PCC

Recology
Hay Road
WASTE ZERO

June 5, 2014

Ms. Pamela Creedon
Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

Re: Draft Cleanup and Abatement Order, Recology Hay Road

Dear Ms. Creedon,

This letter and the attached comments respond to the Draft Cleanup and Abatement Order published by your staff on May 7, 2014. As our comments indicate, Recology objects to the proposed order, and does not agree that it is warranted. As your staff is aware, Recology recently attempted to negotiate the terms of a more limited Cleanup and Abatement Order at its Yuba Sutter facility. That process proved unsuccessful for our company and resulted in a difficult decision to close composting operations at that facility. We cannot risk a similar result at the Recology Hay Road site; therefore, we seek withdrawal of the proposed Cleanup and Abatement Order and a more reasoned, deliberative process to address water quality concerns at the Hay Road site.

By way of background, our company provides essential public services and environmental benefits to the community. Recology companies operate in California, Nevada, Oregon and Washington coordinating dozens of recycling programs to recover a variety of materials and put those materials to their best and highest use. Recology's programs have been replicated throughout the country and serve as a national model for resource recovery initiatives. As the largest employee owned company in the resource recovery industry, partnered with over 118 communities, serving over 750,000 accounts and being the first and largest curbside yard trimmings and food scraps collection program in the country, we have an ongoing commitment to operate well run facilities that protect the environment and meet our customer's sustainability goals in a full and careful manner.

Our Hay Road landfill and Jepson Prairie Organics composting operations are comprehensively designed and carefully operated facilities. The Recology Hay Road landfill serves Solano County, specifically the cities of Vacaville and Dixon. In addition, the unique recycling program at Jepson Prairie Organics diverts yard trimmings, food scraps and other compostable material from homes, restaurants, hotels, grocery and produce markets, delis, and coffee shops in the Bay

Administrative Office: 235 North First Street | Dixon, CA 95620-3027 | T: 800.208.2371 | F: 707.678.5148
Site Location: 6426 Hay Road | Vacaville, CA 95687-9433 | T: 707.678.4718 | F: 707.678.5695

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Area. These source materials create an especially rich compost – perfect for reconditioning soil due to its diverse feedstock. Our composting operations help keep organic materials out of landfills, which furthers the State's waste diversion goals and significantly reduces greenhouse gas emissions. Our composting process serves as a preferable environmentally sustainable alternative to less costly and more impactful practices such as direct land application of non-stabilized organics, and our compost itself is used to replace toxic chemical and synthetic fertilizers in the agricultural and landscape industries.

We understand and appreciate the important mission of the Regional Water Quality Control Board, and we have always strived to work cooperatively with Board staff to address concerns over water quality. We have an excellent track record, we professionally and thoughtfully operate complex facilities in a highly regulated environment, and we set high environmental standards in our industry. Put simply, we have been blindsided by the enormous breadth and scale of the requirements proposed by staff in the Draft Cleanup and Abatement Order targeting our Hay Road facilities.

The extensive array of requirements proposed by the Draft Cleanup and Abatement Order would cost millions of dollars to satisfy, but there has been no demonstration that the requirements are necessary, cost-effective or scaled to the potential for environmental harm. We recognize there are some corrective actions to take at the site and we have proposed a set of actions to bring the site into full compliance with applicable standards. But the site conditions do not pose a significant environmental threat or dangerous situation warranting such a wide-ranging and overly aggressive enforcement action. Many of the findings in the Draft Cleanup and Abatement Order are based on errors and exaggerations and the end result is a set of site regulations that are excessive and unjustified.

We believe many of the issues presented could – and should – be addressed through the reasoned, collaborative process of revising the Waste Discharge Requirements for the Hay Road site, which have not been updated for over five years. We do not believe it is appropriate for staff to push detailed, comprehensive site requirements through to expedited adoption, without adequate consideration of the relevant facts and policies by the Board.

To provide a complete picture of our operations at Hay Road, to facilitate communication, and to educate the agency about our facilities, we invite Board staff and the executive team to visit the site to see it first-hand. To that same end, we also request that the Board Members be invited to attend this site visit. We hope such a visit would lead to a more reasonable and balanced approach at regulating our operations.

In the event staff decides to pursue issuance of the Draft Cleanup and Abatement Order, we request that the proposed order first come before the Board for a hearing, so that we can present the evidence and our objections directly to the agency decision-makers. In its current form, the Draft Cleanup and Abatement Order is not supportable and our company does not accept its terms.

Sincerely,

George P. McGrath
Executive Vice President
& Chief Operating Officer

cc: Wendy Wyels, Regional Water Quality Control Board
Mayumi Okamoto, Office of Enforcement, State Water Resources Control Board
Caroll Mortensen, Director, CalRecycle
Dave Weiss, Solano County Environmental Health Division
Paul Yamamoto, Recology
Drew Lehman, Recology
Amy Dietz, Recology
Bryan Clarkson, Recology Hay Road
Barbara Schussman, Perkins Coie LLP

Perkins Coie

Four Embarcadero Center, Suite 2400
San Francisco, CA 94111-4131
415-344-7000
415-344-7050
www.perkinscoie.com

Marc R. Bruner
PHONE (415) 344-7171
FAX: (415) 344-7371
EMAIL: MBruner@perkinscoie.com

June 5, 2014

Ms. Wendy Wyels
Environmental Program Manager
Compliance and Enforcement Program
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

Re: Draft Cleanup and Abatement Order, Recology Hay Road

Dear Ms. Wyels:

We provide these comments on behalf of Recology Hay Road (RHR) on the Draft Cleanup and Abatement Order (Order R5-2014-XXXX) issued on May 7, 2014. RHR and its technical consultants have had a relatively short time to digest and respond to the voluminous Draft CAO, which is 84 pages in length, contains 91 findings, and proposes a detailed, diverse and extensive array of requirements spanning 10 pages of text. Despite the severe time limitations, RHR and its consultants have prepared itemized responses to the specific findings and provisions of the Draft CAO, which are presented in the attached Technical Appendix. As more information is developed, RHR may supplement these comments.

RHR has worked cooperatively with staff of the Central Valley Regional Water Quality Control Board to address staff's concerns about the quality of groundwater and surface waters at the site, and will continue to do so. But in its current form, the Draft CAO is excessive, unnecessary and unjustified. The multitude of requirements it seeks to impose would necessitate immediate capital, operational and staff expenditures on the order of millions of dollars. It is based on incorrect interpretations of technical data, and it has been proposed without evidence of a significant environmental threat or dangerous site condition warranting the imposition of such a wide-ranging set of requirements through the summary, expedited process of a Cleanup and Abatement Order.

A fundamental problem with the Draft CAO is that the findings and conclusions of Regional Board staff are not supported by the evidence. The findings misconstrue the scientific data,

exaggerate the extent and magnitude of nitrate impacts, and overlook standard geological practices and principles. This highlights the need for the more deliberative approach of revising the Waste Discharge Requirements for the site (Order R5-2008-0188), in lieu of an abridged enforcement process by staff.

The broad array of issues raised in the Draft CAO are much more appropriately addressed through the regular administrative process of amending the site WDRs, which are more than five years old. Indeed, many proposed requirements in the Draft CAO seek to compel significant and immediate changes in the site's operations, facilities and monitoring systems – even though Regional Board staff either have previously approved these items or have known about them for years. Such matters should be addressed, if at all, through the Board's deliberative consideration of revised WDRs, instead of through the truncated enforcement procedure of a Cleanup and Abatement Order.

The costly requirements contained in the Draft CAO are incompatible with the statutory and regulatory policies that govern the issuance of a Cleanup and Abatement Order. These policies mandate a phased, step-by-step approach to identify and utilize the most cost-effective methods for both investigating and cleaning up site contamination. The Draft CAO runs afoul of these policies by seeking to impose a gamut of facility-wide requirements for investigating and remediating nitrate issues without a demonstration that the requirements represent a feasible and cost-effective approach to address issues that are discrete and site-specific.

Finally, there are many items that could easily have been resolved with a simple phone call or email, without escalating the matter to a Cleanup and Abatement Order. These items do not belong in the Draft CAO and further highlight the impropriety of using a Cleanup and Abatement Order.

For these reasons, RHR objects to the Draft CAO. Our objections are outlined in more detail below, and in the attached Technical Appendix.

1. **The Significant Changes In Facility Operations That Would Be Required By The Draft CAO Should Be Addressed Through The Deliberative Process of Revising The Waste Discharge Requirements For The Site, Not Through The Summary Procedure Of A Cleanup And Abatement Order**

As the State Water Resources Control Board has explained, in enacting Water Code Section 13304 to govern cleanup and abatement orders, "[t]he Legislature intended to provide a summary procedure" whereby Regional Board staff could act "expeditiously to correct water quality problems." See *In the Matter of the Petition of BKK Corp.*, State Water Resources Control Board, Order No. WQ 86-13, 1986 WL 1210142, at *2 (Aug. 21, 1986). This summary procedure, as the California Court of Appeal emphasized in *Machado v. State Water Resources*

Control Board, 90 Cal. App. 4th 720, 727 (2001), is intended to allow Regional Board staff to require "immediate action" to clean up and abate discharges "that threaten public health and safety and pose significant risk to the environment," where a delay of remedial action would "exacerbate a dangerous situation."

Here, there is no indication of an imminent threat to public health and safety, significant environmental risk or a potentially dangerous situation requiring immediate enforcement action through a summary, expedited procedure instead of the regular administrative process of revising the site's WDRs. Some examples to illustrate these points are provided below.

(a) Changes to the Site's Groundwater Monitoring Program

One example of the impropriety of using the curtailed procedure of a Cleanup and Abatement Order is the requirement in the Draft CAO to completely revamp the site's extensive groundwater monitoring program. The 2008 WDRs for the site contain a detailed 42-page Monitoring and Reporting Program, which was developed through the deliberative WDR process and is incorporated into the 2008 WDRs adopted by the Regional Board after a hearing. See Order R5-2008-0188, Provision G.3 ("The Discharger shall comply with Monitoring and Reporting Program No. R5-2008-0188, which is incorporated into and made part of this Order."). As explained in the Technical Appendix, the monitoring program has been effective in detecting releases. As further explained in the Technical Appendix, while localized areas of the site have experienced elevated nitrate levels, the technical data do not indicate that these localized areas are comingled or that there is a site-wide plume, and there is no indication of any off-site migration. In many instances, the source of the problem has been removed, corrective actions have been instituted, and the nitrate levels are only slightly higher than the concentration limit and show a declining trend. As indicated in its March 12, 2014 submittal to Regional Board staff, RHR recently proposed to implement corrective action through in-situ bioremediation to address remaining nitrate issues at the locations where they have been detected. As shown in the Technical Appendix, the findings in the Draft CAO that the current Board-approved monitoring network is inadequate, that extensive new monitoring systems are necessary, and that enhanced site-wide remediation actions are warranted are not supported by the evidence and do not reflect accepted hydrogeological principles.

Although there is no evidence of a significant environmental threat, corrective actions are underway, and additional corrective actions have been proposed. Yet the Draft CAO would rewrite numerous key provisions of the Board-approved Monitoring & Reporting Program. This proposed overhaul would mandate substantial expenditures to install a new network of groundwater wells and other monitoring systems, including the replacement of various background monitoring wells that were specifically approved and identified as part of the site's monitoring network in the 2008 WDRs. *See* Order No. R5-2008-0188, Monitoring & Reporting

Program at p. 7. Another background well targeted for replacement under the Draft CAO (Well 4BR) was approved by Regional Board staff only a few years ago, in March 2012.

Regional Board staff seek to implement these major changes in the site's Monitoring and Reporting Program without any Board consideration, input or approval. System-wide modifications to the site's established monitoring program should be pursued, if at all, through revised WDRs, not through a Cleanup & Abatement Order. RHR objects to the proposed changes to the established and previously approved monitoring system, and does not agree that such changes are warranted in light of the evidence.

(b) Changes to the Site's Lined Compost Water Management System

The Draft CAO seeks to require an expensive reconfiguration of the site's lined pond system for handling the surface water that comes into contact with composting operations. There is no reason to address this issue through a Cleanup and Abatement Order. It is an issue that Regional Board staff have known about for no less than *four* years, and there is no evidence of an imminent threat to public health and safety or a dangerous condition that must be addressed through an expedited process. Indeed, contrary to the premise of the Draft CAO, the evidence in the record shows there has not been *any* discharge from the lined pond system to surface waters.

According to the findings in the Draft CAO, staff takes the position that the fact that water from the site's lined "low-flow" pond (which receives water used in composting operations) flows into the site's lined "high-flow" pond (which receives compost stormwater runoff) is not consistent with a factual finding (Finding 88) in the 2008 WDRs. But Regional Board staff have long been aware of how the site's lined pond system works. As noted in a letter from April 2010, Regional Board Compliance and Enforcement staff acknowledged that the high flow pond holds both "compost leachate and stormwater runoff." See Letter from Mary Boyd to Greg Pryor (Apr. 22, 2010). Further, in September 2010, RHR sent to Regional Board staff for their review design drawings for proposed treatment upgrades to the low-flow pond – this submittal indicated that, under the new system, the low-flow pond would be used as an aerobic treatment system for liquid generated from the composting process and that water from this pond would flow into the high-flow pond. See Email and Letter from Bryan Clarkson to Victor Izzo (Sept. 17, 2010) (enclosing design drawings from Brown & Caldwell). After this upgrade was constructed, RHR again notified the Regional Board staff of how the system worked in presenting a report of remedial actions related to a gas bubble identified beneath the high-flow pond's liner:

> "The larger pond serves as the primary storage impoundment for surface water runoff from the composting area. The smaller Low-Flow Pond collects surface water run-off during periods with relatively low discharge to allow more efficient aeration of the stormwater. Water from the Low-Flow Pond is then pumped to

> the larger High-Flow Pond. During higher precipitation events, surface water is pumped directly to the High-Flow Pond."

See Golder Associates, *Report of Remedial Actions, Compost High-Flow and Low-Flow Ponds* (Jan. 26, 2011) (transmitted to Regional Board staff via letter from Bryan Clarkson to Mary Boyd dated Feb. 14, 2011).

