and tested in the laboratory to determine the actual hydraulic conductivity of the compacted material. It is the hydraulic conductivity tests that control acceptance of the project, not density and moisture content.

DTSC Response to Comment 75)

[2]lease see DTSC Response to Comment 74).

[3]omment 76)

5.4.2 Construction Field Testing. Construction records for closure cover at the Bakersfield Facility, demonstrate that all but one field hydraulic conductivity test met or exceeded the hydraulic conductivity requirement. CWM is currently investigating the disposition of the one failing test area. However, it is CWM's view that the field density and moisture tests results are ultimately of limited relevance to the clay liner's ability to provide hydraulic containment either immediately after construction or now. The groundwater monitoring data to date clearly demonstrate that the cover has performed effectively.

Nevertheless, several specific comments were made in the Findings regarding the moisture content at compaction during construction of the clay layer of the cover system. These comments are addressed below.

DTSC Response to Comment 76)

Please see DTSC Response to Comment 74).

Comment 77)

Page 19: Paragraph 3 states, *"The most significant effect of placing the clay layer dry of optimum is that a high leak rate (hydraulic conductivity) will result as shown in Figure 24. This figure shows hydraulic conductivity on the y-axis and clay layer's water content on the x-axis. The optimum water content, which is determined through laboratory testing, is shown as the vertical dashed line in the middle of the graph. As can be seen in the figure, if the water content is less than optimum (dry of optimum in Figure 24), the result is the higher hydraulic conductivity or a greater leakage rate."*

There are two main items within this paragraph. Each is addressed separately below.

"The most significant effect of placing the clay layer dry of optimum is that a high leak rate (hydraulic conductivity) will result as shown in Figure 24."

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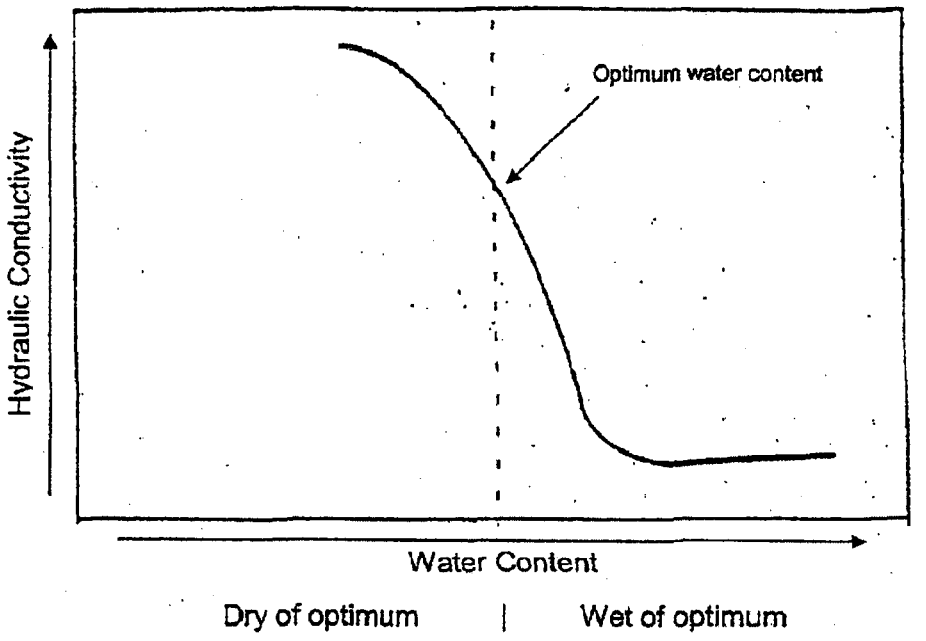
[1]5.4.3 **Generalization Regarding Hydraulic Conductivity.** While the relationship is true in a general sense, that specific figure (see Figure 3, below) is qualitative in nature and is not based on laboratory testing.



[2]**Figure 3. Figure 24 from Findings and Determination (DTSC, 2006).**

5.4.4 Liner Compatibility. A liner compatibility study (EMCON, 1983) on clay liner soil obtained from the Bakersfield Facility determined the hydraulic conductivity at two relative compactions, dry and wet of optimum moisture content. Optimum moisture content was determined by ASTM International (ASTM) D1557 (Modified Proctor). These results are presented in Figure 4, below. As can be seen, for the specific soil used at the Bakersfield site, the variation in hydraulic conductivity is not as extreme as shown in Figure 3, which was derived from USEPA (1991b).

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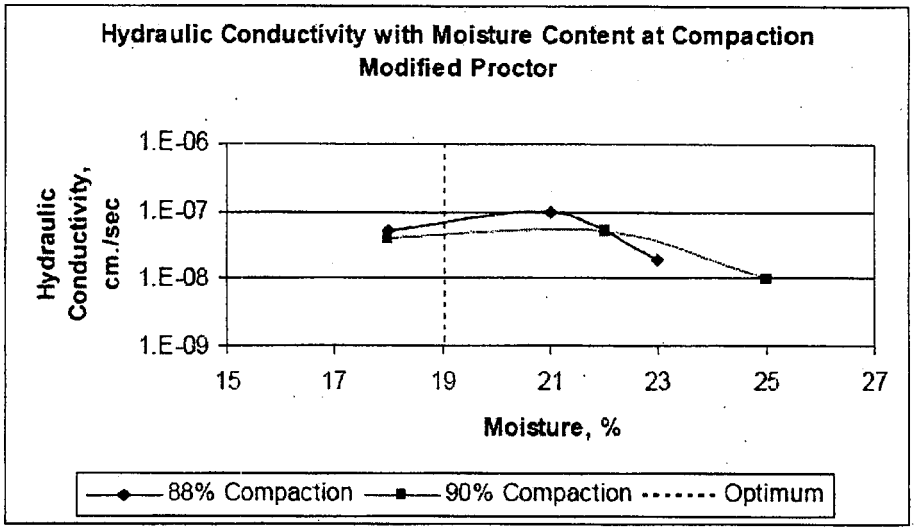

Figure 4. Hydraulic Conductivity vs. Moisture Content – Bakersfield Clay Soil

Figure 5 (below) presents all of the hydraulic conductivity testing performed on undisturbed samples obtained during closure construction of the cover.

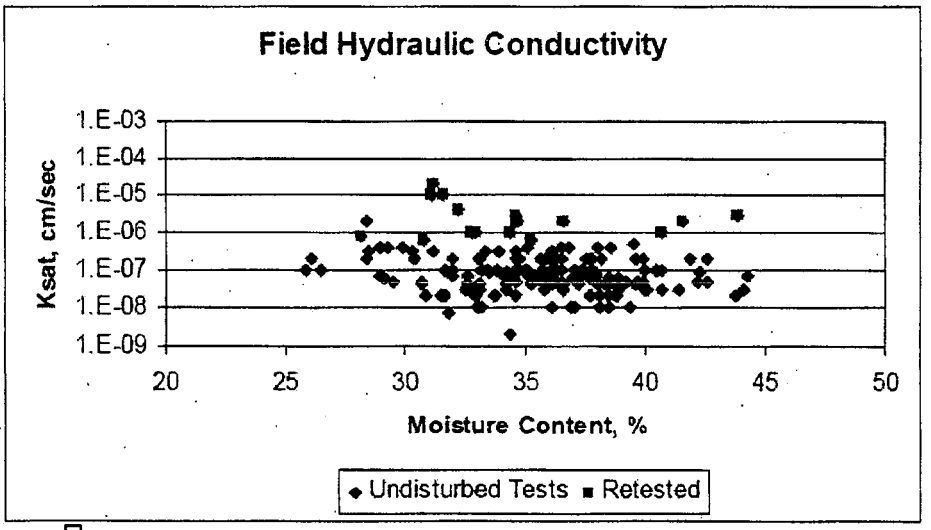

Figure 5. Field Hydraulic Conductivity vs. Moisture Content

As can be seen in this figure, there is no indication of increased hydraulic conductivity with decreasing moisture content. Note that all failing field hydraulic conductivity areas were re-tested with passing results as discussed below. A letter dated April 13, 1978 from Mr. Michael Dukes, EMCON Associates to Mr. James Allen, State of California Department of Health Services, Toxic Substances Control, and was accepted by issuance of the permit (DHS, 1991), changed the maximum hydraulic conductivity specification from 1×10^{-7} centimeters per second (cm/sec) to 5×10^{-7} cm/sec.