Further, as explained in the Technical Appendix, the lined ponds constitute a self-contained system; there has been no discharge to surface waters since the system was first constructed in 2006 and no such discharge is allowed to occur. Given that Regional Board staff have known about the connection between the two lined ponds for over four years, and given that the system does not discharge to surface waters, there is no basis for an immediate enforcement action through a Cleanup and Abatement Order. Rather, *if* any modifications to the long-standing lined pond system are warranted, it is more appropriate to address any issues associated with that system, including how it is designed and how it operates, through revisions to the 2008 WDRs. RHR objects to the provisions of the CAO that require immediate modifications to the lined pond system, and does not agree that such requirements are warranted in light of the evidence.

(c) The Use of Compost Water for Dust Control

The Draft CAO would prohibit the use of any water that comes into contact with composting operations for dust control on the lined landfill units. But as explained in the Technical Appendix, RHR has on several occasions informed Regional Board staff that water from the lined compost ponds are used for dust control on the landfill units. These communications date back to 2010; there is no threat or dangerous condition to be remedied through a Cleanup and Abatement Order. See, e.g., Golder & Associates, Liner Repair Plan for the Compost Area Storm Water Pond (Sept. 16, 2010), at p. 1 (transmitted to Regional Board staff via letter from Greg Pryor to Mary Boyd, dated Sept. 20, 2010); Golder & Associates, *Report of Remedial Actions, Compost High-Flow and Low-Flow Ponds* (Jan. 26, 2011) at p. 2 (transmitted to Regional Board staff via letter from Greg Pryor to Mary Boyd, dated Feb. 14, 2011).

In addition, as explained in the Technical Appendix, use of compost water for dust control on the lined landfill modules would not impact water quality, as the water is applied to dry materials such that most of it would be absorbed, resulting in minimal infiltration into the refuse. And if infiltration occurs, the lined landfill modules are designed to collect and remove liquids that percolate through the refuse.

Equally important, the claim in the Draft CAO that the use of compost water for dust control is a violation of the 2008 WDRs is unfounded. The cited provision of the 2008 WDRs, Specification B.13, restricts the discharge of "[l]eachate or landfill gas condensate ***from a lined landfill***

module"; the specification does not say anything about leachate or runoff from ***composting operations***.

Given the site's known and longstanding practice of using water from the lined compost pond for dust control, given the lack of any evidence that this practice is causing a water quality problem, and given that the basis cited for the requirement in the Draft CAO does not apply by its terms, this issue is not appropriate for a summary Cleanup and Abatement Order. The management and use of compost water from the lined pond system are more appropriately suited to the permit revision process, and during that process full consideration of the benefits and risks of the current operations should occur. There are important environmental benefits to re-using water for dust control purposes, especially during this time of extreme drought conditions. RHR objects to the provisions of the CAO that require a change to the facility's dust control operations, and does not agree that the proposed requirements are supported by the evidence.

2. The Draft CAO Is Not Consistent With The Statutory and Regulatory Policies That Govern The Issuance Of A Cleanup And Abatement Order

In addition to the lack of an imminent environmental threat warranting the summary, expedited procedure of a Cleanup and Abatement Order, the Draft CAO proposed by Regional Board staff does not comport with the statutory and regulatory policies that govern the issuance of these types of orders. Section 13307 of the Water Code requires the State Board to establish policies and procedures for the issuance of cleanup and abatement orders by the Regional Boards. This statutory provision mandates that the governing rules include "[p]olicies for carrying out a phased, step-by-step investigation to determine the nature and extent of possible soil and groundwater contamination or pollution at a site"; "[p]rocedures for identifying and utilizing the most cost-effective methods for detecting contamination or pollution and cleaning up or abating the effects of contamination or pollution"; and "[p]olicies for determining reasonable schedules for investigation and cleanup, abatement, or other remedial action at a site," taking into account the financial and technical resources that are available." See Water Code § 13307(a)(2)-(4). The Water Code further provides that, in requesting reports for a water quality investigation, "[t]he burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports." Water Code § 13267(b)(1).

To implement these statutory mandates, the State Board has adopted a set of policies and procedures that require a comparative assessment of the feasibility, effectiveness and cost-effectiveness of the available remedial options. These policies and procedures are codified in the State Board's Resolution No. 92-49, *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304* (Apr. 21, 1994, as modified Oct. 2, 1996), which reiterates the legislative policies of Section 13307 of the Water Code (see ¶ 5). The Resolution also specifies that cleanup and abatement actions should proceed in "progressive sequence," which involves an evaluation of "feasible and effective" remedial options before

adopting and implementing a preferred alternative (see ¶ II.A.1). As part of this process, the Resolution calls for a consideration of "the effectiveness, feasibility, and the relative costs of applicable methods for investigation, and cleanup and abatement" (see ¶ III.C). The Regional Board's Basin Plan for the Central Valley similarly emphasizes the need to consider the level of the threat posed to human health and the environment and to evaluate cleanup alternatives to compare the effectiveness, cost and time to achieve cleanup levels. See Basin Plan at p. IV-19 (which is part of the Regional Board's *Policy for Investigation and Cleanup of Contaminated Sites*).

Here, the Draft CAO does not abide by these guiding legislative and regulatory principles. For instance, the Draft CAO purports to dictate the details of facility-wide changes to the site's groundwater monitoring system, without any determination that the extensive and expensive upgrades are warranted in light of the evidence, much less feasible and cost-effective methods of investigation.

The Draft CAO also requires "enhanced" corrective action consisting of an expansion of the proposed in-situ remediation to actively remediate all groundwater at the site where the concentration limit for nitrate is exceeded. See Draft CAO at Order ¶ 7(d) at p. 29. Specifically, this provision of the Draft CAO would require that RHR expand "the current in-situ corrective action measure such that all groundwater impacted by nitrate exceeding a concentration of 5 mg/L nitrate-N is actively remediated." *Id.* But there has been no evaluation of whether this remedy presents a feasible or cost-effective approach on a site-wide basis, whether other effective and less costly site-wide options might be available, or whether active remediation is even appropriate for areas with declining nitrate levels where exceedances may be eliminated in a short time-frame through natural attenuation. In contrast to the all-at-once approach mandated by the Draft CAO, RHR already has proposed a step-by-step approach to prioritize and target the in-situ remediation to the specific areas of the site where it is anticipated to provide the most cost-effective solution.

Given that RHR has proposed voluntarily to proceed with its in-situ remediation plan, it is not necessary to mandate that plan through the issuance of a Cleanup and Abatement Order. As for the proposed requirements in the Draft CAO to expand that plan across the site, RHR objects to those requirements as they are not supported by the evidence and do not comport with the governing policies and procedures requiring a phased, step-by-step approach to identify and utilize the most cost effective methods of investigation and remediation of ongoing nitrate contamination. These principles are especially important here, where the numerous requirements of the Draft CAO would impose a particularly costly remedy.

3. Many of the Requirements In the Draft CAO Are Unnecessary For An Enforcement Action

Many of the requirements in the Draft CAO are unnecessary, as they are already being addressed or could have been resolved through a simple email or phone call. For example:

- The Draft CAO would require RHR to file a name change form, a simple administrative matter that need not be included in an enforcement order.

- The Draft CAO would require RHR to file a Notice of Intent under the State Board's Industrial Storm Water General Permit. This is another matter that should have been handled administratively, rather than though a Cleanup & Abatement Order.

- The Draft CAO would require RHR to cease discharging compost water to unlined areas, but this directive ignores the fact that RHR already has proposed improvements to alleviate this concern.

- The Draft CAO would require removing all compost material or product that is not stored within the 54-acre designated in the WDRs. But these materials already are stored within this area, so including such a requirement within the Draft CAO is unnecessary.

- The Draft CAO would require the submission of an Amended Report of Waste Discharge to address improvements in composting methods that have reduced odors and the generation of compost water, even though Regional Board staff have been aware of these same improvements since a 2010 inspection – four years ago. If this is necessary, this is another matter that should have been handled administratively without formal enforcement action.

- The Draft CAO would require a water balance report, even though such a report has already been prepared for the high-flow pond and the water flowing into the low-flow pond is subject to manual controls so that its capacity would not be exceeded. This is unnecessary, and duplicative of information already before the Regional Board.

- The Draft CAO requires the submission of a site map and stamped as-built drawings, another matter that could have been requested without a Cleanup and Abatement Order.

- The Draft CAO would require a leak detection survey in 2015, even though such a survey is already scheduled to be performed within that timeframe.

- The Draft CAO would require various other technical reports that are part of the ongoing compliance process, could have been requested in a letter, and do not warrant the issuance of Cleanup and Abatement Order.

These examples serve to highlight the impropriety of formal enforcement action through a Cleanup and Abatement Order, instead of simply requesting the permittee for the desired information.

* * * * *

The Draft CAO is unreasonable. It seeks to impose comprehensive site-wide regulations that are out of proportion with the actual level of environmental harm, inconsistent with the policies and procedures for issuance of a Cleanup and Abatement Order, incompatible with prior staff reviews and approvals, and unsupported by the technical data. We hope that we can arrive at a more reasoned and deliberative approach to address water quality concerns at the site. In the event staff decides to pursue issuance of the Draft CAO, we request that the proposed order first be put before the Board Members for a hearing, so that the agency decision-makers can determine and weigh the facts, apply the relevant policies, and come to a fully informed decision.

Sincerely yours,

Marc R. Bruner

Marc R. Bruner

cc: ✓ Pamela Creedon, Executive Officer, Central Valley RWQCB
Mayumi Okamoto, Office of Enforcement, State Water Resources Control Board
Caroll Mortensen, Director, CalRecycle
Dave Weiss, Solano County Environmental Health Division
George McGrath, Recology
Paul Yamamoto, Recology
Drew Lehman, Recology
Amy Dietz, Recology
Bryan Clarkson, Recology
Barbara Schussman, Perkins Coie LLP

TECHNICAL APPENDIX

ITEMIZED RESPONSES TO DRAFT CLEANUP AND ABATEMENT ORDER R5-2014-XXXX RECOLOGY HAY ROAD June 5, 2014

This document provides itemized responses to Findings #1 through #91 and Orders #1 through #17 presented in the Draft Cleanup and Abatement Order R5-2014-XXXX (Draft CAO) prepared by staff of the Central Valley Regional Water Quality Control Board (CVRWQCB) and issued on May 7, 2014. The responses are based on a comprehensive review of the historical record of correspondence available in Recology Hay Road (RHR) files and information contained in prior reports and submittals, as well as technical evaluations by RHR staff and their consultants who are familiar with the site conditions and history. The technical consultants who participated in preparing these responses are Ken Haskell, P.E. and Kris Johnson, P.G., C.E.G. of Golder Associates Inc., and Mike Delmanowski, C.E.G., C.Hg., Senior Hydrogeologist of EBA Engineering. Their resumes are attached. In addition, supporting documentary materials are attached in CD format.

RESPONSES TO FINDINGS IN THE DRAFT CAO

Finding #1

Finding #1 should be revised as follows to more accurately reflect the site features:

"The Discharger operates an active landfill and composting operation regulated by the Water Board under the name of "Hay Road Landfill" (facility). The facility consists of two Class III landfills (LF-1 and LF-2), one Class II landfill (LF-3), a Class II sewage sludge waste pile (WP-9.1), a Class II sewage sludge land treatment unit (LTU), green-waste and food-waste composting areas, ~~and~~ two lined ~~leachate~~compost ponds, and one unlined holding pond, as shown on Attachment A. The landfill ~~covers~~ is located on a 640-acre site, of which 256 acres are permitted for landfill disposal and composting operations.~~, and the entire property~~ The 640-acre site also includes a ~~160 acre~~ borrow pit area ~~in support of the landfilling operations~~ and a ~~224 acre~~ habitat preserve. The Hay Road Landfill is located about eight miles east of Vacaville on Hay Road in Solano County."

Finding #2

No Comment

Finding #3

As a point of clarification, Jepson Prairie Organics (JPO) is a DBA of RHR, so in fact it is RHR that operates that operates the composting facility at the site.

Additionally, this item is not appropriate for a CAO, as the issue could readily be resolved through a simple oral or written request to RHR, without the need for formal enforcement action. RHR will file a Form 200 name change.

Finding #4

This item is not appropriate for a CAO, as the issue could readily be resolved through a simple oral or written request to RHR, without the need for formal enforcement action. JPO, as a DBA of RHR, will file a Notice of Intent under the State Water Resources Control Board's *Statewide Industrial Storm Water General Permit* (SWRCB Water Quality Order No. 97-03-DWQ.

Finding #5

Finding #5 should be revised as follows:

"Recology Hay Road is also enrolled under the Central Valley Water Board's ~~NPDES~~ Limited Threat General WDR Order R5-2013-0073 (NPDES Permit NO. CAG995002) for dewatering of a borrow pit for access to soil during the dry season. Extracted groundwater is discharged through ditches to the A-1 Channel, a surface water drainage. Dewatering is required both to lower the groundwater under the landfill (per WDR R5-2008-0188 paragraph 65) and to allow the Discharger access to excavate soil to use in landfill operations."

Finding #6

As explained in these itemized responses, and in the accompanying correspondence, RHR does not believe that the extensive and far-reaching requirements in the Draft CAO are warranted under the facts and circumstances. Many of issues raised in the Draft CAO are more appropriately raised through the process of revising the Waste Discharge Requirements for the site. In addition, RHR has proposed corrective actions to address nitrate issues and does not believe additional corrective actions are required.

Composting Operations and Leachate

This section title should be revised to "Composting Operations and Compost Leachate".

Finding #7

No Comment

Finding #8

No Comment

Finding #9

The transition from in-vessel composting to the current aerated static pile system at the JPO facility was implemented as an improved methodology to suppress odors and to allow for more controlled moisture conditioning of the feedstock. This transition has proven successful in this regard and has served to reduce the amount of compost leachate that is generated due to increased losses by evaporation. It has been RHR's understanding that the CVRWQCB has been informed of, and has observed, the modifications to the food waste processing methodology during the 2010 annual inspection (April 22, 2010) of the facility by CVRWQCB staff. Our understanding was that documentation of the revised food waste processing methodology and any other compost facility descriptions in the WDRs would be formally updated as part of the next WDRs revision. That process would include the submittal of a Report of Waste Discharge (RoWD) to demonstrate that the new methodology is sufficiently protective of water quality. In light of these circumstances, we do not believe that a CAO is the appropriate mechanism for making the requested updates. Nevertheless, we will submit an RoWD to this issue.

Finding #10

This finding should be deleted because all compost material is stored within the permitted 54-acre compost facility footprint. The facility made a commitment in Golder's March 12, 2014 letter report submitted to the CVRWQCB to remove aged compost stored in the eastern area of the site by August 2014. The removal of this material is currently in progress. As a point of clarification, the removal of this material is being implemented as a proactive measure in the event it has served as a source to groundwater impacts in the eastern site area, not because it has been stored outside the permitted compost facility footprint. Thus, there is no basis for including this issue in the Draft CAO.

Finding #11

The reference to Prohibition A.18 is incorrect. The correct reference is Prohibition A.19.

As explained in the Responses below (#12 & #13), the lined ponds are designed as a self-contained system; there has not be a discharge to surface waters and no such discharge is allowed.

Finding #12

CVRWQCB staff have long been informed that water from the low-flow pond flows into the high-flow pond.

- The CVRWQCB approval letter (dated September 22, 2006) of the high-flow pond design acknowledges that the high-flow pond would contain "storm water runoff that comes in contact with liquids from the food waste Ag-Bag composting operation" and that the high-flow pond would not contain just stormwater.

- Design plans for the low-flow pond upgrades were submitted to the engineering group of the CVRWQCB on September 17, 2010 that included drawings of the pumping and piping system for discharge to the high-flow pond.

- In Golder's January 26, 2011 *Report of Remedial Actions, Compost High-Flow and Low-Flow Ponds*, the following statements are provided ... "Golder Associates Inc. (Golder) is submitting this report summarizing the remedial actions completed for the 5-acre Compost High-Flow Pond and the 0.5-acre Compost Low-Flow Pond at the Recology Hay Road (RHR) Facility. The larger pond serves as the primary storage impoundment for surface water runoff from the composting area. The smaller Low-Flow Pond collects surface water run-off during periods with relatively low discharge to allow more efficient aeration of the stormwater. Water from the Low-Flow Pond is then pumped to the larger High-Flow Pond. During higher precipitation events, surface water is pumped directly to the High-Flow Pond."

It should be noted that compost leachate contained in the low-flow pond is aerobically treated prior to being discharged to the high-flow pond. It also should be noted that the high-flow pond is constructed to a higher specification than the low-flow pond (80-mil HDPE liner vs 60-mil HDPE liner). Finally, it should be noted that the lined pond system is self-contained; there has been no discharge from the high-flow pond (which is designed to handle the average annual rainfall plus a 100-year, 24-hour storm event, per the September 8, 2006 design report prepared by Kleindorfer and approved by CVRWQCB), nor is any such discharge allowed to occur. Pond overflow would only occur in an emergency.

If clarifications are necessary to ensure the pond system is adequately described in the WDR findings, then a revision to the WDRs would address this issue.

Finding #13

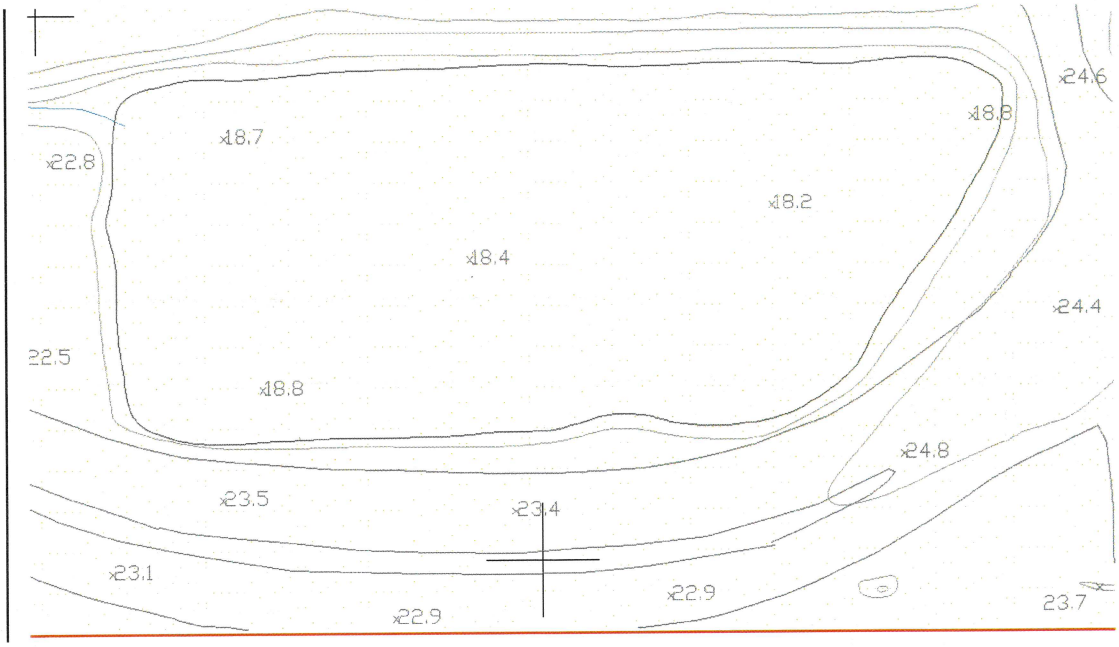
See Response #12. There is no discharge to surface waters from the lined pond system; such a discharge has never occurred and it is not allowed to occur.

Finding #14

As a general comment, we do not agree with the term "green waste pond" used throughout the CAO to describe the unlined western compost area pond. While this pond receives compost leachate and stormwater runoff from the western portion of the compost pad, it also receives stormwater discharge from other areas in the western portion of the site. Thus, the term "western compost area pond" would be more appropriate.

The statement that liquid from the western compost area pond discharges to the A-1 Channel and surface waters does not accurately reflect the entire discharge system. The liquid from the western compost area pond initially flows through bioswales and a sedimentation basin prior to discharge off-site and eventually to the A-1 Channel. As communicated in Golder's March 12, 2014 letter report submitted to the CVRWQCB, the facility has committed to re-routing the water in the western area compost pond to a lined ditch that will discharge to a sump at the southwest corner of the compost facility. The runoff water in the sump will be pumped to the lined low-flow pond during non-storm and low runoff storm events, and to the high-flow pond during high runoff storm events. These improvements are scheduled for completion by the end of September 2014.

The statement that the base elevation of the western compost area pond is "unknown" is not accurate. The base elevation of the western compost area pond was determined as part of a 2008 topographic survey to be 18.2 feet. An excerpt from this survey is provided below.



Finding #15

The stated assumption that the western compost area pond contains high strength waste, similar in content to the high-flow pond, is not accurate. The high-flow pond receives runoff from the active food waste compost while the western compost area pond receives green waste runoff. The difference in the waste characteristics of the runoff is demonstrated by sample analyses performed in February 2014 on water collected from the western compost area pond. A comparison of the two ponds is provided in the table below.

Analyte	Western Compost Area Pond		High-Flow Pond (1)
	February 7, 2014	February 28, 2014	November 2013
Nitrate/Nitrite as N (mg/L)	0.037	1.5	14.66 (2)
TKN (mg/L)	13	22	320
Ammonia as N (mg/L)	0.3	2.5	11

mg/L: Milligrams per Liter
TKN: Total Kjeldahl Nitrogen
(1) Based on data presented in Table 1 of the Draft Cleanup and Abatement Order.
(2) Summation of nitrate and nitrite concentrations.

As shown above, the concentrations of the analytes tested are substantially lower than the concentrations in the high-flow pond as presented in Table 1 of the CAO.

The statement that the western compost area pond has likely caused or contributed to groundwater pollution in the eastern portion of the landfill is also not accurate. In this regard, the western compost area pond was identified as one of the potential sources of nitrate in groundwater as part of the *Well 4BR Nitrate Investigation* prepared by Golder dated July 19, 2013. Furthermore, groundwater flow in the area of the western compost area pond is toward the west, thereby precluding the possibility of it inducing groundwater impacts in the eastern portion of the site.

As outlined in the response to Finding #14, the facility has committed to re-routing the western area runoff to a lined ditch that will discharge to a sump at the southwest corner of the compost facility. The runoff water in the sump will be pumped to the lined low-flow pond during non-storm and low runoff storm events, and to the high-flow pond during high runoff storm events. These improvements are scheduled for completion by the end of September 2014.

Finding #16

As noted in the previous response to Findings #12 and #13, we disagree that the mixing of compost leachate and stormwater is a violation of the WDR since the liquid management process between the low-flow and high-flow ponds has long been understood, observed and acknowledged by CVRWQCB staff and there is no discharge to surface waters. Please refer to the responses to Findings #12 and #13.

In regards to water balance, Kleinfelder completed a water balance for the high-flow pond as part of the design report dated September 8, 2006. The pond size was designed to accommodate a design storm equal to the average annual rainfall at the site (20 inches per year) plus a 100-year, 24-hour storm (4.82 inches). The pond was determined to have a maximum volume of 1,979,897 cubic feet and a maximum surface area of 224,000 square feet. It should be noted that this water balance assumed a total compost area of 22 acres. However, the current compost area, including the western portion of the compost pad, measures only 20.6 acres. Therefore, this water balance is still relevant and the meets the CAO requirements.

A formal water balance has not been performed for the low-flow pond and will therefore be checked for capacity. However, please note that discharge to the low-flow pond is limited by the pumping capacity of the two solids handling pumps that transfer compost leachate from the compost pad to the low-flow pond. In other words, the discharge of compost leachate to the low-flow pond has a maximum discharge rate that is not impacted by the size of the storm events. Provided the discharge from the low-flow

pond to the high-flow pond exceeds the solids handling pumps capacity, the capacity of the low-flow pond cannot be exceeded.

Finding #17

The high-flow pond bottom elevation of 22 feet MSL was established by Kleinfelder as part of the pond design report dated September 8, 2006. This design was approved by the CVRWQCB in a letter dated September 22, 2006. As part of Finding #17, it states that the high-flow pond bottom elevation "is only a few feet" higher than the groundwater elevation reported at wells G-19R and G-26 is not accurate. As shown on the groundwater contour map included as Attachment A of the CAO, the actual separation ranges from 4 to 4.5 feet. While the highest historical groundwater elevation could have been equal to the bottom of the pond (based on historical hydrographs for well G-4/G-4R, G-19R, and G-26), this condition has not occurred since the lined pond was constructed.

Finding #18

The reference to WDR Finding #28 of the WDRs is incorrect. The correct reference is Discharge Specification B.28 of the WDRs. In addition, Finding #18 of the CAO as currently written does not include findings contained in the February 14, 2011 report prepared by Golder entitled *Subgrade Sampling Results, Compost Area Pond*. The report concluded that the potential impact related to the pond liner leaks were minor. Thus, the following language should be added to the end of Finding #18 to reflect these findings:

"The subgrade soils were sampled prior to the pond liner repairs (*Subgrade Sampling Results, Compost Area Pond report dated February 14, 2011*) and the results showed that the water in the high-flow pond was sufficiently dilute, such that high concentrations of inorganic parameters had not accumulated in the underlying soil subgrade. The subgrade below the high-flow pond was not impacted by excessive concentrations of compost pond water parameters to warrant additional corrective actions."

Finding #19

RHR will conduct this survey in 2015. Enforcement action through a CAO is not necessary to address this issue.

Finding #20

As previously stated above: (1) it is acknowledged that the high-flow pond contains runoff from the active compost facility that is comprised of both stormwater and compost leachate; and (2) the high-flow pond is not allowed to overflow to surface waters. The

overflow pipe, which is presented in Kleinfelder's September 9, 2006 design report that was approved by the CVRWQCB (letter dated September 22, 2006), is for emergency situations only. Liquid has not discharged from the pond since it was constructed in 2006.

In addition, the following corrections should be made to Table 1:

- Incorrect units are used for the lead result. The result was 150 µg/L as opposed to 150 mg/L as reported in Table 1. Thus, the result should be changed to 0.150 mg/L.

- The "Nitrate" designation should be changed to "Nitrate/Nitrite as N".

Finding #21

No Comment

Finding #22

The statement that Golder reported that 10 million gallons of "leachate" was removed from the ponds is not accurate. The Golder report actually stated that "Draining the pond required removal of approximately 10 million gallons of liquids through evaporation and dust control..."

Finding #23

The reference to WDR Discharge Specification D.13 is incorrect. The correct reference is Discharge Specification B.13. Furthermore, compost pond water is not landfill leachate (as described in Discharge Specification B.13) and should therefore not be considered to be associated with this Discharge Specification.

Additionally, RHR informed the CVRWQCB that it was using compost pond water for dust control over lined portions of the landfill in Golder's *Liner Repair Plan* dated September 16, 2010. It was again discussed in Golder's *Report of Remedial Actions High-Flow and Low-Flow Ponds* report dated January 26, 2011 that described the liner inspection and repairs that were completed. The use of this water for dust control over lined waste modules is protective of water quality as the modules are designed to collect and remove liquids that percolate through the refuse. With that being said, since the application of dust control water is performed in a manner as to not generate appreciable runoff and is applied to dry materials that are generating dust, most of the water that is applied is typically absorbed by the materials, resulting in minimal infiltration into the refuse.

Finding #24

The reference to WDR Discharge Specification D.13 is incorrect. The correct reference is Discharge Specification B.13.

It is recommended that an updated description of the compost facility's liquid management process be prepared as part of a WDR revision.

Nitrate-Related Compounds Released to Groundwater

Finding #25

The CVRWQCB acknowledges that nitrate is difficult to remove from water and includes a statement that "evidence suggests that once nitrate enters groundwater it can remain there for decades." Many of the nitrate remediation requirements and expectations included in this CAO are contrary to this acknowledgment.