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DTSC Response to Comment 77)

Please see DTSC Response to Comment 74).

Comment 78)

> **3.4.5 Optimum Water Content.** The second part of the paragraph in question reads, *"if the water content is less than optimum (dry of optimum in Figure 24), the result is the higher hydraulic conductivity or a greater leakage rate."*
>
> This statement is a generalization of a soil's hydraulic conductivity immediately after compaction. However, during construction of the clay layer for the cover at the Bakersfield Facility, intensive construction quality assurance testing was performed including laboratory hydraulic conductivity testing on undisturbed samples (Shelby tubes) of clay cover obtained from inplace and compacted cover material. The hydraulic conductivity was determined from 146 areas of the clay cover during construction. Of the 146 areas sampled, 17 were determined to have hydraulic conductivities higher than the specified minimum. All 17 of these areas were reworked in the field and retested with passing results. Therefore, regardless of the moisture content of the soil during construction, the hydraulic conductivity of the constructed clay layer was tested and confirmed to be in accordance with the project's maximum hydraulic conductivity requirement. In fact, of the 17 areas that were reworked, 6 required a lower moisture content in order to achieve the required hydraulic conductivity. Consequently, leakage through the cover cannot be directly linked to a higher hydraulic conductivity associated with moisture content at compaction.

DTSC Response to Comment 78)

Please see DTSC Response to Comment 74).

Comment 79)

> Page 19: Paragraph 2, Item 1. *"During the installation of the closure cover, the clay layer's water content was apparently not placed according to specifications"*
>
> **Allowable Moisture Content Varies.** Specifying a moisture content range for field compaction requires that the allowable moisture content variation be determined in the laboratory. There are two primary laboratory test methods used to determine optimum moisture content of a soil; ASTM D1557 (Modified Proctor) and ASTM D698 (Standard Proctor). At the Bakersfield site, the moisture content specification for the closure project, plus 3 percent of optimum as determined by the Standard Proctor is inconsistent with the moisture content specification used for the liner compatibility study performed specifically for the Bakersfield Facility and construction of the base liner systems for the ponds at the

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Bakersfield Facility (Modified Proctor). The implications of this site-specific factor are described in detail below.

Liner Material. At the Bakersfield site, the clay soils used during construction of the base clay liner for the ponds and pits, and the clay soils used during construction of the closure cover, were obtained from the same formation present at the site, the Round Mountain Silt. Therefore, material properties are the same for soils used for both phases of the project. This is verified by review of as-built documentation. During construction of the base liner of the ponds in the EWMU and during the liner compatibility study, optimum moisture content was determined by the Modified Proctor. Laboratory optimum moisture as determined by the Modified Proctor during base liner construction and as determined by the Standard Proctor during closure cover construction were compared for soils with similar Atterberg limits (plasticity) and percent minus the No. 200 sieve (Figure 6) and indicates that all Standard proctor optimums are greater than Modified optimums for similar soils. Therefore, the clay material at a moisture content 3 percent over Modified optimum moisture is 3 to 9 percent less than Standard proctor optimum moisture.

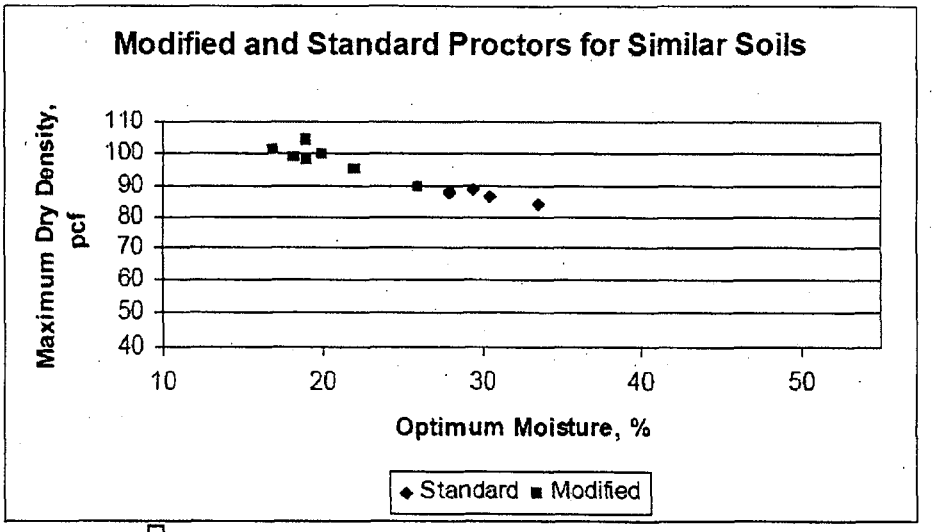

Figure 6. Modified vs. Standard Proctor

Additionally, the USEPA (1991b, page 14) indicates that moisture contents at compaction one percent over optimum moisture content Standard Proctor, are sufficient to mold clods together and achieve the desired soil structure.

Therefore, plus 3 percent over optimum as determined by the Standard Proctor is not consistent with the recommendations in the USEPA document (USEPA, 1991b).

DTSC Response to Comment 79)

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[1]lease see DTSC Response to Comment 74).

Comment 80)

5.4.6 Technical Specifications. The technical specifications for construction of the base liner required the moisture content at compaction be plus 3 percent of Modified optimum moisture. Additionally, the liner compatibility study used the Modified Proctor as the reference maximum dry density and optimum moisture content. The project history suggests that the technical specifications incorrectly combined the 3 percent over optimum requirement with the Standard Proctor when the specifications should have used the Modified Proctor. The data indicate that the clay soils for the cover were compacted at or near Standard optimum moisture which resulted in moisture contents greater than 3 percent over Modified optimum moisture.

DTSC Response to Comment 80)

Please see DTSC Response to Comment 74).

Comment 81)

Page 19: Paragraph 2, Item 2. *"The clay layer was likely not placed uniformly or with consistency as the water content varied from minus 9.6 to plus 8.8% of optimum"*

5.4.7 Moisture Analyses. As previously discussed in our comment to Page 19: Paragraph 2, Item 1; optimum moisture content is determined by laboratory testing. During construction of the cover's clay layer, 26 Standard Proctor tests were performed in the laboratory. However, only two of these Standard Proctors (Nos. 17 and 232) were used by the field Construction Quality Assurance (CQA) personnel when evaluating nearly all of the field density and moisture content results

Figure 7 presents the maximum dry density and optimum moisture content for the Standard Proctors performed during construction of the cover. Also indicated on the figure are laboratory test numbers 17 and 232, which are the optimum moisture content results of the two Standard Proctors used to evaluate nearly every field density and moisture content test performed during construction. As can be seen in the figure, there are several optimum moisture content values that are below and above the values used to evaluate the results. Therefore, it appears that correlation of a specific field moisture content with an appropriate optimum moisture determined from laboratory testing on a similar soil was not performed by [2]he field CQA personnel. However, a general relationship between the moisture content at compaction and the optimum moisture content can be made as described below.

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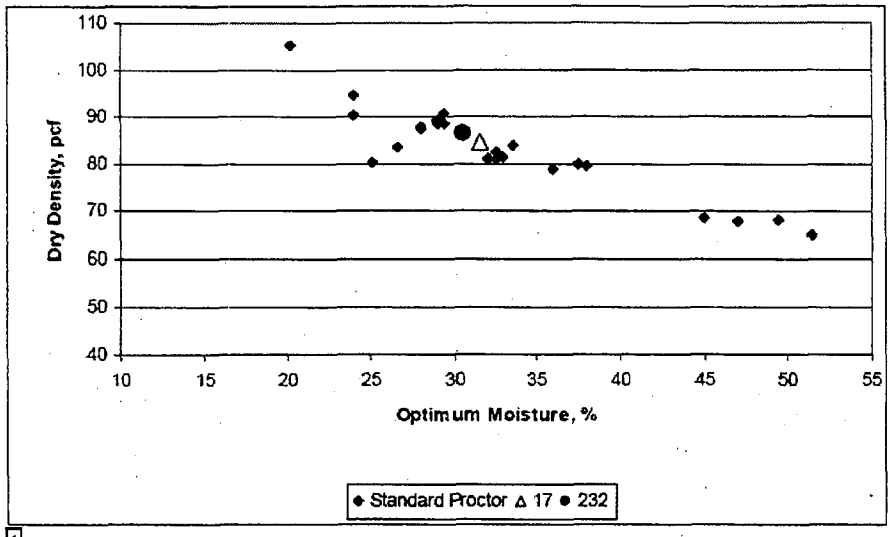

Figure 7. Standard Proctors Performed During Closure Cover Construction

DTSC Response to Comment 81)

Please see DTSC Response to Comment 74).