Finding #26

No comment

Finding #27

No comment

Finding #28

The statistical methodology employed at the landfill was developed to account for the presence of two general groundwater types (low total dissolved solids [TDS] and high TDS) at the site related to the presence of older and younger alluvium at the ground surface, and to compensate for the groundwater dewatering operations that reversed the groundwater flow direction in the western half of the site, effectively pulling higher TDS groundwater from the eastern part of the site over to the western part of the site (Einarson Geoscience, Inc., November 29, 1995, *Spatial Variability of Inorganic Constituents in Groundwater*). These conditions prompted the employment of intra-well and inter-well statistics for the western and eastern portions of the site, respectively. Furthermore, because of the spatial variability, the groundwater monitoring program was designed to use a few indicator parameters that would be indicative of landfill leachate, but not susceptible to the spatial variability at the site. Title 27 allows for this type of flexibility when site hydrogeology and water quality characteristics dictate such measures. This statistical methodology has been acknowledged by the CVRWQCB as

being appropriate based on the approval of WDRs/MRPs at the site that include this approach.

In regards to specific statements in Finding #28, we do not agree that there is a lack of consistency in the groundwater monitoring network due to the repositioning of monitoring wells in response to waste cell expansions. In general, replacement monitoring wells must be positioned further away than the original monitoring well, otherwise the new monitoring well would be covered by the new waste cell. There is no getting around this constraint. In regards to replacement monitoring well construction characteristics, the new monitoring wells are constructed based on the conditions encountered when drilling at the new location. Constructing a monitoring well exactly the same as a monitoring well located hundreds of feet away does not conform to standard hydrogeologic practice. Furthermore, monitoring programs as a whole are dynamic in nature, not static. Groundwater flow conditions may change with time, monitoring wells may be destroyed and new monitoring wells added, as appropriate. Because of these variables, concentration limits are updated annually to compensate accordingly. In our opinion, the groundwater monitoring network is fully functional for the intended purpose and conforms to Title 27 requirements.

Finding #29

In accordance with the existing MRP, groundwater monitoring is conducted on a quarterly, semi-annual and annual basis, depending upon the location (eastern and western portion of site) and function (i.e., detection or corrective action monitoring) of the monitoring wells. Finding #29 should be revised to accurately reflect the MRP.

Finding #30

No Comment

Finding #31

For clarity, use of the term "leachate" for describing compost contact water should be changed to "compost leachate" to distinguish it from landfill leachate.

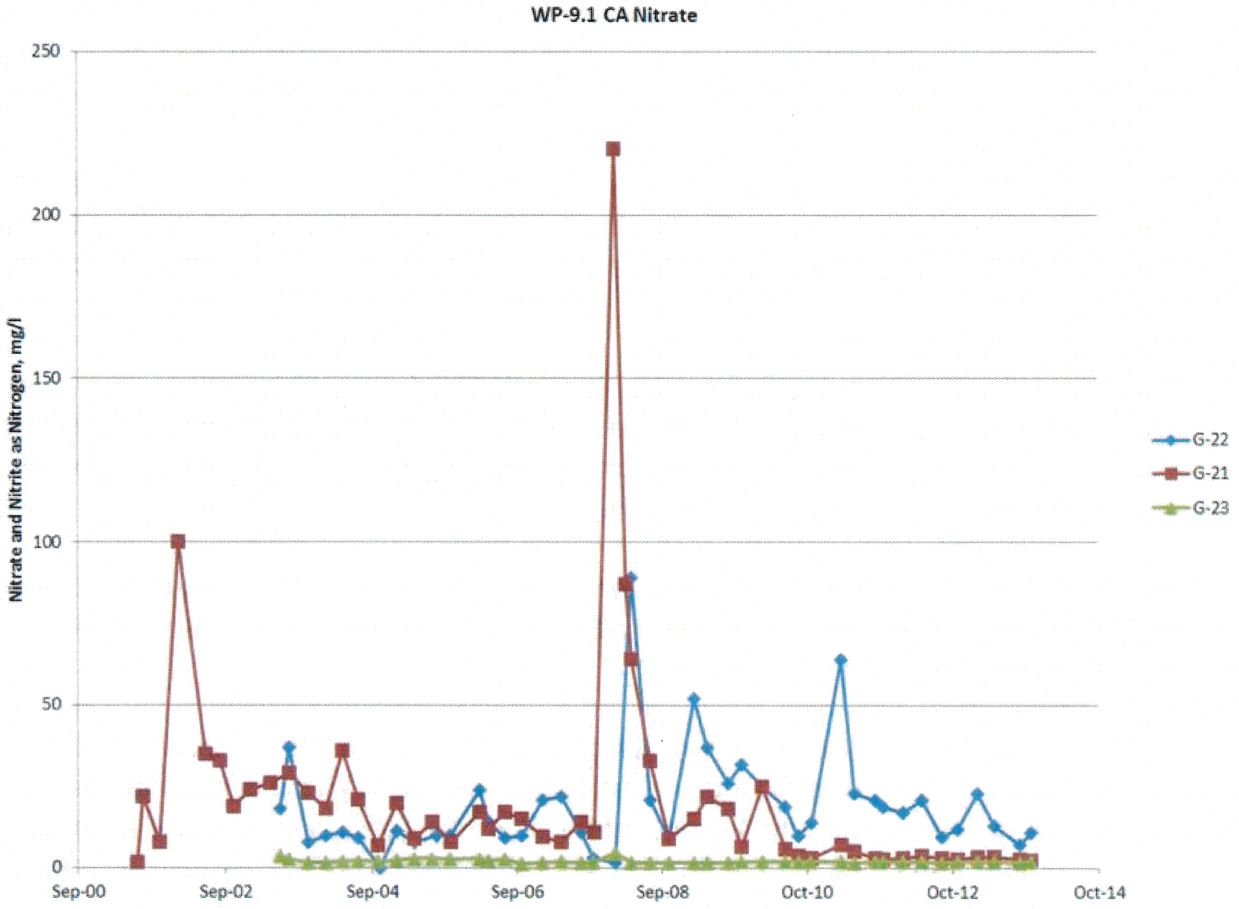
Reference Footnote #8 that states that "the storage of finished product in this area and the collection of leachate in the high-flow pond are both violations of the WDRs" is incorrect. WDR Finding #88 states that "an additional 32 acres is used to store finished compost product." As previously stated in the response to CAO Finding #10, all finished product has been stored within the permitted 54-acre boundary. In regards to the high-flow pond contents, the 2006 pond design approval recognizes that the high-flow pond will contain runoff from the active composting area which is understood to contain both compost leachate and stormwater. Finally, modifications to the low-flow pond were

submitted to the CVRWQCB on September 17, 2010. These drawings included a pump and piping system to pump aerated liquid from the low-flow pond to the high-flow pond. In light of these circumstances, we do not agree with the alleged violations and request that Reference Footnote #8 be deleted in its entirety.

Finding #32

The stated extraction rate of 0.6 gallons per minute (gpm) is not accurate. An extraction rate of 1.7 gpm was presented in Golder's Second Semi-annual and Annual 2013 Monitoring Report dated January 30, 2014. The overall extraction rate based on 7,000,000 gallons total extracted since 2004 equates to approximately 1.5 gpm.

The final sentence of this finding states that the nitrate plume has not been remediated. While treatment efforts are ongoing, this statement does not accurately reflect the progress that has been made by the corrective action program (CAP) in the area of WP-9.1. As shown on the graph below, groundwater extraction at G-22 has effectively reduced nitrate concentrations in corrective action well G-21 to below the concentration limit. The Fourth Quarter 2013 nitrate concentration in G-22 was 11 mg/L, which is just above the concentration limit and significantly less than the elevated concentration observed in 2011. Finally, deeper monitoring well G-23, which is located adjacent to G-21 and G-22, continues to show no evidence of impacts at depth. This data clearly demonstrates that the corrective action efforts in this area are effectively addressing the nitrate issue. As such, we do not agree that additional correct actions, other than what is currently being implemented, are necessary.



Finding #33

As a point of clarification, the information contained in Table 2 includes some monitoring wells that no longer exist.

As for the content of this finding, The CVRWQCB portrays the eastern area nitrate impacted groundwater as a single nitrate plume with a single source, WP-9.1. However, multiple investigations and reports have documented that there is not a single plume, but rather distinct, localized areas of nitrate impacts that are not necessarily connected to one another. In addition, the CVRWQCB portrays that corrective actions have been ineffective. To the contrary, several corrective actions and source control measures have resulted in reduced concentrations of nitrate in groundwater. The following summarizes the nitrate areas identified in Table 2 of the draft CAO:

- Nitrate in well G-18 has been reduced from 12 mg/L to 5.5 mg/L, just above the concentration limit through improving runoff controls from the former LTU area and former dried sludge stockpile. The LTU was clean closed and the stockpile removed. Removal of the source has resulted in the nitrate reduction to near the concentration limit.

- Well G-4R concentrations have an overall downward trend likely resulting from drainage improvements near the northeast corner of the compost area.

- Well G-19 had been damaged and the well seal apparently was damaged, resulting in elevated nitrate. The well was properly destroyed and replaced with well G-19R, which has had nitrate below the concentration limit since its installation.

- Since groundwater extraction started in the WP-9.1 corrective action area, well G-21 has shown a decrease in nitrate from 220 mg/l to 2.5 mg/L, which is below the concentration limit. The extraction well (G-22) has also decreased in nitrate concentration from 89 mg/L to 11 mg/L.

- Wells G-24, G-14, and G-31 have been destroyed to allow for landfill construction and are now covered by disposal modules DM-6 and DM-4.3. Pertinent details regarding these wells are as follows:

  - Following well destruction, as part of the nitrate extent investigation, a grab groundwater sample was located adjacent to the former location of well G-14. The nitrate concentration at this boring location (B-1) was 3.6 mg/L, much lower than the last result from well G-14, potentially indicating that the nitrate in well G-14 was of limited extent or a result of surface water infiltration along the well casing.

  - The nitrate in well G-24, which was located downgradient from the G-21 corrective action area, was likely the result of downgradient groundwater migration from the extraction well area that was not initially captured by G-21. A grab groundwater sample (B-2) located between the former locations of well G-24 and G-14 had a low nitrate concentration, 3.5 mg/L, indicating that the nitrate identified at former well G-24 did not extend to the well former G-14 area.

  - The nitrate at the former well G-31 location had low nitrate concentrations in borings to the north and south, showing the elevated nitrate in this area was of limited extent, but may have been from the area to the west where a similar nitrate concentration was found adjacent to the finished compost storage area.

Further details regarding the various nitrate areas in the eastern portion of the site are provided in the responses to Findings #32 and #34 through #39.

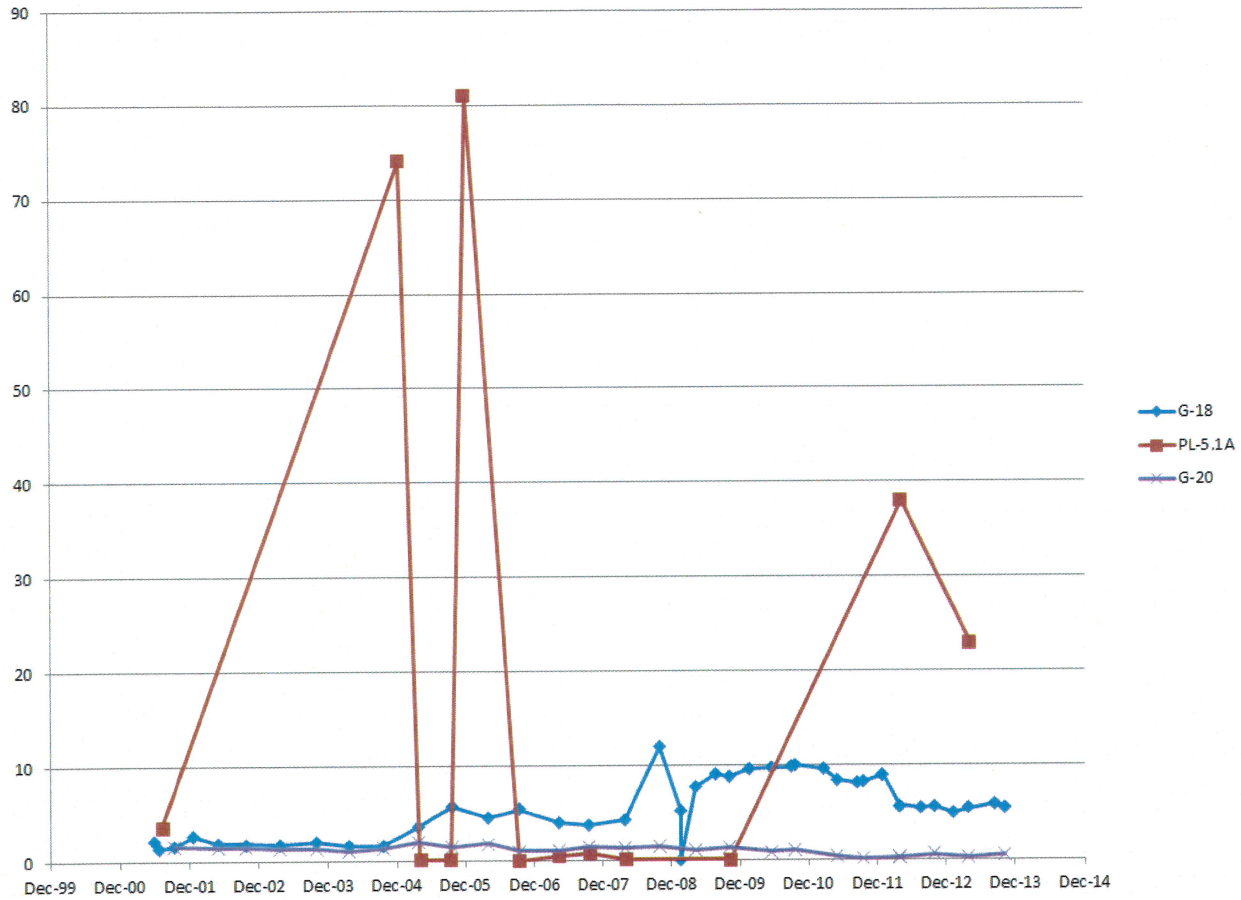
Finding #34

The reference to the initial nitrate concentration detected in background monitoring well G-18 of <0.06 mg/L on 6 June 2001 is incorrect. The initial sample from G-18 was collected on 27 June 2001 and revealed a nitrate concentration of 2.2 mg/L. In regards to the statement that inclusion of analytical data beyond 2004 is not appropriate, we disagree with this statement on the basis that there was not a statistically significant upward trend in G-18 until the second half of 2006 and the slightly higher nitrate concentrations in G-18 were similar in range to those in another upgradient background monitoring well (G-17), which had been as high as 3.7 mg/L in the same time period. Thus, using the 2006 concentration limit was statistically valid, rather than going back to 2004. Based on the valid nature of this statistical approach, Finding #34 should be deleted.

Finding #35

As reported to the CVRWQCB in 2009 (Golder, October 12, 2009, *Amendment to Report of Waste Discharge and Establishment of Evaluation Monitoring Program for Nitrate Detections in Monitoring Wells G-4R and G-18),* the increase in nitrate in G-18 was the result of nitrate-impacted runoff from the LTU area and the former dried sludge stockpile. As outlined in the aforementioned report, runoff water from the LTU was sampled during the rainy season. Samples were obtained from: (1) the drainage ditch that flows north from the LTU and discharges into the landfill's perimeter drainage ditch that flows past well G-18; and (2) the drainage that flows south from the LTU and ponds near former monitoring well G-14. The nitrate concentrations were 120 mg/L in the north-flowing drainage and 93 mg/L in the south-flowing drainage, thereby indicating that the source of nitrate in groundwater from wells G-14 and G-18 may have been runoff water from the LTU. The report further suggested that the nitrate in the runoff water may have been from residual dried sludge that remained on the surface of the LTU following the sludge drying season. In response to these findings, corrective action measures were subsequently implemented in 2011 that entailed clean closing of the LTU area and the dried sludge stockpile area in question that drained toward G-18 (waste module DM-6 has since been constructed within this footprint). Since removal of the nitrate source and implementation of the corrective action measures, nitrate concentrations in G-18 have been effectively reduced as exhibited by the 5.5 mg/L concentration detected in 2013, which is only 0.5 mg/L over the concentration limit. As illustrated in the graph provided at the end of this response, the nitrate concentration in G-18 continues to exhibit a decreasing trend as it approaches the 5 mg/L concentration limit, thereby demonstrating that the previous corrective action provisions have been effective in reducing nitrate concentrations over time. Based on this ongoing downward trend, we do not agree that additional assessment or correct actions in this area are necessary.

Reference Footnote #9 included as part of Finding #35 should also be deleted as the correlation is not supported by the data or hydrogeological characteristics. Reference is made to the soil admixing operations which occur at waste module DM-5.1. However, these operations didn't commence until 2009, well after the time that the peak nitrate concentration occurred in background monitoring well G-18 (October 2008). Furthermore, it is unlikely that water in the pan lysimeter (PL-5.1A) for DM-5.1 affects G-18, which is 700 feet upgradient of PL-5.1A. Finally, monitoring well G-20, the closest downgradient monitoring well from PL-5.1A has nitrate of <1 mg/L. The correlation of nitrate in PL-5.1A and G-18 is not evidenced by the inserted graph.



Based on the information outlined above, this finding should be deleted in its entirety.

Finding #36

No Comment

Finding #37

The identification of selected grab groundwater sample locations in Table 3 as being downgradient of groundwater extraction well G-22 is incorrect. Groundwater flow is toward the east-southeast, not south-southeast toward B-3. Note that in the Fourth Quarter 2013, monitoring well G-26 (adjacent to B-3) had a higher groundwater elevation than monitoring wells G-21 and G-22. Two soil borings that are closer to and more directly downgradient from G-22 are B-2 and B-1, which had nitrate concentrations below the concentration limit.

As noted above and explained further in Response #38, there is not a single nitrate plume in the eastern area, but distinct localized areas of nitrate impacts, which makes Table 3 misleading. It would be more appropriate to state what was presented in Golder's *Monitoring Well G-31 Nitrate Investigation Report* dated May 22, 2013; i.e., "There are several potential nitrate sources for this area of elevated nitrate concentrations, including: (1) leakage from WP-9.1 (occurred prior to 2000 and resulted in corrective actions including groundwater extraction at well G-22); (2) the western LTU area; (3) the compost area pond (pond liner leakage in 2010 and repaired in 2011); (4) the finished compost storage area located west of future DM-4.3 and south of the western LTU and compost area pond; and (5) the former Alamo Creek A-1 channel."

Finding #38

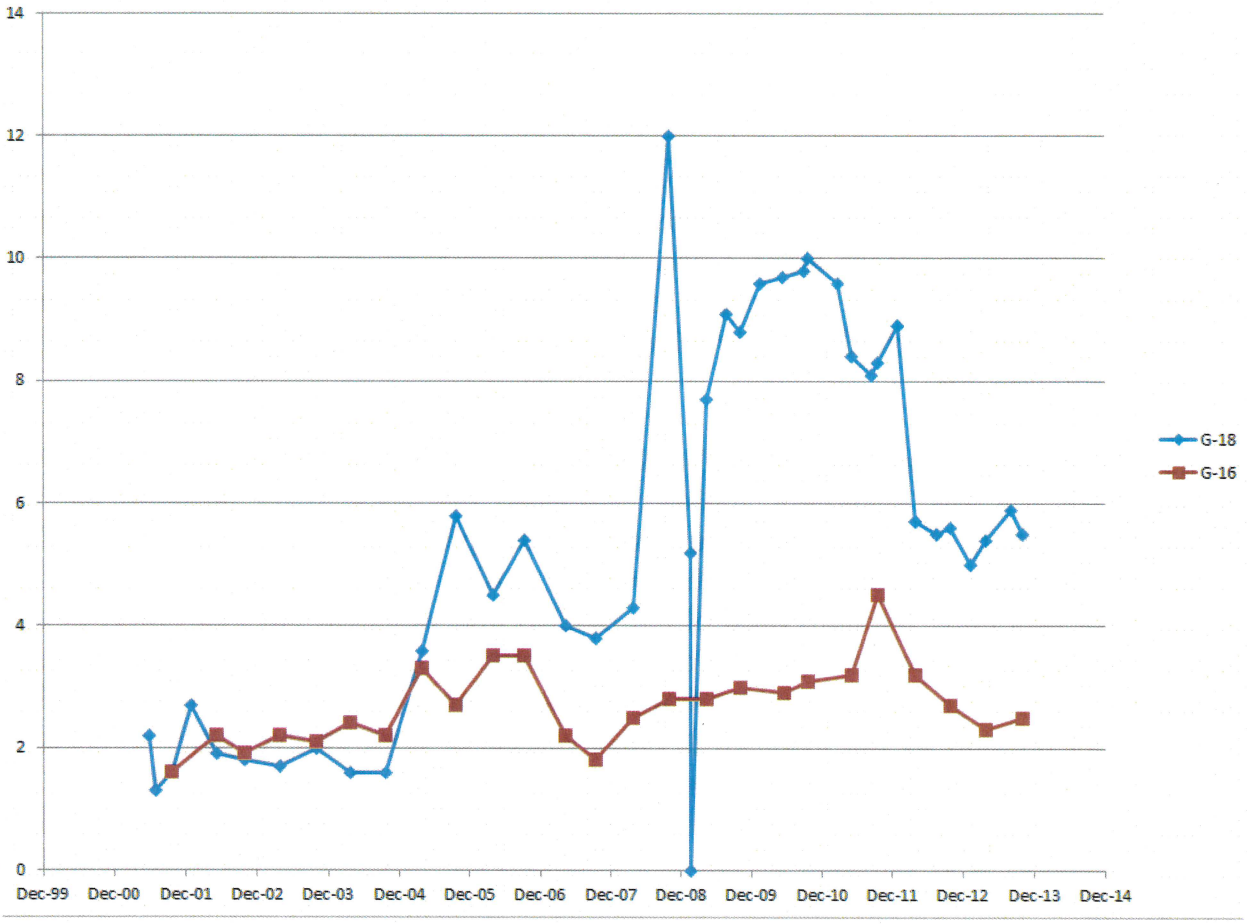
From an overall perspective, it is important to emphasize that the nitrate conditions at the site are comprised of distinct localized areas associated with different sources and do not represent a single nitrate plume as stated in this finding. As presented in Golder's March 12, 2014 letter report submitted to the CVRWQCB, there are currently three nitrate-impacted groundwater areas at the site; (1) Waste Pile 9.1 corrective action area; (2) western site area encompassing well 4BR, and (3) eastern site area adjacent to DM-6.2 and DM-4.3. These are three separate plumes and should not be collectively grouped because such an interpretation implies a much larger area of impact than is actually present. It should also be emphasized that each of the individual plumes is restricted to the interior of the site and have not impacted downgradient perimeter monitoring wells.

In regards to specific statements outlined in this finding, in the case of G-22, this extraction well was installed to address the release from WP-9.1, and as previously discussed in our response to Finding #32, has shown progress in reducing nitrate concentrations to levels near the concentration limit. Nitrate in the area of monitoring well G-4R, in turn, was related to a different source, overflow from the ditch at the compost area, which has been corrected. Similarly, nitrate in the area of monitoring wells G-14 and G-31 was associated with the dried sludge stockpile, which has been removed. As such, the statement referring to a single nitrate plume is not

representative of site conditions or consistent with what has been previously reported to the CVRWQCB.

As for the previously submitted nitrate iso-concentration maps, please be advised that the nitrate contours are constrained by groundwater concentrations below the concentration limit of 5 mg/L. As such, only nitrate contours of 5 mg/L or greater were shown for illustration purposes. Under Reference Footnote #12, it is stated that that the map does not include the concentrations for monitoring wells G-14, G-4R, G-16, and G-18. However, this statement is not entirely accurate. Monitoring well G-4R is shown on the map and its nitrate concentration data used accordingly. While G-16 and G-18 were not shown (just off the map to the east and north, respectively), nitrate concentration data from these monitoring wells were used in development of the map. Finally, nitrate concentration data from G-14 was included in the May 2013 report, but because a newer adjacent grab groundwater sample had been collected and exhibited a much lower nitrate concentration, the grab groundwater sample data was used instead to provide a more current "snapshot" of the conditions in this area at that time. Thus, it is our opinion that all relevant nitrate concentration data was used to develop a nitrate iso-concentration map that accurately represents the nature and extent of the nitrate impacts.

Finally, the last sentence of Reference Footnote #12 states that G-18 and G-16 exhibit an increasing trend of nitrate over time. However, this statement is not supported by the data presented in the graph below. As shown, the nitrate concentration in G-16 at the time of the most recent sampling event was 2.5 mg/L. As for G-18, the recent trend is downward as exhibited by a 8.9 mg/L concentration in 2012 versus a concentration of 5.5 mg/L in 2013.



Finding #39

In 2011, the CVRWQCB rejected the proposal to install a wood-chip permeable reactive trench.

In April 2014, a revised CAP (Golder, *Revised Corrective Action Program for Nitrate Detections in Monitoring Wells G-31 and 4BR*) was submitted to the CVRWQCB to address the nitrate impacts in proximity of the former location of G-14. The Discharger is currently responding to comments to the revised CAP as issued by the CVRWQCB in their letter dated May 22, 2014. Thus, provisions are being made to address the nitrate issue at this location. With that being said, it should be acknowledged that the prior corrective actions as described in the above CAO excerpt (i.e., removal of the dried sludge stockpile and clean closure of the eastern portion of the LTU) were beneficial in reducing portions of the nitrate impacts in this area based on the results of subsequent groundwater grab sampling that revealed a nitrate concentration of 3.6 mg/L in a boreole (B-1) drilled near G-14 (Golder's *Amended Report of Waste Discharge to Establish Corrective Action Program for Nitrate Detections in Monitoring Wells G-31 and 4BR* dated December 6, 2013). The proposed corrective actions, once approved by the CVRWQCB, will serve to expand on these previous efforts.

Finding #40

The final sentence of this finding states that the CAO implements and expands upon the Discharger's 12 March 2014 proposal to inject a carbon source as a means of promoting nitrate reduction in groundwater. However, the CVRWQCB has subsequently issued a rejection/comment letter dated May 22, 2014 for this proposed corrective action. As outlined in the response to Finding #39, the Discharger is currently responding to the CVRWQCB's letter with the intent of obtaining regulatory approval to proceed with the CAP.

As noted above, it is stated by the CVRWQCB that the CAO serves to "expand" on the revised CAP. If this statement implies increasing the area to be targeted by the proposed injection process, then we strongly disagree with this approach. The proposed coverage as outlined in the revised CAP, which includes the areas in proximity of well G-31 (eastern area of the landfill) and well 4BR (western area of the landfill), targets the areas of highest nitrate concentrations within each plume along the longitudinal direction of groundwater flow. Subsequent propagation of the anaerobic environment created by the injection process will serve towards eventually degrading the peripheral portions of the respective plumes. This approach is considered reasonable, both in terms of its technical feasibility and the costs. To expand the injection process to encompass all portions of the plume that exceed the target cleanup level (5 mg/L) would be unnecessary and excessive, particularly in light of the fact that neither plume extends beyond the landfill property boundary. Based on these circumstances, it is our position that the scope of revised CAP that has been proposed is appropriate.

Finding #41

As communicated in Golder's March 12, 2014 letter report, the facility plans to route the western compost area runoff to a lined ditch that will discharge to a sump at the southwest corner of the compost facility. The runoff water in the sump will be pumped to the lined low-flow pond during non-storm and low runoff storm events, and to the high-flow pond during high runoff storm events. The planned improvements are scheduled for completion by the end of September 2014.

Finding #42

The statement that groundwater pumping from the dewatering trench was suspended because it was proven that the impact of the slurry wall was negligible is not accurate. Pumping from the dewatering trench continued until the borrow pit dewatering dried the groundwater trench. The suspended use of the dewatering trench had nothing to do with the slurry wall.