Comment 82)

5.4.8 Maximum Dry Density. When the maximum dry density and optimum moisture content for all of the Standard Proctors performed during construction are plotted, the "Line-of-Optimums" results (Figure 8). The Line of Optimums is the moisture content that requires the least amount of compactive effort to achieve the maximum density for the soil. When the field density and moisture content test results are plotted with the laboratory tests, it can be seen that the trends are coincident (Figure 9). **What this indicates is that the CQA and construction personnel adjusted the moisture content in the field to be at or very near optimum moisture as determined by the Standard Proctor in accordance with the general recommendations in the USEPA (1991b) document.**

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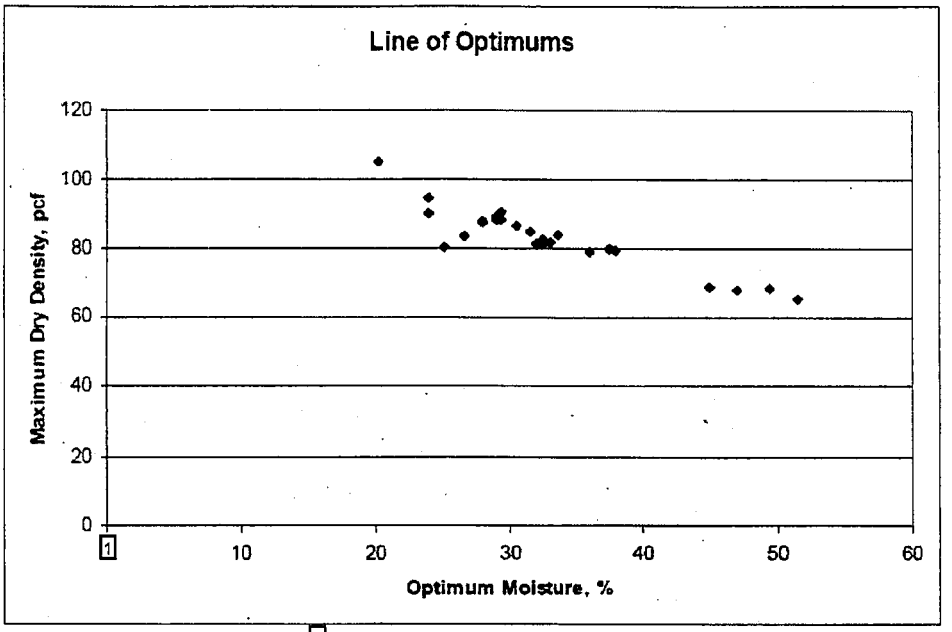

Figure 8. Line of Optimums

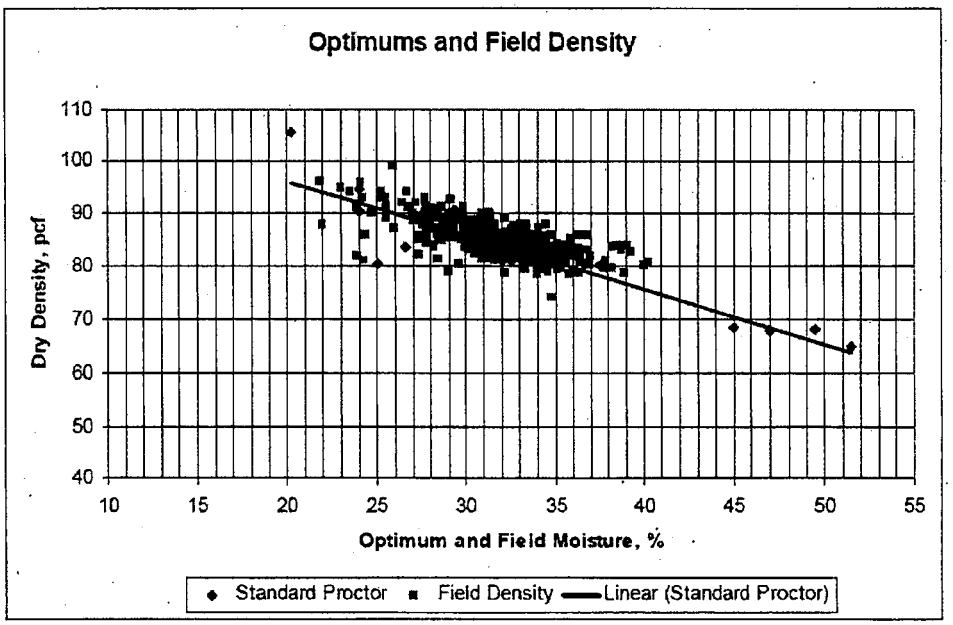

Figure 9. Laboratory and Field Test Results

Page 19: Paragraph 2, Item 3. *"Placement of the clay layer was significantly dryer than optimum (-9.6%) which would result in excessive dryness, and cracking of the closure cover."*

USEPA (1991b, page 20) states "The higher the water content of the soil and the higher the plasticity of the soil the greater the shrinkage potential for desiccation." Therefore, soils compacted at drier moisture content will have less of a tendency

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to desiccate than soils compacted at wetter moisture contents. As discussed above, the clays were compacted at slightly lower water contents (drier) than was optimal. Consequently, the field data is in agreement with the USEPA Publication that there is a lower potential for desiccation.

In summary an independent review of the data at the completion of construction or conducted today would confirm that the clay liner was constructed in accordance with the intent of the design parameters and regulations in effect at that time. Moreover, subsequent performance data confirm that the containment structures have performed effectively to date.

DTSC Response to Comment 82)

Please see DTSC Response to Comment 74).

Comment 83)

5.5 Leachate Analysis. This section of the Findings, which focuses on "leachate removal" in relation to monthly rainfall, is erroneous on several levels.

NWCCP is Not a Leachate Collection Point. The DTSC assumes that the NWCCP is a collection point for leachate from the WWMU. As previously discussed in Section 3 of these Comments, the WWMU consists of former lined and unlined waste ponds, landfills, and spreading areas. The WWMU lined cells were not required to be constructed with leachate collection systems underlying the liners. During closure, waste was stabilized in these former ponds, landfills, and spreading areas and covered with clay and vegetative layers. The NWCCP was not constructed as a leachate collection point for the WWMU nor is there a natural or engineered liner to focus leachate potentially generated in the WWMU to the NWCCP. The NWCCP was constructed to remediate local non-hazardous waste (scrubber waste) impact in the Northwest Canyon and to mitigate continued migration toward Poso Creek. Affected groundwater collected in the NWCCP is not leachate, but a mixture of perched groundwater of meteoric origin and groundwater impacted with scrubber waste (sodium sulfate). The NWCCP effectively operates as a large-diameter extraction well; however, because the "well" is open, it will collect meteoric water (rainfall and possibly surface runoff) as well as perched groundwater. Nevertheless, the Findings treat NWCCP volumes as leachate.

DTSC Response to Comment 83)

Please see DTSC Response to Comment 15).

Comment 84)

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Monthly Rainfall Comparisons. The DTSC assumes that a direct comparison can be made between monthly rainfall and leachate volume generation. As discussed above, rainfall has a direct relationship to volume in the NWCCP, but not necessarily to the generation of affected groundwater collected there. Moreover, the only LCRSs are in the EWMU, and removal of leachate from the collection sumps is not done on a monthly basis, but on a periodic basis when enough leachate is present to pump. Consequently, it is difficult to correlate monthly rainfall versus EWMU leachate removal volumes.

DTSC Response to Comment 84)

DTSC is aware of the leachate removal operations at the Chemical Waste Management Bakersfield site. These leachate removal operations do provide relevant information regarding when increased volumes of leachate are removed following rainfall events, as is particularly evident during the 1998 water year. Such information can be useful in assessing the closure cover's ability to prevent rainfall from entering the waste management units.

Comment 85)

5.5.1 Leachate Collection to Monthly Rainfall
Page 21: In this section DTSC compares total rainfall as measured near the facility to leachate pumped from the LCRSs in the EWMU and impacted groundwater pumped from the NWCCP. The data used are plotted on Figures 27 through 32 included in the Findings.

Page 22: In the Third Paragraph, DTSC states, in reference to Figure 27 in the Findings, "*These data clearly illustrate leachate generated from the disposal areas in the WWMU and collected in the NWC Sump correspond closely to rainfall events*".

Inaccurate Caption. The caption for Figure 27 of Findings states "NWC leachate collection to monthly total rainfall". This caption is inaccurate because the NWCCP does not collect leachate. As previously described, it was installed to collect residual waste in alluvium and bedrock in the Northwest Canyon. It continues to collect locally impacted perched groundwater as well as meteoric water. This figure should be deleted, or at a minimum, it should better reflect the nature of the NWCCP, by changing the caption to read "NWCCP water collection to monthly total rainfall."

DTSC Response to Comment 85)

Please see DTSC Response to Comment 15).

Comment 86)

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Groundwater Elevations. The NWCCP is not an LCRS for the WWMU and rain falling on the WWMU may have little, if any, effect on the elevation of groundwater in the Northwest Canyon. As described under Section 3.2, the NWCCP is an excavation that was completed in an active surface water drainage north of the Facility and used to collect local impacted groundwater and residual scrubber waste that discharged from the Facility prior to 1980. This active drainage contains groundwater that changes in elevation seasonally with increasing and decreasing precipitation. If the elevation of groundwater in the Northwest Canyon increases, then the volume of impacted groundwater in the NWCCP will also increase. The increased volume of groundwater in the NWCCP corresponds to an increased volume of water in the NWCCP.

DTSC Response to Comment 86)

Please see DTSC Response to Comment 15).

Comment 87)

Direct Precipitation. Additionally, the NWCCP is open and can collect direct precipitation and potentially overland flow. During the 1997-1998 El Niño year (October through June) about 190,000 gallons (DTSC calculated 240,000 gallons) were pumped from the NWCCP and disposed of at an offsite disposal facility. During the 1997-1998 rainfall year, approximately 14.7 inches (1.2 feet) of rain fell. Based on Drawing 1 from the Waste Distribution Exploration, Volume II (EMCON, 1988b), the surface area of the impacted portion of Northwest Canyon upstream of the NWCCP is about 27,000 square feet. The 1.2 feet of rain during 1997-1998 over that surface area equates to more than 240,000 gallons of rainwater. This number is very close to the estimated volume of impacted groundwater pumped from the NWCCP. This estimate does not include an unknown number of gallons of overland flow and subsurface flow from the approximately 4.3 million square feet of catchment area upgradient from the NWCCP. These facts do not support the DTSC assertion that the increased volume of impacted groundwater pumped from the NWCCP following heavy rain is due to infiltration through the WWMU and collection in the NWCCP. The increased volume is simply due to increased precipitation causing increase in groundwater level with additional contribution from direct precipitation and possibly overland flow. Thus, the DTSC's correlation of volume removed from the NWCCP and potential leachate production in the WWMU is inaccurate and should be appropriately qualified or removed from the Findings and Determination.

DTSC Response to Comment 87)

Please see DTSC Response to Comment 15).

Comment 88)

[1]Page 22: In the fourth paragraph DTSC indicates that increased leachate pumped during 1997-1998 El Niño year from the LCRSs for ponds P01, P02, P05, and P06 was due to infiltration of rainwater through the cover overlying the waste.

Near Zero Infiltration Even during El Niño. In fact, the LCRS for Pond P03 did not accumulate any additional leachate following rain events. The following table (Table 1) presents statistics for the ponds in question, using 1.2 feet of rainfall[2] for the 1997-1998 El Niño rain year and the leachate volumes reported for 1998.

Pond	Surface Area (square feet)	1997-98 Rainfall on Pond Surface (gallons)	[3]1998 Leachate Volume (gallons)	Prevented from Infiltration (percent)
P01	49,500	440,000	679	99.8
P02	88,000	790,000	3,621	99.5
P03	70,000	630,000	0	100
P05	75,600	570,000	2,686	99.5
P06	40,000	360,000	1,799	99.5

Table 1. Leachate Infiltration versus Rainfall

[4]If it is assumed that the volume of leachate pumped from the LCRSs is due to infiltration of rainwater through the cover, then the cover prevented 99.5 to 100 percent of the rain that fell on the cover from infiltrating through the cover.

DTSC Response to Comment 88)

Please see DTSC Response to Comment 16) and Comment 18).

Comment 89)

[5]**No Pattern of Leachate Increase.** DTSC does not explain why during previous or subsequent years, similar increases in leachate production as a result of rainfall were not observed. Additionally, DTSC does not explore alternate possibilities for sources of the leachate collected following the 1997-1998 El Niño rain year. For example, the first few years following closure construction leachate production was high. Annual surface elevation surveys showed that the cover over waste subsided during the initial years following closure construction as the waste consolidated under the load of the cover. As the waste consolidated, residual liquids (leachate) in the waste were forced out of pore spaces and accumulated in the LCRSs. The 1997-1998 El Niño rainfall may have loaded the cover to an extent near or greater than the load imposed following initial construction and caused additional consolidation of waste. Assuming a porosity of 30 percent for the cover material, as much as 50 pounds per square foot may have been added to the cover material during the El Niño year. Waste consolidation or volume reduction in the ponds may have forced residual leachate out of the waste and, as

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This is an indirect reference to performance standards of minimal infiltration and implies that the cover performed satisfactorily.

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designed, into the LCRSs. For example, leachate production from P02 LCRS was 3,621 gallons (484 cubic feet) during the El Niño year. P02 covers an area of 70,000 square feet. Less than 1/100 of a foot of waste consolidation over that area could produce the volume of leachate observed. Increased leachate production due to loading the cover with rainwater and consolidating waste may also explain why increased leachate production was not observed following other rain years with less total precipitation.

DTSC Response to Comment 89)

CWM has not provided any technical literature, field or laboratory studies, or other generally recognized sources of engineering or geotechnical information to support the hypothesis that increased leachate generation was created from saturated soil overburden pressure on the landfill mass. DTSC cannot simply accept this hypothesis absent of supporting documentation.

Comment 90)

5.5.2 Cumulative Leachate Removal
Page 23: Second paragraph, DTSC states, "*Figure 34 shows the cumulative leachate removal graph for the NWC Sump. This figure clearly illustrates that leachate is continually being produced by rainfall infiltration into the waste disposal units of the WWMU that drain into the NWC Sump*".

As previously presented, the NWCCP collects impacted groundwater in the Northwest Canyon. It was not installed as an LCRS for the WWMU. Figure 34 simply shows that the cumulative volume of pumped groundwater from a collection point dug into an active drainage (Northwest Canyon) will continue to increase because the Northwest Canyon continues to receive the natural groundwater flow and runoff that collects in the NWCCP.

DTSC Response to Comment 90)

Please see DTSC Response to Comment 15).

Comment 91)

Page 23: Third paragraph, statements in this paragraph have been addressed by previous comments in this section.

Leachate Analysis is Incomplete. The DTSC's focus on leachate volumes, even if it were accurately calculated, is of limited value in assessing the integrity of the landfill cover. Such data, without any consideration of leachate or groundwater *quality,* sheds little or no light on the fundamental regulatory question, which is whether the cover is performing and can be expected to continue to perform as "necessary to protect human health and the environment."

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DTSC Response to Comment 91)

Once a material is classified as a hazardous waste, it remains a waste until it meets the criteria described in CCR title 22 and CWM goes through waste declassification process. CWM retains responsibility to manage the waste as waste until the material has been reclassified as nonhazardous.

The DTSC Draft Post-Closure Permit Special Conditions have been modified to allow for the following:

1. Within 60 days of the effective date of the permit, submit a waste declassification notification pursuant to California Code of Regulations, title 22, section 66260.200; or

2. Within 60 days of the effective date of the permit, submit a work plan demonstrating the Facility will meet the closure by removal and decontamination standards of chapter 14 of division 4.5 of the California Code of Regulations, title 22; or

3. CWM shall follow the Special Conditions of the Draft Post-Closure Permit, which are included in Part V, 3. of the Final Post-Closure Permit.