The statement that groundwater gradient changes resulting from the groundwater extraction operations only occurs during the summer is not accurate. The groundwater gradient conditions persist throughout the year.

Finding #43

As previously discussed in the response to Finding #28, the intra-well statistical methodology employed for the western portion of the site has been dictated by the influx of higher TDS groundwater from the east due to the historical and ongoing groundwater extraction operations. This approach, which is permitted under Title 27, has been determined to represent the most appropriate course of action under the site-specific conditions, to reduce false-positive results caused by the TDS influx, and has been acceptable to the CVRWQCB based on their incorporation of the statistical methodologies into the existing WDR/MRP. The blanket statements included in Finding #44 are speculative and are not supported by the data or previous report submittals. It is our opinion that the current statistical approach remains a viable and representative approach and that the CVRWQCB's contention that the statistical approach needs to be re-evaluated is unfounded. Furthermore, any revision to the Board-approved MRP methods should be addressed as part of a WDR/MRP revision, not a CAO.

In regards to specific statements presented in this finding, we have multiple points of contention. These points of contention, as well as an acknowledgement of needing to update the concentration limit for monitoring well G-6, are as follows:

- Opening Paragraph: The statement that the use of intra-well statistical methods at this site is in conflict with US EPA guidance is not accurate. US EPA guidance clearly states that "spatial variability...often precludes the pooling of data across multiple background wells or the proper upgradient-to-downgradient comparison of background wells against distinct compliance wells. Instead, the usual approach is to perform intra-well comparisons, where well-specific background data is culled from the early sampling history at each well."

- First Bullet Item: This bullet item questions how the nitrate concentration limits for monitoring wells G-1 and G-11M could change so significantly in 2012 and 2013 over the course of a single sampling event. In response to this question, the CVRWQCB requested an evaluation of the concentration limits in G-1 and G-11M by letter dated June 1, 2012 and in a meeting on September 19, 2012. The evaluation was submitted to the CVRWQCB by letter dated November 30, 2012 where the lower concentration limits were presented. The lower limits have been used since this transition occurred. Note that for at least the past 5 years of monitoring, the nitrate concentrations in both G-1 and G-11M have been lower

than these new concentration limits. Based on this circumstance, this bullet item should be deleted.

- Second Bullet Item: The statement is made that it appears that that a nitrate plume has passed through the area of Well 4B based on changes in concentrations over the period of 1990 through May 2012. Well 4B is within the defined nitrate impacted western area. This statement is speculative and should therefore be deleted. The proposed CAP addresses the nitrate issue in this area of the site.

- Third Bullet Item: The reason for the higher nitrate characteristics in replacement monitoring well 4BR can be attributed to its closer proximity to the core of the higher nitrate concentrations defined by grab groundwater sampling investigation. Furthermore, the location of 4BR was approved by the CVRWQCB in their workplan approval letter dated March 23, 2012.

- Fourth and Fifth Bullet Items: Consistent with the above response to the first bullet item, these bullet items should be deleted for the same stated reason.

- Sixth Bullet Item: The statistical program determined a non-parametric tolerance limit for G-6 using the highest historical value. Review of the historical data indicates that the 8 mg/L value is an outlier and should have been removed from the analysis. As a result, the concentration limit will be revised in the next monitoring report due July 31, 2014. Note that calculating a new concentration limit without the outlier would likely not have affected the historical determinations of potential groundwater impact from the landfill.

Overall, it is our opinion that Finding #43 is more appropriate as a comment on the landfill's monitoring program, not as part of a CAO. The current statistical evaluations that have been historically performed for the site have been approved by the CVRWQCB through the adoption of the existing MRP. Thus, if the CVRWQCB wants to modify the statistical evaluations for the site, then such provisions should be implemented as part of a WDR/MRP revision.

Finding #44

Please refer to the previous responses to Findings #28 and #43 for detailed discussions regarding the basis and rationale for the statistical methodologies employed at the site. As concluded in those responses, the current statistical methodologies are considered to represent the most appropriate approach under the site-specific conditions and are compliant with Title 27.

Finding #45

No Comment

Finding #46

The statement that the eight temporary borings presented in CAO Table 4 are all downgradient from DM-11 and DM-2.1 is not accurate. Based on information contained in Golder's Amended Report of Waste Discharge to Establish Corrective Action Program for Nitrate Detections in Monitoring Wells G-31 dated December 6, 2013, coupled with the southwesterly to westerly groundwater flow direction beneath DM-11 and DM-2.1, none of the eight borings are located downgradient of DM-11 or DM-2.1.

In regards to the Reference Footnote (#17) included in this finding, we disagree with the statement that the intra-well concentration limits calculated for the western portion of the facility are inappropriate.

Finding #47

There are multiple points of contention with respect to the information presented in this finding. These points of contention are as follows:

- The statement that over 8,000 gallons of liquids were pumped from a single pan lysimeter in DM-11 is not accurate. The stated volume represents a combined volume pumped from PL-11.1 and PL-11.2 that occurred over a 3-month period.

- Quoting strictly the highest nitrate concentration of 113 mg/L is misleading. Subsequent testing conducted in June 2011 following removal of the aforementioned 8,000 gallons was <1 mg/L.

- We do not agree that the data support the statement that nitrate concentration data from borings TW-4, TW-5, TW-9, and TW-20 appear to be indicative of a plume from DM-11. Other alternative sources have been identified in the area that could be responsible for the nitrate conditions in groundwater.

- Contrary to what is stated in this finding, the lateral extent of the nitrate impacts in this area has been defined as outlined in the July 19, 2013 report prepared by Golder. There are two locations where the vertical extent needs confirmation. Additional sampling was proposed in the April revised CAP.

- CVRWQCB staff have copies of the design plans and therefore has the means of determining the approximate pan lysimeter volume. Based on the dimensions shown on the design plans, the pan lysimeter volume is approximately 1,250

cubic feet. Assuming a 30 percent porosity, the corresponding volume of the pan lysimeter equates to approximately 2,800 gallons. The largest volume removed at any one time was 2,500 gallons on March 23, 2011 from PL-11.2 when the water level was measured at 3 feet.

- Overflowing from the pan lysimeter into the vadose zone assumes that the water was not already in the vadose zone from the stormwater infiltration.

As communicated in Golder's March 12, 2014 letter report submitted to the CVRWQCB and as previously discussed in the response to Fining #14, the facility has committed to re-routing the western area runoff to a lined ditch that will discharge to a sump at the southwest corner of the compost facility. The runoff water in the sump will be pumped to the lined low-flow pond during non-storm and low runoff storm events, and to the high-flow pond during high runoff storm events. These improvements are scheduled for completion by the end of September 2014. In addition, the revised CAP dated April 3, 2014 (Golder, *Revised Corrective Action Program for Nitrate Detections in Monitoring Wells G-31 and 4BR*) targets the elevated nitrate area in question under this finding.

Finding #48

The reference to December 2012 should be changed to December 2013.

Pan Lysimeter Liquids

This section title should be revised to "LCRS Sump and Pan Lysimeter Liquids".

Finding #49

The discussion in this finding fails to mention surface water runoff as a third potential source for the liquid detected in the pan lysimeter. Surface water runoff as a potential source has been demonstrated and supporting data in this regard has been presented in numerous previous reports submitted to the CVRWQCB and should not be omitted. Therefore, Finding #49 should be revised to acknowledge that liquids in a pan lysimeter could be the result of surface water runoff during large rainfall events.

Finding #50

The "Required Separation" subheading in Table 5 should be revised to "Required Separation Between LCRS Sumps and Groundwater".

The following revision should be made to Reference Footnote #18: "Per WDR Finding 65."

Finding #51

The low separation beneath DM-1 in March and May, 2011 was during a time when the site was not allowed to discharge extracted borrow pit water on a regular basis – the Limited Threat Discharge Permit was obtained in May 2011. Groundwater modeling performed in 1996 (Einarson, Fowler & Watson July 17, 1996, *Proposed Method to Achieve Five Feet of Separation Between Waste and Groundwater for Disposal Module 1, B & J Drop Box Sanitary Landfill*) presented a groundwater flow model predicting that 5-foot separation could be achieved following 10 years of borrow pit dewatering. However, borrow pit dewatering has been intermittent due to discharge permitting issues and the predicted drawdown was not reached until more consistent dewatering occurred after obtaining the Limited Threat Discharge Permit. These details should be provided as a footnote to Table 6 to provide a fair representation of the events that led to the temporary encroachment of the 5-foot separation specification.

It should be noted that the lowest portion of DM-1 is along the western edge of the module, which has an HDPE liner and is underlain by the groundwater drain. Any groundwater that approached the base of DM-1 would have been removed via the groundwater drain. It should be further noted that since dewatering has been performed on a consistent basis, the separation reported has been between 6 and 7 feet.

Finding #52

The methodology used to determine groundwater separation at the site includes initially measuring depth to groundwater to the nearest 0.01 foot from each of the groundwater monitoring network wells. The depth to groundwater measurements, which are referenced to the top of casing, are converted to elevations. The collective groundwater elevation data is then modeled using a groundwater computer software program (Surfer) to generate a contour map. The software program statistically interpolates between elevation data points to estimate points of equal elevation (i.e., equipotential lines or "contours"). In the case of groundwater elevations beneath the waste modules, the software program utilizes elevation data from wells closest to the respective waste modules to interpolate elevations between these points. The resulting contours that extend beneath the waste modules, coupled with data from the nearest monitoring well, are then compared to the LCRS sump elevations to determine groundwater separation. This methodology is consistent with standard hydrogeologic practices for analyzing groundwater elevation data.

In regards to specific statements including in this finding, we have identified multiple points of contention. These points of contention are as follows:

- We disagree with the statement that previously submitted monitoring reports do not clearly show whether the groundwater separation specification is satisfied. A

table has been provided in each report that clearly presents the separation. An example of this table is provided at the end of this response.

- In regards to precision, stating an accuracy of more than 0.5 foot would be implying too much accuracy. Historically, the practice has been to either round up or round down from 0.5, such that >2.5 feet would be rounded up to 3 feet, whereas <2.5 would be rounded down to 2 feet. In the case of Table 6 as presented in CAO Finding #51, reporting to 0.1 foot would not change the interpretations. Thus, the current practice employed at the site is considered satisfactory.

- As described in the opening paragraph of this response, the methodology used to determine groundwater separation is consistent with standard hydrogeologic practices. As such, we disagree with the general statement that questions the interpolation of groundwater elevation data from site-wide gradient maps The selected data used in the analysis are conservative, including use of the closest monitoring well to each sump. Where necessary, groundwater elevations are rounded upwards in the preparation of groundwater contour maps as a conservative measure.

- The slurry wall has been shown to be an ineffective barrier to groundwater flow. Differences in groundwater elevation between adjacent monitoring wells inside and outside the slurry wall appear to be more likely related to the groundwater gradient than influences imparted by the slurry wall.

- While groundwater elevations in the area of the LTU are monitored using nearby monitoring wells, the amount of groundwater separation has not been historically reported. Future reports will include this information.

- In regards to LCRS sump and pan lysimeter elevations, this information was provided in the as-built certification reports submitted to the CVRWQCB following construction of the respective waste modules, which the CVRWQCB subsequently approved. If desired, these elevations can be referenced in future report submittals.

In summary, standard hydrogeologic interpretations are made to determine the groundwater elevations to allow for a calculation of the separation. In our opinion, the report table (see example below) clearly defines what the separation is and in many cases, the estimation errors would have to be off by more than 2 to 10 feet for the separation to approach the minimum groundwater separation requirement. Based on these circumstances and the information provided above, it is our position that the procedures currently employed at the site to determine groundwater separation are satisfactory for the intended purpose.

Separation of Groundwater From Lowest Point of Landfill Modules
Third and Fourth Quarters 2013
Recology Hay Road

Module	Sump Elevation (ft amsl)	September 2013		October 2013		WDR Required Separation
		Groundwater Elevation (ft amsl)	Approximate Separation (ft)	Groundwater Elevation (ft amsl)	Approximate Separation (ft)	
1	7	-1	8	1	6	5
2.1	24	10	14	10	14	3
2.2A	26	-4	30	-4	30	2.5
2.2B	26	8	18	8	18	2.5
3.1	22	14	8	13	9	2.5
3.2	20	9	11	9	11	2.5
3.3	21	9	12	9	12	2.5
4.1	20	14	6	15	5	2.5
5.1A	24	15	9	15	9	2.5
5.1B	24	15	9	15	9	2.5
5.2	22	17	5	17	5	2.5
6	23	18	5	17	6	2.5
9.1A	25	18	7	18	7	2.5
9.1B	25	18	7	18	7	2.5
11.1	25	13	12	12	13	2.5
11.2	25	14	11	14	11	2.5

Notes:
Sump and groundwater elevations rounded to nearest foot.
ft amsl = feet above mean sea level
Groundwater elevations from Figures 2 and 3 of this report.
Groundwater elevations are piezometric heads, so actual separation may be greater.
Information required per section D.1. of MRP R5-2003-0118.

Finding #53

The following bullet items provide a summary of previous responses (see Finding #52 above for complete discussions) to the five specific items referenced in this finding:

- The current monitoring network is sufficient to provide a reliable determination of the groundwater separation beneath the respective waste modules. The requirement to install additional groundwater monitoring devices as close as possible to each LCRS sump and within the slurry wall is unnecessary and not cost effective in light of the sufficiency of the existing groundwater monitoring network.

- The current monitoring procedures used to determine groundwater separation, including the use of groundwater elevation data from monitoring wells closest to

the respective waste module LCRS sumps and interpolation using computer software, are appropriate for determining compliance with WDR Discharge Specification D.2.

- The reporting of groundwater separation in units of 0.1 foot is not practical or necessary to adequately estimate the groundwater separation distance beneath the LCRS sumps. Stating an accuracy of more than 0.5 foot would be implying too much accuracy. With that being said, conditions have shown that a 0.5-foot level of accuracy has been adequate to ensure compliance determination.

- The requirement to immediately lower of the groundwater table if necessary is not likely achievable. Even if suitable extraction wells, pumping, and piping are in place, the time it would take to lower the groundwater in the area would likely exceed the duration of the seasonal fluctuation. Based on the ongoing borrow pit dewatering and the effects resulting from realignment of the A-1 channel, it is unlikely that the permitted groundwater separation zones will be encroached.