Comment 92)

> **6.0 FINDINGS AND DETERMINATION**
> The Final section of the Findings reiterates the assertions and recommendations made throughout the report regarding extension of the post closure care period, substantial reconstruction of the landfill cover, and corresponding adjustments in financial assurances. The Findings cited as the basis for these recommendations are unsupported by the facts, and do not include or consider the most relevant data available for the site; the roughly two decades of water quality data which demonstrate no current or projected risk to human health or the environment from this site. Therefore, these Findings do not meet the regulatory standard, which requires that such modifications of the post-closure care can only be made where they are substantiated to be "*necessary to protect human health and the environment.*" CWM disagrees that the post-closure care period should be extended, at this time, for an additional 30 years until 2036. Such a decision is premature and is not warranted by the facts. That evaluation can be re-visited during the next 12 years of the initial 30-year post-closure care period. CWM also strongly contests DTSC's prescription of an essentially new $26 million cover for the Bakersfield Facility. Such an engineering effort and associated costs are entirely unwarranted because there is no demonstrated harm or threat to human health or the environment, a finding essential to imposing additional post-closure requirements. CWM is committed to enhanced maintenance, security and inspection of the existing cover.

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DTSC Response to Comment 92)

The DTSC Draft Post-Closure Permit Special Conditions have been modified to allow for the following:

1. Within 60 days of the effective date of the permit, submit a waste declassification notification pursuant to California Code of Regulations, title 22, section 66260.200; or

2. Within 60 days of the effective date of the permit, submit a work plan demonstrating the Facility will meet the closure by removal and decontamination standards of chapter 14 of division 4.5 of the California Code of Regulations, title 22; or

3. CWM shall follow the Special Conditions of the Draft Post-Closure Permit, which are included in Part V, 3. of the Final Post-Closure Permit.

The Final Post-Closure Permit Special Conditions Part V, 3. are based on the following:

The Chemical Waste Management Bakersfield facility received hazardous waste and is regulated as a closed hazardous waste disposal facility. CWM is required to operate with a post-closure permit during the facility's post-closure period.

While a closed hazardous waste disposal facility is in post-closure care, it is DTSC's policy, as well as its duty to ensure that each of the following elements of post-closure is independently present and appropriately maintained at the facility:

- closure cover
- environmental monitoring
- leachate collection and removal, and
- financial assurance

The word "independently" is used to express that one of these elements of post-closure care does not influence another. For example, if a closed hazardous waste disposal facility was in compliance with the standards of its environmental monitoring program, this element of post-closure care does not influence DTSC's requirements to have a closure cover present and appropriately maintained, a leachate collection and removal system, or the facility's financial assurance.

In determining whether the above elements of post-closure care are present and appropriately maintained, DTSC must make decisions based on applicable regulation, site data and information, DTSC policy, and the collective experience of the DTSC in ensuring long-term human and environmental health of the State of California.

Meteorological and leachate removal data collected during and following the 1998 water year indicate that the CWM Bakersfield closure cover does not meet the standards of preventing downward entry of water into closed disposal areas for a period of at least 100 years as required by California Code of Regulations, title 22,

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[1]section 66264.310. Section 66264.310 requires cover placement and assessment based on the following:

- prevents downward entry of water into closed disposal areas for a period of at least 100 years;
- functions with a minimum maintenance;
- promotes drainage and minimizes erosion;
- accommodates settling and subsidence;
- accommodates lateral and vertical shear forces generated by the maximum credible earthquake;
- has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present;
- conforms to the provisions of subsections (e) through (r) of section 66264.228, which outlines additional criteria for closure cover layers, grading, runoff control, and construction and maintenance.

[2]Meteorological and leachate removal data collected during and following the 1998 water year have indicated, large amounts of rainfall during this time resulted in large amounts of leachate removal, which indicates the closure cover does not meet the requirements of title 22, section 66264.310.

Restarting the thirty year post-closure period is based on the DTSC analysis that without proper operation and maintenance of the existing closure structures, significant impacts to human health and the environment will occur. DTSC does not have to document an existing significant impact. Without adequate post-closure care, the waste material entombed within the facility will eventually be released into the environment through natural processes of rainfall, wind, erosion, and surface water infiltration to groundwater. It is not a matter of if, it is a matter of when.

Comment 93)

6.1 Regulatory Standard

[3]Page 24: Paragraph 1 states: *"The DTSC finds it is necessary to extend the post-closure period for the Chemical Waste Management Facility a minimum of thirty years from 2006. This finding is made to ensure isolation of wastes and to minimize the risk posed by these wastes to either humans or environmental receptors for an indefinite and possibly perpetual period."*

As outlined in CCR Title 22 §66264.117(b)(2)(B), the DTSC can *"extend the post-closure care period applicable to the hazardous waste management unit or facility, if the Department finds that the extended period is necessary to protect human health and the environment (e.g., leachate or groundwater monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful to human health and the environment.)"*

No Applicable Findings. Despite the regulation's specific reference to leachate and groundwater monitoring results, migration of hazardous wastes, and harmful

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concentrations, the DTSC has declined to review available groundwater monitoring data in making its Findings. The DTSC dismisses the relevant data as "inconclusive." and therefore irrelevant to the question of environmental protection. However, to the contrary, the RWQCB found in prior assessment of the site, "The closure of the (CWM-Bakersfield) waste management units with waste left in place will protect water quality and the beneficial uses for surface water or groundwater below the site" (RWQCB, 1999). Monitoring data collected to date confirms and supports the Water Board's findings on this point. In the 2002 CME report (DTSC, 2002), DTSC stated: "Since implementation of corrective measures during closure, POC wells for the WWMU have shown stable or decreasing concentrations" and; "Concentration limits (in the corrective action wells) for the WWMU should be reduced to reflect the decrease in concentrations that have occurred in this area (area of affected groundwater) since closure". These statements indicate DTSC recognize that groundwater quality affected by former site activity has improved and linked the improvement to corrective measures during closure construction.

The DTSC's findings do not meet the regulatory requirement for extension of post-closure care because:

- DTSC presents no findings as to the concentrations of hazardous waste constituents in leachate or groundwater.

- DTSC presents no findings as to any threats to human health.

- DTSC extrapolates a theoretical threat to downstream environmental receptors without presenting any actual evidence of hazardous waste concentrations that might be harmful.

- DTSC did not include or discuss relevant and extensive site-specific data, which clearly demonstrates that the cover is performing effectively, that leachate is minimal and non-hazardous, that impacted groundwater is non-hazardous, and that impacts to groundwater from inorganic constituents have attenuated to near background since closure construction.

The DTSC has not met its own regulatory standard for a finding that extension of the post-closure care period is necessary. Unless the DTSC can make a finding consistent with the requirements of CCR Title 22 66264.117, of conditions that cannot be addressed during the next 12 years of post-closure care, an extension of post-closure care is not justified.

DTSC Response to Comment 93)

Please see DTSC Response to Comment 92).

Comment 94)

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0.2 Need for Extension of Post-Closure Care Period

Page 24. The DTSC reiterates, as a series of bullet points, items that it asserts establish the need for an extension of the post-closure care period for 30-years from 2006. The first bullet states: *"Disposed hazardous wastes have not likely degraded since the Facility's closure, and will not likely degrade in a 30-year time period from 2006."*

No Hazardous Waste Data Cited. As previously detailed in these Comments, and DTSC provides no support for this statement regarding hazardous waste degradation. It does not describe or list what hazardous wastes were disposed at the facility. The principal waste disposal at this site was of oil E&P wastes. Such wastes are exempted from RCRA (40 Code of Federal Regulations, Section 261.4). Additionally, DTSC's own evaluation of E&P wastes generally (DTSC, 2002a) found that they are exempted from RCRA and that *"the wastestreams sampled were not found to be hazardous based on the data obtained and the statistical analysis of that data; however isolated cases are discussed where E&P wastes displayed California hazardous waste characteristics."* Yet without identifying any specific compounds or site data to suggest that the Facility poses such an isolated exception, DTSC concludes that *"disposed hazardous wastes have not likely degraded since the Facility's closure,"* and *"will not likely degrade in a 30-year time period from 2006."*

The DTSC cites no evidence for their conclusion that hazardous wastes will not degrade over a 50-plus year period. Yet, processes such as hydrolysis, reduction photolysis, photo-oxidation, biodegradation, adsorption, and fixation of metals and other chemicals are known to "degrade" hazardous wastes in the environment. The fact that no hazardous wastes have been detected in groundwater over the 21-year period of record (1985 through 2006) indicates that if they ever were present in the landfill, they have degraded to the point that they are not a threat to water quality or are being effectively contained by the cover and liner. Further, DTSC does not discuss quantities, potential pathways, or evidence of environmental movement of hazardous wastes at the Facility during 19 years of closure. Therefore, the bulleted language is not support by relevant facts, and does not justify the proposed extension of the post-closure care period.