- As-built certification reports that include documentation of the LCRS sump and pan lysimeter elevations were previously submitted to the CVRWQCB following construction of the respective waste modules.

Based on the above information, Finding #53 should be deleted in its entirety.

Finding #54

The detection of liquids in the pan lysimeters does not necessarily constitute a release. As previously outlined, the introduction of surface water runoff into the pan lysimeters after large sustained rainfall events has been documented to represent the likely source of the liquid.

Finding #55

The context of this finding is misleading. As written, it implies that liquids have been consistently detected and pumped from selected pan lysimeters since 2011. In actuality, water infiltration has been documented to occur only periodically after significant rainfall events. For example, water was detected in the pan lysimeter for DM-4 on December 24, 2012 and again on January 2, 2013 (next measurement). After pumping the water from the pan lysimeter on the aforementioned dates, no additional water was detected in the pan lysimeter for the remainder of 2013. Based on these conditions, Finding #55 should be revised as follows to provide a more accurate representation of these occurrences.

In regards to the mandate to mitigate the problem of water entering the pan lysimeters, it should be noted that the act of repairing is an iterative process, where retrofits are made and subsequent monitoring is performed. However, determination as to whether the retrofits are successful cannot be confirmed until the occurrence of a heavy prolonged rainfall event.

Finding #56

There are multiple points of contention with respect to the information presented in this finding. These points of contention are as follows:

- We disagree with the statement that pan lysimeters are designed to confirm that the separation of groundwater is maintained. Pan lysimeters are unsaturated zone leak detection monitoring devices per Title 27 and are not intended or designed to demonstrate separation.

- We disagree with the statement that the pan lysimeters are not functioning as designed. The primary purpose of pan lysimeters is to allow for the collection of water samples for laboratory analysis if water is present so that a determination can be made as to whether the water is from a landfill leak or an alternate source. Title 27 allows for false positive detections and alternate sources to be identified for indication of a release. The site has CVRWQCB-approved CAPs for several pan lysimeters that were incorporated into the existing WDR.

- As already discussed, the current monitoring system has demonstrated to be adequate for evaluating groundwater separation. Furthermore, the groundwater separation at many of the LCRS sumps has been shown to exceed the minimum separation requirements by several feet or more. Adding additional monitoring points to provide further confirmation is considered unnecessary.

In summary, the only issue in this finding that has merit is the requirement for the Discharger to take all steps necessary to stop any intrusion of stormwater into the pan lysimeters. However, since this requirement is already stipulated above in Finding #55, Finding #56 should be deleted in its entirety.

Finding #57

The CVRWQCB's issue with potentially compromising the LCRS sumps' capacity by discharging and temporarily storing pan lysimeter liquid represents a valid concern. However, managing the pan lysimeter liquid through the LCRS sump system is still considered a reasonable means by which to handle this material. Instead of the current practice of temporarily storing the pan lysimeter liquid in the LCRS sumps until the sumps' automated pumping system is activated via liquid level controls, the pan

lysimeter liquids will be immediately pumped from the LCRS sumps by manually over-riding the liquid level controls, thereby maintaining the capacity of the LCRS sumps to collect leachate. The volume of pan lysimeter liquids discharged into and pumped out of the LCRS sumps will be recorded to confirm that the volumes are comparable. In addition, the liquid level in the pan lysimeter will be checked after pumping and recorded to aid in identifying future discharges into the pan lysimeter.

It should be noted that per Title 27, Section 20340, the LCRS systems are designed to collect and remove twice the maximum anticipated daily volume of leachate from the waste module. Thus, the periodic introduction of pan lysimeter liquid at the volumes historically observed should not compromise the overall system capacity. With that being said, the proposed procedure of immediately pumping any pan lysimeter liquid discharged to the LCRS sumps should alleviate any concerns with respect to potential capacity constraints.

In regards to a liquid management disposal plan, it is proposed that the pan lysimeter liquids be managed in the same manner as leachate collected from the waste module; i.e., used for dust control within lined waste modules. If the volume of pan lysimeter liquid pumped exhausts the storage capacity of the leachate storage tank, then provisions will be made to pump the leachate storage tank and dispose of the liquid to the local publically-owned treatment works (POTW) facility.

Finding #58

No Comment

Finding #59

Tabulating the volume pumped is not explicit in the MRP. The text portion of the report includes the volume of water pumped from the respective pan lysimeters. Future reports will include tabulated volumes of liquid removed from the pan lysimeters, as well as tabulated volumes of the pan lysimeter liquid pumped from the LCRS sumps following discharge.

Finding #60

Under the current WDR/MRP, the landfill determines concentration limits for unsaturated zone monitoring points using historical data for each monitoring point, not background unsaturated zone monitoring points. The statement that the unsaturated zone monitoring network is inadequate because background monitoring points for data comparison has not been established does not reflect the method prescribed in the Board-approved MRP. The existing MRP states under Section C(3) - Concentration Limits: The Discharger shall establish concentration limits for the following monitored mediums as follows:

1. *Unsaturated Zone* – With the exception of VOCs and certain biosolids monitoring parameters (for which a non-statistical method is used to determine concentration limits), the concentration limits for COCs in the unsaturated zone shall be based on statistical evaluation of historical monitoring data for each monitoring point, as proposed by the Discharger. These concentration limits shall be updated semi-annually and included in each monitoring report.

As for the mandate to establish a background unsaturated zone monitoring network, pan lysimeters are much more amenable to being monitored as leak detection devices, not classical background/detection. Installing and determining concentration limits using background points would likely not be successful due to the differing conditions between some off-site location versus the unsaturated zone directly underlying a waste unit. The current evaluation method practiced by the landfill comparing the laboratory analytical results to potential sources (leachate, landfill gas, surface water, groundwater, etc.) has been successful at discriminating between landfill releases and other sources. The results of these analyses have been incorporated into the existing WDR findings. The current practice for unsaturated zone evaluation needs to be formalized by incorporating into a revised WDR/MRP, rather than using background points.

Finding #61

No Comment

Finding #62

The requirement that ADC be isolated to prevent contact with direct precipitation and stormwater runon/runoff is not practical. In general, the function of ADC is to cover refuse at the end of daily operations to prevent odors, wind-blown litter, vectors, etc. Since regulations allow the use of ADC year-round, the ADC material will inevitably be exposed to rainfall during certain times of the year. Thus, this requirement as stated would eliminate the use of most ADC materials altogether, not just at the RHR Landfill, but at any landfill site. The ADC materials currently utilized at the site are identified in the WDR as an approved ADC product and satisfy the site specific performance requirements of Title 27, Section 20705.

Although dried sewage sludge stored on top of DM-11 was originally identified as a *possible* source for the elevated nitrate conditions in the area of monitoring well 4BR, the actual source has yet to be confirmed. The dried sewage sludge at DM-11 is fully covered with clayey material (and has been since 2009), thereby preventing direct contact with rainfall. Dried sewage sludge stockpiles on other waste units are also covered in this manner.

Sewage Sludge Operations at WP-9.1 and LTU

Finding #63

Per WDR Discharge Specification B.7, a demonstration of potential threat characteristics is required of wastes not already listed in the WDR prior to their use as ADC or intermediate cover. Dried sewage sludge is already identified in the WDR as an ADC product. As outlined in the February 2013 Joint Technical Document (JTD), the ADC materials currently utilized at the site satisfy the site specific performance requirements of Title 27, Section 20705.

Finding #64

No Comment

Finding #65

There are several points of clarification with respect to the information presented in this finding. These points of clarification are as follows:

- The stated average groundwater extraction rate of 0.6 gpm at extraction well G-22 is not accurate. An extraction rate of 1.7 gpm was presented in the Fourth Quarter 2013 monitoring report. The overall extraction rate based on 7,000,000 gallons total extracted since 2004 equates to approximately 1.5 gpm.

- As previously outlined in the response to Finding #38, G-22 was installed to address the release from WP-9.1 and has shown substantial progress in this regard by reducing nitrate concentrations to levels near the concentration limit. Nitrate trends in former downgradient monitoring well G-24 also demonstrated that G-22 has been effective at capturing the plume associated with WP-9.1.

Finding #66

As previously described in the response to Finding #38, there are currently three nitrate-impacted groundwater areas at the site, two of which are located in the eastern portion of the site (i.e., Waste Pile 9.1 corrective action area and the eastern site area adjacent to DM-6.2 and DM-4.3). These two locations are associated with different sources and do not represent a single nitrate plume as implied in this finding. As such, they should not be collectively grouped because such an interpretation implies a much larger area of impact than is actually present, or in the case of this finding, erroneously implies that the plumes have migrated significant distances. As noted earlier, these plumes are restricted to the interior of the site and have not impacted downgradient perimeter monitoring wells. These conditions are presented in Golder's March 12, 2014 letter report that has been submitted to the CVRWQCB.

In regards to statements presented in this finding, there are several points of contention. These points of contention are as follows:

- The statement that nitrate exceeds the concentration limit at a distance of more than 1,000 feet downgradient of extraction well G-22 is misleading. As outlined in the previous response, there are likely multiple sources in the area in question. As a result, the source of the nitrate at the point 1,000 feet away is different than the source at G-22. G-22 was not installed to pump impacted groundwater from 1,000 feet away. The data do not indicate that impacted groundwater from WP-9.1 has migrated down to this area.

- The statement that borings closer to G-22 exhibited higher nitrate concentrations is incorrect. The borings closer to G-22 actually had lower nitrate concentrations than borings further downgradient.

Based on the information presented for both Findings #65 and #66, the contents of these findings should be combined into a single finding and rewritten in a manner that more accurately reflects the discussion above. In addition, the discussion using G-22 as the basis for concluding that the corrective action measures are insufficient should be revised as the data suggests the contrary.

Finding #67

The final sentence of this finding indicates that the scope of the proposed in-situ bioremediation injection program should include injection points in the area of WP-9.1. In this regard, the area of WP-9.1 has been excluded in the proposed in-situ bioremediation injection program as the program only targets source areas that warrant corrective action as defined by the recent investigations. In the case of WP-9.1, groundwater extraction from G-22 has effectively removed nitrate from the initially impacted well (G-21). In addition, the nitrate concentrations in G-22 have exhibited an overall downward trend over the past 3 years and have approached the background concentration. Thus, the expansion of the bioremediation efforts into the area of WP-9.1 is not considered warranted in light of the data.

Runoff Collection/Drainage System and Landfill Slopes

Finding #68

No Comment

Finding #69

No Comment

Finding #70

Since DM-11 is contiguous with the older DM-2.1, DM-2.1 represents the critical component with respect to the overall stability. Thus, the stability performance of DM-2.1 will be evaluated to determine whether the performance of DM-2.1 under the Class II design earthquake event will compromise the seismic performance of the adjacent Class II disposal modules, including DM-11. If it is determined that DM-2.1 will compromise the performance of the adjacent Class II disposal modules, a corrective design will be prepared.

Finding #71

A site-specific seismic characterization was performed by Norm Abrahamson as part of the original design of the Class II landfill in 1994. This report is included in the site's Joint Technical Document (Appendix D). However, the characterization of fault activity and magnitude can change over time due ongoing earthquake engineering research. In light of more recent studies on the Midland fault, located east of the landfill, this seismic characterization will be updated for the RHR Landfill.

Finding #72

Peak ground accelerations (PGA) were estimated by Norm Abrahamson (1994) and used in the design of all slopes at the site. This design maximum PGA will be re-evaluated based on the updated seismic characterization and the latest attenuation relationships (i.e., prediction of PGA as a function of the distance from the fault epicenter).

Finding #73

If existing slopes are determined to be steeper than those recommended in previous slope stability reports, or recommendations provided in any updated slope stability analyses reports, the identified steeper slopes will be re-evaluated for slope stability.

Finding #74

The CAO only cites a portion of the Title 27 requirements for seismic stability [Section 21750(f)(5)(C)] and omits a key requirement. The next subsection [Section 21750(f)(5)(D)] states "**In lieu of achieving a factor of safety of 1.5 under dynamic conditions, pursuant to paragraph 21750(f)(5)(c), the discharger may use a more**

rigorous analytical method that provides a quantified estimate of the magnitude of movement." Since 1995, every Class II landfill at the site has been evaluated consistent with Title 27, Section 21750(f)(5)(D) using this more rigorous analytical method. All of these analyses have been submitted to the CVRWQCB for review and approval. The CVRWQCB has never previously commented on any deficiencies in these analyses.

Furthermore, in California, which has a relatively high seismic activity, the vast majority of the modern composite-lined landfills throughout California, such as the RHR Landfill, submit slope stability analyses pursuant to Title 27, Section 21750(f)(5)(D). As a standard of practice, these more rigorous analyses are routinely approved by the various RWQCB's throughout the State including the Central Valley. A partial list of landfills where the RWQCB has approved this more rigorous seismic stability approach include the Anderson Landfill, Neal Road Landfill, Ostrom Road Landfill, Yolo County Central Landfill, Kiefer Landfill, Fink Road Landfill, and Altamont Landfill.

Finding #75

As a point of clarification, while the infiltration of stormwater is considered a potential source of the liquid entering selected pan lysimeters, the cause of the infiltration is not the result of inadequate sizing of the drainage control systems. The infiltration appears to be occurring along the terminal edges of the composite base liner systems that allows water to infiltrate following periods of significant rainfall. Retrofits to the liner system have been made in an attempt to mitigate this issue. It should be noted that regardless of whether there are adequate drainage and stormwater controls, there will inevitably be some infiltration into the soil, which increases with larger storm events.

Flood Protection

Finding #76

As a point of clarification, the perimeter berms are not required strictly for flood protection. For the Class II waste modules, the perimeter berms are being constructed along an elevation of 40 feet MSL to serve as both a flood control berm and to increase slope stability for the final refuse fill geometry. The additional berm height primarily serves to provide additional stability against global failure of the waste mass (movement along the base liner system. The finding should recognize this dual purpose.