DTSC Response to Comment 94)

Once a material is classified as a hazardous waste, it remains a waste until it meets the criteria described in CCR title 22 and CWM goes through waste declassification process. CWM appears to be circumventing these regulations by placing the burden upon DTSC of proving waste buried at the CWM Bakersfield site to be hazardous. CWM retains responsibility to manage the waste as waste until the material has been reclassified as nonhazardous. CWM management will need to provide field data to support the assertion that the waste material has degraded below legal criteria.

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If CWM wishes to remove all waste material to below waste thresholds, it can follow the same process used at another of CWM facilities, CWM Coalinga. Once a material is classified as a hazardous waste, it remains a waste until it meets the criteria described in CCR title 22 and CWM goes through waste declassification process.

Comment 95)

> [1]**Cessation of Care is False Premise.** As noted in Section 1, the remaining three bullet points offered in support of the proposed 30-year extension (starting in 2006), are all based on the *false premise* that the alternative to such an extension is "cessation of the post-closure care period." This is a mischaracterization of the permitting decision at hand. This is a permit *renewal* exercise; occurring 19 years into a statutory 30-year post-closure care period. Neither CWM nor the DTSC has proposed that the post-closure care period should "cease," short of the current 30-year period, which ends in 2018. Therefore, the relevant inquiry, for purposes of any potential extension of the post-closure care period is *not* what would happen if all post-closure care suddenly ceased in 2006, but whether current and projected conditions at the site are sufficiently protective of human health and the environment going forward. If site conditions are *not* adequately protective, then the question is: what period of extension beyond the original 30 years is "necessary" to secure such protection? In fact, this question is more appropriately posed towards the end of the 30-year period, when the impending "cessation" of post-closure care may be genuinely at issue. In the current situation there are still 12 years remaining on the post-closure clock, and no evident threat to human health or the environment. Therefore, at this time, there is no basis for requiring any extension beyond the original 30-year post-closure care period.

DTSC Response to Comment 95)

The DTSC Draft Post-Closure Permit Special Conditions have been modified to allow for the following:

1. Within 60 days of the effective date of the permit, submit a waste declassification notification pursuant to California Code of Regulations, title 22, section 66260.200; or

2. Within 60 days of the effective date of the permit, submit a work plan demonstrating the Facility will meet the closure by removal and decontamination standards of chapter 14 of division 4.5 of the California Code of Regulations, title 22; or

3. CWM shall follow the Special Conditions of the Draft Post-Closure Permit, which are included in Part V, 3. of the Final Post-Closure Permit.

[2]In regard to the above alternative number 3, DTSC issues post-closure permits for a maximum of 10 years and upon renewal must review if the 30-year post-closure period is adequate, or if an alternative post-closure period must be implemented. Restarting the

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[1] thirty year post-closure period is based on the DTSC analysis that without proper long term operation and maintenance of the existing closure structures, significant impacts to human health and the environment will occur. DTSC does not have to document an existing significant impact. Without adequate long term post-closure care, the waste material entombed within the facility will eventually be released into the environment through natural processes of rainfall, wind, erosion, and surface water infiltration to groundwater. It is not a matter of if, it is a matter of when. CWM is now only providing 12 years of financial assurance (FA) for post-closure care. Who will provide post-closure care after 12 years? In the absence of completing the hazardous waste declassification process or removing all hazardous waste, it is clear that post-closure care will be needed after 12 years; however there is not sufficient FA to provide for this care. CWM proposal implies that taxpayers must provide any FA beyond 12 years if CWM becomes financially insolvent or refuses to pay. CWM argument would require taxpayers to be responsible for post-closure care in perpetuity, after CWM paid for the first thirty years.

Comment 96)

> [2] **Taxpayer Burden.** The second bullet states, *"The burden of costs associated with maintaining the Facility will default to the California taxpayers should post-closure care be allowed to cease."* As previously noted in Section 1, the assertion that the burden of post-closure care would fall to California taxpayers "should post-closure care cease" is doubly flawed. Not only does it posit the premature cessation of care half way through the post-closure care period, it ignores the existence of the required financial assurances that are in place specifically to address such a lapse or default, if it were to occur during the remainder of the current post-closure period. CWM has not proposed to cease operation or withdraw its existing financial assurances for this site. The cited burden to taxpayers is a non-issue.

DTSC Response to Comment 96)

Please see DTSC Response to Comment 32), and Comment 95).

Comment 97)

> The third bullet states, *"The closure cover (aka containment system) at the Facility has deteriorated since 1991 when it became subject to the first postclosure permit. If any cessation of the post-closure period were allowed, the deterioration of the closure cover which has occurred over the first 15-years of post-closure will continue and will likely be considerably more significant. The result of such deterioration would include onsite and potentially offsite environmental exposures to the disposed hazardous wastes."* These unsupported statements paint a picture of extreme disrepair and neglect; one that DTSC asserts will lead to exposure of on-site hazardous waste. This is not what the regulatory, monitoring, and engineering inspection records for this site show. The regular monitoring inspections do not indicate significant erosion or other disrepair to the

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closure cover. The annual independent engineering inspections likewise do not indicate significant erosion or disrepair and do not recommend substantial repairs to any portion of the cover. The regulatory inspections by the RWQCB and DTSC also note only minor disrepair, which has been repaired.

The statement that the deterioration of the containment system will *"likely be considerably more significant,"* when the post-closure care period ends is an opinion that is not supported by data. The closure cover has withstood some of the most significant rainfall seasons on record with little or no deterioration and no *"onsite or potentially offsite exposures to the disposed hazardous wastes."* Indeed, with respect to burdens on taxpayers, the DTSC's proposal would place an undue burden on California taxpayers and consumers, by requiring the unnecessary expenditure of significant CWM resources to reconstruct the properly functioning cover of a non-polluting closed landfill. These are resources that could be better spent on the remediation of more problematic landfill sites, or on the development of positive environmental programs for effective waste management.

DTSC Response to Comment 97)

It is DTSC's interpretation of the regulations that DTSC does not have to document an existing significant impact, but that an impact is reasonably expected based on a set of reasonable assumptions. Our assumptions are simple: without adequate post-closure care, the waste material entombed within the facility will eventually be released into the environment through natural processes of rainfall, wind, erosion, and surface water infiltration to groundwater. It is not a matter of if, it is a matter of when.

Please see DTSC Response to Comment 16).

Comment 98)

Future Deterioration. The fourth bullet states: "*If post-closure care were to cease, this deterioration will likely result in hazardous wastes washing from the Facility into Poso Creek which could impact several downstream environmental receptors.*" This statement is not substantiated by the data. Once again, it is unclear what hazardous waste DTSC is referring to, since the water quality analyses have detected non-hazardous concentrations of waste constituents. Additionally, no evidence exists that this type of cover deterioration has occurred during the first 19 years of closure. The DTSC provides no conceptual model for review of this type of failure and gives no indication of where this "hazardous waste" will be washing from or what the threat would be to downstream receptors.

DTSC Response to Comment 98)

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It is DTSC's interpretation of the regulations that DTSC does not have to document an existing significant impact, but that an impact is reasonably expected based on a set of reasonable assumptions. Our assumptions are simple: without adequate post-closure care, the waste material entombed within the facility will eventually be released into the environment through natural processes of rainfall, wind, erosion, and surface water infiltration to groundwater. It is not a matter of if, it is a matter of when. Once a material is classified as a hazardous waste, it remains a waste until it meets the criteria described in CCR title 22 and CWM goes through waste declassification process. CWM appears to be circumventing these regulations by placing the burden upon DTSC of proving waste buried at the CWM Bakersfield site to be hazardous. CWM retains responsibility to manage the waste as waste until the material has been reclassified as nonhazardous. CWM management will need to provide field data to support the assertion that the waste material has degraded below legal criteria.

Comment 99)

> **Poso Creek.** The fourth bullet goes on to say that "*Poso Creek's final discharge point is the Kern National Wildlife Refuge which provides habitat for a number of aquatic species, migrating birds, shorebirds, marsh and waterfowl, upland species, and the endangered Buena Vista lake shrew, San Joaquin kit fox, and the blunt-nosed leopard lizard.*" This statement does not fully explain the flow regime of Poso Creek. Poso Creek is an intermittent and ephemeral stream whose discharge rarely reaches the valley floor and even more rarely is able to make its way 30 miles across a flat valley floor to the Kern Wildlife Refuge. Based on a conversation with Mr. Dana Munn, of the North Kern Water Storage District, in order for the surface water to make it across the valley, the flow volume has to be greater than about 200 cubic feet per second west of Highway 99.

DTSC Response to Comment 99)

Poso Creek's final discharge point is the Kern National Wildlife Refuge. DTSC is aware of the flow regime of Poso Creek; however, it is DTSC responsibility to consider the potential long-term environmental consequences of the hazardous waste disposal facilities under the DTSC's oversight.

Comment 100)

> **6.3 Financial Assurances and Estimates**
> Page 24 Paragraph three states: "*DTSC is including the following condition in the CWM Bakersfield post-closure permit to continue post-closure care to assure adequate isolation of the hazardous waste. Among other things, the Facility shall provide:*
>
> *1. Revised financial assurance equal to a 30-year cost estimate approved by DTSC for all elements of post-closure care. The CWM Bakersfield postclosure permit will include a DTSC derived 30-year cost estimate. Should CWM not*

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DTSC can apply "reasonable assumptions" and yet the regulated community cannot. There are two different standards. Yes, erosion occurs - when it rains. Erosion in the Pozo Creek is limited because of sporadic rainfall throughout the year.

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provide an alternate cost estimate which is deemed adequate by DTSC, CWM shall use the cost estimate provided by DTSC. Revised financial assurance based on a DTSC approved 30-year cost estimate for all elements of post-closure care shall be submitted within 60 days from the effective date of the permit."

CWM has the following objections, in addition to those made in Section 1 of these Comments. First, the lead in phrase "*Among other things, the Facility shall provide:*" is vague and unclear. DTSC does not list what those "other things" would be. Second, because there is no demonstrated necessity for an extension of post-closure care, there is no necessity for extension of the postclosure care cost estimate. The applicable FA regulation (CCR Title 22 §66264.142) requires preparation and submittal of a post-closure care estimate by the owner/operator. It makes no provision for imposition of a post-closure care estimate prepared by the DTSC. CWM objects to the expanded financial conditions. However, in order to address the Item 1 comment on Page 24 of the Findings, and the DTSC's analysis in Attachment 7 to the Draft Permit, CWM has prepared the following preliminary analysis of the relevant financial issues:

Attachment 7 to the Draft Permit. The revised FA in Attachment 7 to the Draft Permit does not accurately reflect known natural events for which financial assurance is needed. The Cost Estimate prepared by DTSC does not reflect market costs of disposal of non-hazardous liquids. Kettleman Hills charges $0.56 per gallon for non-hazardous liquids that do not require stabilization. In addition, actual transport charges for the previous seven months from the facility averaged $566 per load. The Leachate Management and Disposal cost summary has been adjusted to reflect an average of 44,000 gallons per year (264 loads over 30 years) at $0.56 per gallon disposal cost and at $566 per load.

CWM has prepared a revised FA Cost Estimate. The Cost Estimate Summary is included as Attachment II. Other changes reflected in this Cost Estimate include recognition of costs related to quarterly cover inspections, quarterly fence inspections and repair, animal control, and cover repairs. DTSC's assumption of 1,040 hours per year spent managing work efforts at this facility is not realistic. This assumes 20 hours per week is required. A more realistic value is 520 hours per year. Consequently, the annual cost is adjusted to $25,000 per year.

A contingency of 20 percent exceeds what is required. DTSC requires a 10 percent contingency.

The revised Post Closure Care annual FA is $259,921 and the total cost estimate for the remaining life of the permit is $7,797,632.

DTSC Response to Comment 100)

Please see DTSC Response to Comment 17) and Comment 25).

Comment 101)

6.4 Leachate and Rainfall Data

Page 24 Paragraph 4 states: *"Additionally, document review, analysis and field observations discussed in this report show that the existing closure cover is not effective in preventing rainfall from entering the waste or sustaining damage from weathering and animal activity. For example, leachate production has increased over time during storm events and there are several occasions where animal activity has breached the integrity of the cover. Replacing or conducting extensive repairs to the existing closure cover is therefore required."*

As noted in Section 5.5, an increased volume of leachate was pumped during 1997-1998 El Niño year from the LCRSs for ponds P01, P02, P05, and P06. DTSC assumes that this was due to infiltration of rainwater through the cover overlying the waste. The LCRS for Pond P03 did not accumulate additional leachate following rain events. Table 1 (see Section 5.5.1) presents statistics for the ponds in question, using 1.2 feet of rainfall for the 1997-1998 El Niño rain year (based on the Bakersfield Airport rain gage) and the leachate volumes reported for 1998.

These data indicate that if it is assumed that the volume of leachate pumped from the LCRSs is due to infiltration of rainwater through the cover, then the cover prevented 99.5 to 100 percent of the rain that fell on the cover from infiltrating through the cover.

The DTSC presents no data or information to indicate that the cover layer has sustained any substantive damage from weathering or animal activity. Moreover, because it declines to examine or discuss water quality data for the site, the Findings report mistakenly *assumes rather than establishes* that the posited infiltration of rainfall and leachate levels pose a threat to human health and the environment.

DTSC Response to Comment 101)

Once a material is classified as a hazardous waste, it remains a waste until it meets the criteria described in CCR title 22 and CWM goes through waste declassification process. CWM appears to be circumventing these regulations by placing the burden upon DTSC of proving waste buried at the CWM Bakersfield site to be hazardous. CWM retains responsibility to manage the waste as waste until the material has been reclassified as nonhazardous.

The California Code of Regulations, title 22, section 66264.310 sets requirements for closure covers which include:

- prevents downward entry of water into closed disposal areas for a period of at least 100 years;
- functions with a minimum maintenance;

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- promotes drainage and minimizes erosion;
- accommodates settling and subsidence;
- accommodates lateral and vertical shear forces generated by the maximum credible earthquake;
- has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present;
- conforms to the provisions of subsections (e) through (r) of section 66264.228, which outlines additional criteria for closure cover layers, grading, runoff control, and construction and maintenance.

[1]Based on historic leachate removal data, the CWM Bakersfield closure cover has not prevented downward entry of water and does not meet applicable requirements.

Comment 102)

> **6.5 Cover Meets Applicable Performance Standards.** The closure performance standard for CCR Title 22 is given in §66264.111, which requires that *"The owner or operator shall close the facility in a manner that...c) minimizes the need for further maintenance; d) controls, minimizes or eliminates,* ***to the extent necessary to protect human health and the environment****, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to the ground or surface waters or the atmosphere." [emphasis added.]*
>
> The current closure cover meets this standard in that it has eliminated post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to the environment. The cover's effectiveness in this regard is evidenced by the lack of any new releases detected in the water quality monitoring system and continued reduction of concentrations of monitoring parameters in impacted monitoring wells toward background conditions. Despite the surficial maintenance issues identified by the DTSC, the cover has achieved this level of performance with "minimal further maintenance;" -- that is, with the standard maintenance regime for a facility of this kind. Therefore, the proposal for *"replacing or conducting extensive repairs to the existing closure cover"* is not justified.

DTSC Response to Comment 102)

Please see DTSC Response to Comment 16) and Comment 18).

Comment 103)

> [2]Page 25 Paragraph 1, item 2 states that the Facility shall provide: *"Engineering plans and specifications to reconstruct the closure cover to original design specifications that meet regulatory requirements. These plans and specifications*

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should specify a cover that includes the following components or their equivalent..."

CWM's closure plan (EMCON, 1985) was found to the meet the requirements for effective isolation of hazardous and nonhazardous waste residues through the approval of the plan by the DHS (1987) and the RWQCB (1990). The closure plan was implemented and certified by a California-registered Professional Engineer (EMCON, 1988a) and the closure certification was approved by the DHS (1989). CWM was issued post-closure care permits by the DHS (1991) and the USEPA (1991a) after approval of the post-closure care plan. The post-closure care plan described maintenance of the closure cover, which was to be commissioned after an annual inspection and recommendation by a California-registered Professional Engineer. In accordance with the permit, CWM has had the closure cover inspected annually each spring since 1991 and has implemented the maintenance recommendations of the inspector. Despite these documented maintenance activities, and substantial evidence of cover integrity to date, the DTSC has proposed reconstruction of the closure cover to meet a prescriptive closure cover design, such as might be required for a newly permitted hazardous waste disposal facility. Such a standard is inappropriate and unwarranted at the Bakersfield Facility.

The applicable closure standard for the Facility is presented in CCR Title 22 §66264.111. These requirements are performance standards (i.e., "controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste ... to the ground or surface waters or to the atmosphere") rather than prescriptive standards (i.e., specified thickness of low permeability materials). The DTSC has provided no evidence to support a finding that the current cover fails to meet these performance standards.

DTSC Response to Comment 103)

Please see DTSC Response to Comment 16), Comment 18), and Comment 71).

Comment 104)

Figures 29 through 32 of the Findings chart total monthly rainfall and leachate removed from the site LCRSs. These charts show that with the exception of the 1997-1998 El Niño rain year, leachate did not tend to accumulate in the LCRSs following rain events. The leachate that accumulated during the 1997-1998 El Niño rain year in the LCRSs may be attributed to cover loading and waste consolidation and not to infiltration. However, if the leachate that accumulated was due to infiltration, then the current WMUs cover prevented 99.5 to 100 percent (see Table 1 in section 5.5.1 of this response) of the rain that fell on the cover from infiltrating. How much more effective would a new prescriptive cover be when compared to the current cover that prevents infiltration during average and above average rain years and prevents all but 0.5 percent (assuming leachate

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was generated due to infiltration) of incident precipitation from infiltrating during the heaviest rainfall year on record?

DTSC Response to Comment 104)

Please see DTSC Response to Comment 16), Comment 18), and Comment 89).

Comment 105)

Page 25 Paragraph 1, Item 3 presents the requirement for a FA mechanism for cover reconstruction. As stated above in the comment on Item 2, the cover is functioning according to applicable performance standards and there is no need to reconstruct it. Therefore, there is no need to provide for reconstruction in the FA.

Even if the cover were to be totally replaced, a construction period of 180 days for a facility of this size is unreasonable and could not be achieved. A minimum of one year is required to design and construct a 91-acre cap. This one-year period assumes that material is readily available to construct the both the clay and biotic layers and that there is timely agency review of all documents and permits.

DTSC Response to Comment 105)

Please see DTSC Response to Comment 19).

Comment 106)

Page 25 Paragraph 1, Item 4, states that the Facility shall provide: *"Monthly leachate measurements and quarterly leachate production reports that document monthly rainfall."*

This requirement is overly restrictive and imposes an unnecessary burden on CWM. The waste discharge requirements (RWQCB, 1999) provide a schedule for leachate monitoring that has been working adequately. Leachate is measured monthly in the LCRSs that continue to contain enough leachate to pump. DTSC has presented no information that would justify monthly measurements in the LCRSs that do not typically contain enough leachate to pump. CCR Title 22 requires a semi-annual leachate measurement frequency.

As regards the measurement of monthly rainfall, reliable monthly rainfall data can be obtained at the following website for the Bakersfield airport, which is approximately 9 miles from the Facility and experiences the same or substantially similar weather patterns as the Facility:
http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0442 .

DTSC Response to Comment 106)

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DTSC has ignored that performance question at the end of Comment 104.

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Please see DTSC Response to Comment 20).

Comment 107)

Page 25 Paragraph 1, Item 5 states, "*"A survey plat which shows the exact boundaries of the current closure cover and all disposal areas superimposed on a parcel map."*

CWM submitted these data as part of the facility closure.

DTSC Response to Comment 107)

Please see DTSC Response to Comment 21).

Comment 108)

Page 25 Paragraph 2, Item 6 states; *"Plans and specifications to repair and upgrade fencing to effectively prevent cattle from entering the premises. Plans and specifications shall be submitted within 60 days from the effective date of the permit. Construction shall begin within 30 days of plan approval and should be completed within 180 days of initiation."*

As referenced in Section 1.3.3, CWM has already implemented quarterly fence inspection and repair program. In July 2006, more than 400 feet of fence and fence posts were replaced.

DTSC Response to Comment 108)

Please see DTSC Response to Comment 22).

Comment 109)

6.6 Conclusion

The DTSC Findings concludes with the following statement: *"The above and other factors discussed in this document illustrate the need for continued, and likely perpetual post-closure care of the landfill and the associated institutional and engineering controls of the Facility."* However, as CWM has demonstrated throughout these Comments, the weight of the evidence regarding site conditions and cover performance at the Bakersfield Facility illustrates quite the opposite. Of particular relevance is the 21 years of water quality data, which documents key indicators of cover integrity and environmental protection. These include:

- the minimal generation of leachate from the site;
- the absence of hazardous concentrations of waste constituents in leachate or groundwater;

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- the decreasing incidence and impact of inorganic constituents in impacted groundwater -- to near background levels; and

- the generally high level of naturally occurring TDS in the area.

Rather than critically examining this extensive body of *groundwater quality* data, the Findings report dismisses it as "inconclusive," and focuses instead on the less relevant details of *water volume*. In doing so, the Findings fail to link their general assertions of cover deterioration and water infiltration to any demonstrable environmental impact or threat to "human health or the environment." Instead, they *assume*, rather than *establish* the risk of dire environmental consequences, and *ignore* rather than *refute* the substantial evidence to the contrary.

As a consequence, the recommendations proposed in the Findings and in the Draft Permit are completely out of step with the site-specific realities of the Bakersfield Facility. While there are numerous examples of landfills that leak hazardous wastes and threaten neighboring sensitive receptors, the fact is that the Bakersfield Facility simply is not one of them. This is a closed facility that accepted little or no hazardous waste, that is *not* leaking hazardous constituents, with a cover that has *not* been compromised, and substantial evidence that it does *not* pose a current or likely threat to any sensitive receptors. Therefore, DTSC's proposed extension of the post-closure care period, and prescriptive reconstruction of the landfill cover are clearly not "*necessary to protect human health and the environment.*" Therefore, CWM requests that the Findings be revised to reflect these facts, and that the proposed extension and special conditions be withdrawn from the Draft Permit.

DTSC Response to Comment 109)

Please see DTSC Response to Comment 16), Comment 18), Comment 30), Comment 32), Comment 35), Comment 55), and Comment 95).

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Comment 110)

Monitoring Program			WMU Background		WMU Detection					WMU Corrective Action			Poso Creek Alluvium Background Wells			Poso Creek Alluvium Corrective Action Monitoring Wells					Northwest Canyon Groundwater	Latchum
Sample Designation		STLC	C02	CW17	C08	C11	C12	CW15	MW02	MW03	MW06	MW11	MW03	PC05	PC06	MW07R	PC01R	PC02	PC03R	PC04	NWCCP	P02
Sampling Date			08/04/04	08/03/04	08/04/04	08/03/04	08/03/04	08/03/04	08/03/04	01/28/00	08/05/04	01/28/00	08/04/04	08/04/04	08/04/04	08/05/04	08/05/04	08/05/04	08/05/04	08/05/04	12/07/05	12/07/05
WMU		(Title 22, §66261.24)	western	western	eastern	eastern	eastern	eastern	western	western	western	western										
Threshold Metals																						
Antimony	mg/l	15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.03
Arsenic	mg/l	5	0.110	<0.010	0.015	0.024	0.034	<0.010	<0.010	0.017	0.016	<0.010	<0.010	0.053	0.013	0.013	0.010	0.024	0.030	0.031	0.013	0.062
Barium	mg/l	100	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.025
Cadmium	mg/l	1	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0074	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0051	0.021
Chromium	mg/l	5	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.015
Copper	mg/l	25	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.048
Lead	mg/l	5	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	NM	<0.0030	NM	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.015
Mercury	mg/l	0.2	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	NM	<0.00020	NM	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Nickel	mg/l	20	0.210	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	NM	0.10	NM	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.011	2.6
Selenium	mg/l	1	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.30	<0.005	<0.0050	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.017	0.15
Zinc	mg/l	250	0.440	<0.020	<0.020	<0.020	<0.010	<0.020	0.022	NM	<0.020	NM	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.042	0.28
Phenols by 420.1																						
Total Phenolics	mg/l	1.7[a]	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NM	<0.020	<0.020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.025	<0.02

Notes:
mg/l - milligrams per liter (ppm) per unit
NM - not measured
Detected constituents are in bold
STLC=Soluble Threshold Limit Concentration

DTSC Response to Comment 110)

Table noted.

List of persons providing comments

List of persons providing comments

1. Philip Perley, Closed Site Project Manager, Closed Site Management Group, Waste Management, 9081 Tujunga Avenue, Sun Valley, CA 91352