Finding #77

Most of the landfill was constructed with a 40 foot MSL elevation exterior perimeter berm, except for the northern and western boundary of DM-1, which have an exterior perimeter berm of about 30 feet MSL. The 100-year flood elevation is estimated to be 25 feet MSL. For the Class II WMU's, a perimeter berm is being constructed to an

elevation of 40 feet MSL to serve as both a flood control berm and to increase slope stability for the final refuse fill geometry. The additional berm height primarily serves to provide additional stability against global failure of the waste mass (movement along the base liner system).

As noted in WDR Facility Specification C.12, "as the site is developed, a flood protection and slope stability levee (or berm) shall be constructed around the site to at least 40 feet above mean sea level to prevent flood water from a 100-year flood from entering the site." This berm has been constructed along the outboard perimeter of the Class II WMU's, including DM-2.2, WP-9, DM-3, DM-4, DM-5, DM-6, and the southern boundary of DM-11. In addition, a berm was previously constructed to 40 feet MSL along the southern perimeter of DM-2.1. Based on the above construction characteristics, all module berms, including DM-1, meet the flood protection requirement.

Since WDR Facility Specification C.12 refers to the 40 feet MSL berm height as specifically being necessary to protect against flood waters, this specification should be updated to accurately reflect the stability component of the design criteria. This modification could be done as part of a WDR revision.

Finding #78

The following revisions are recommended for Finding #78:

"The Discharger's 2013 topographic site plan (i.e., the *Recology Hay Road 2013 Winterization Plan*) indicates that some exterior berms along the north side of the facility may not meet the ~~flood protection~~ berm height requirements stipulated in ~~the~~ WDR~~s of a berm height of at least 40 feet MSL around the site~~Facility Specification C.12. This Order requires that the Discharger ~~submit a site drawing which indicates the location, distance, and height of all flood control berms and whether the berm meets the requirements of the WDRs~~ review the existing berms and verify that they provide adequate flood protection and also provide adequate slope stability under existing and near-term fill conditions (i.e., next 5 years). If ~~not~~ findings from the review identify insufficient berm heights, this Order requires that the Discharger ~~install~~ heighten the berms ~~that~~ to comply with the WDRs. Berm heights shall be reviewed every 5 years as part of the Periodic Site Reviews."

Groundwater Monitoring Network

Finding #79

The groundwater monitoring network has been discussed with the CVRWQCB and modified to meet the CVRWQCB requirements several times since 1996. For example, the entire eastern area monitoring network and approach were reviewed and approved by the RWQCB starting with the installation of eight groundwater monitoring wells in

2001 (RWQCB workplan approval letter dated June 8, 2001, Eastern Area Monitoring Wells, B&J Sanitary Landfill). In addition, the monitoring system has been reviewed and approved by the CVRWQCB through adoption of the existing WDR/MRP. Finally, the monitoring system has been shown to be effective and has detected past releases from the landfill (e.g., nitrate from WP-9.1 and other sources, barium increases due to landfill gas [LFG] migration from the DM-1 area, etc.). Based on these circumstances, we do not agree with the CVRWQCB's position that the groundwater monitoring network is insufficient. As a result, this finding should be deleted in its entirety.

Finding #80

As referenced above in the response to Finding #79, the CVRWQCB has reviewed and approved the current monitoring network. The landfill monitoring approach was covered in a March 2001 one day long meeting with the CVRWQCB and was subsequently incorporated into WDR/MRP 5-01-101. The monitoring network and approach has been incorporated into subsequent WDR revisions in 2003 (R5-2003-0118) and 2008 (R5-2008-0188). CVRWQCB communication during the time period of installing the initial eastern area monitoring network stated that the monitoring wells be installed in the "uppermost saturated permeable zone" and the landfill complied with that requirement and has continued to install groundwater monitoring wells following the same criteria.

There are multiple points of contention and corrections with respect to the information presented in this finding. These points of contention/correction are as follows:

- The "Monitoring Location" identifications presented in Table 7 of the CAO for gas probes G-18 and G-19 are incorrect. The correct identifications are GP-18 and GP-19.

- Title 27, Section 20415(b)(1)(B)(1) states that a sufficient number of Monitoring Points shall be installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the Unit. Per Title 27, an "aquifer" is defined as "a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs." In addition, "uppermost aquifer" is defined as "the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer."

  It is well known that groundwater at the site is shallow. Historically, the groundwater monitoring network has targeted the more permeable layers underlying the site as directed by the CVRWQCB. In a January 22, 2001 CVRWQCB letter regarding *Monitoring Wells for Detection Monitoring*, the CVRWQCB stated: "The proposed new wells should be drilled and logged to a

depth sufficient to ensure proper placement of the well screens in the uppermost saturated permeable zone."

A CVRWQCB letter dated May 11, 2001 regarding *Detection Monitoring Wells for Waste Pile 9.1, Land Treatment Unit and Disposal Module 5* stated: "Section 20415(b)(1)(B)(5) requires that additional wells be installed, as necessary, to monitor the zone(s) of highest hydraulic conductivity in the aquifer underlying the unit."

Installing monitoring wells in the uppermost permeable layer has been repeatedly approved by the CVRWQCB. Groundwater monitoring well installation workplans have included the following text: "The new monitoring well will target the sandy layers, the zones of highest hydraulic conductivity. Because the groundwater beneath the Landfill behaves as one water body and is not divided into discrete layers or water-bearing zones, the new well will be installed in the first-encountered sandy layer in the soil boring."

- The reference to minor variation in the elevation at which groundwater was encountered is not clear in Table 7 of this finding. The estimated elevations provided in the table range from 13 to 18 feet, which looking at the site groundwater contour map covers roughly two-thirds to three-quarters of the site. WDR Finding #28 states ... "The depth to groundwater varies from about 2 to 23 feet below ground surface (bgs), averaging about 10 feet bgs or 10 feet above mean sea level (MSL)." This data does not support "minor variation" statement.

- As discussed in the comment above, the wells are screened across the uppermost saturated permeable zone. The wells are not constructed at the water table since this is not an underground storage tank site where you need to screen across the water table to detect any floating hydrocarbons.

In addition to the text, there are also multiple points of contention with respect to the information presented in Table 7. These points of contention are as follows:

- It is not clear what is meant by the following statement ... "measure the fluctuation in the water table." The referenced wells have shown fluctuations in the groundwater elevation that resemble the other wells at the site. The wells are fully capable of showing fluctuations in the groundwater. If the CVRWQCB is referring to the point that the well is not screened across the water table, this is not necessary at landfills. This is not a gasoline UST site where floating hydrocarbons are a threat to water quality.

- Title 27 states that the monitoring points "provide the best assurance of the earliest possible detection of a release from the Unit"; there is no reference to "earliest possible moment". Groundwater flows more quickly through more

permeable hydrogeologic units. For example, in the last monitoring report (Golder's Second Semi-annual and Annual 2013 Monitoring Report dated January 30, 2014), the groundwater flow velocities at the landfill were estimated to range from 60 to 340 feet per year in the sandy sediments and less than one foot to 2 feet per year in the fine-grained sandy silts and clays. Monitoring in the more permeable sandy sediments provides for the best assurance of the earliest possible detection of a release. To illustrate further – using the calculated groundwater flow velocities - if a monitoring well is 10 feet away from a landfill release, it could take from 5 to more than 10 years to be detected in a well screened in a silt or clay, while it would take from 10 to 60 days to be detected in a well screened in sandy sediments.

- For monitoring well 4BR, it is stated … "Water encountered at ~ 13.8 msl. Well completed 4 feet below the water table.. No open screen." As stated above, this is not a UST site where open screens are needed to detect floating hydrocarbons.

- For monitoring well G5R, it is stated … "G5R is screened too deep to identify a release at its earliest possible moment and measure the fluctuation in the water table." Well G-5R is a piezometer used only for water level measurement. The well is not a detection monitoring well used to identify a release from the landfill. Previous comments regarding "earliest possible moment" and "water table fluctuation" also apply here.

Based on the information provided above, including the regulations, past CVRWQCB involvement and approval of the existing monitoring network through adoption of the current MRP, the local hydrogeologic characteristics (including the fine-grained nature of the reported shallowest zone as compared to the first-encountered permeable sandy layer), and basic hydrogeologic principles, we do not agree that the existing groundwater monitoring network needs to be upgraded to monitor the very shallow water-bearing zone.

Finding #81

This Finding's conclusion that the existing groundwater monitoring network is in violation of the WDR and Title 27 is not only an extreme exaggeration of the facts, but is also inaccurate. As pointed out previously, installing monitoring wells in the shallowest ***permeable*** zone has been a CVRWQCB requirement that the site has followed and wells have been designed and installed using CVRWQCB-approved workplans. In addition, targeting of the shallowest ***permeable*** zone meets the definition of the uppermost aquifer as outlined in Title 27. Finally, accurate determinations of groundwater elevations are made in accordance with the CVRWQCB-approved Sampling and Analysis Program that allow for accurate representation of the uppermost

aquifer beneath the site. These facts clearly demonstrate that the landfill is not in violation of the WDRs or Title 27.

In regards to specific statements presented in this finding, there are multiple points of contention. These points of contention are as follows:

- Various statements that the current groundwater monitoring network does not comply with Title 27 contradicts the fact that the landfill is being monitored under the CVRWQCB-approved MRP.

- The interpretation of what constitutes the uppermost aquifer at the site is discussed at length under the response to Finding #80.

- The statement that the well screen construction does not allow for accurate measurement of the water table is incorrect. The groundwater at the site has been shown to behave as a single water body. A table presenting the groundwater elevations in adjacent shallow wells and deep wells at the site is provided below. As presented in the "GW Elev. Difference" column, the data shows minimal difference in groundwater elevation (0.09 to 0.23 feet) even though the wells monitor much different depths. Please note that this comparison should not be confused with the comparison discussed in the response to Finding #80, which pertains to where groundwater was first encountered during drilling, not where it subsequently stabilized.

Shallow Wells			**Deep Wells**			**Summary**	
Well	Bottom Elev. of Well (feet MSL)	Groundwater Elev. (feet MSL)	Well	Bottom Elev. of Well (feet MSL)	Groundwater Elev. (feet MSL)	GW Elev. Difference (feet)	Well Elev. Difference (feet)
G-8	4	15.56	D-1	-43	15.71	0.15	47
P-1	0	16.43	D-2	-42	16.29	0.14	42
MW-4	-11	8.62	D-4	-45	8.85	0.23	34
MW-7	-20	12.19	D-6	-46	12.28	0.09	26
MW-5	-21	12.49	D-5	-46	12.59	0.10	25
Groundwater elevations measured 10/29/2013							

- The statement that the existing groundwater monitoring network does not comply with Section 20415(e)(13) of Title 27 is incorrect. This portion of Title 27 refers to the measurements made when the wells are sampled, i.e., accurate measurements of the depth to groundwater (to 0.01 foot) in each well shall be made and the wells shall be surveyed to 0.01 foot. Accurate determinations of

the groundwater surface elevation at the site are determined using these measurements. The CVRWQCB approved the landfill Sampling and Analysis Program, which includes the aforementioned water level measurement method.

Finding #82

This finding contends that downgradient Point of Compliance monitoring is not provided by the existing groundwater monitoring network for DM-1, DM-4.3, the LTU, and DM2.2. Per Title 27, Point of Compliance wells are to be positioned along the vertical surface located at the hydraulically downgradient limit of the waste module. Based on this definition, the following information demonstrates that the CVRWQCB's interpretation is not accurate:

- Wells G-9 and MW-4 are located along the western and southern boundaries, respectively, of DM-1. The southwesterly groundwater flow direction beneath DM-1 thereby positions these wells hydraulically downgradient of the waste module.

- In the case of DM-4.3, an alternative monitoring strategy was proposed in the nitrate CAP. Grab groundwater samples were proposed rather than installation of a monitoring well, because the landfill will expand into the area to the south of DM-4.3 and a monitoring well would need to be destroyed.

- Well G-26 was installed and approved by the CVRWQCB as a downgradient monitoring well for the LTU (*Installation of Monitoring Well G-26 and Destruction of Monitoring Well G-15* dated September 1, 2004; and well installation workplan for G-26 included as part of the *Groundwater Detection Monitoring for DM-5.2 and New LTU Area* report dated March 17, 2004).

- Wells G-11, G-11M, and G-11R are located along the western boundary of DM-2.2. The westerly groundwater flow direction beneath DM-2.2 thereby positions these wells hydraulically downgradient of the waste module.

Since the above monitoring locations are part of the CVRWQCB-approved MRP, their function as Point of Compliance monitoring points are not in violation of the WDRs or Title 27.

Based on the information above, the only comment in Finding #82 that has merit corresponds to the installation of Point of Compliance monitoring wells downgradient of the low-flow and high-flow ponds in the compost facility area. However, this issue is already addressed under Finding #19. Thus, Finding #82 should be deleted in its entirety.

Finding #83

The last sentence of this finding states that a Notice of Violation (NOV) was issued on May 2, 2014 with regard to the reported failure to test for all the required analytes for the 8260 analysis. This statement is incorrect as no NOV has been received by the Discharger, and CVRWQCB staff have stated that the NOV was not issued.

In addition to the aforementioned issue, the following points of clarification/explanation are provided with respect to the comments outlined in this finding:

- The list in the existing MRP includes a duplicate compound listed 2 ways; i.e., Di-isopropylether (DIPE) and di-Isopropyl ether. Thus, the compound list actually contains only 69 constituents.

- The implication of using the term "8260 short list" on the sample chain-of-custody forms is somewhat of a misconception. This term has been used to let the laboratory know to analyze for the shorter list of VOCs in the MRP (Table IX), not the longer COC list of VOCs (Table X). The laboratory is then supposed to analyze for the VOCs listed in Table IX. Apparently, through an oversight by the laboratory, not all 69 of the VOCs were on the list for each monitoring event. Review of the last reported monitoring event (Fourth Quarter 2013) revealed that all VOCs were included in the list.

- Review of a 2012 lab report indicated that the following three VOCs on the list were not reported by the laboratory: hexachloroethane; 2-nitropropane; and tert amyl ethyl ether. However, these three VOCs have been reported more than 1,400 times and they have never been detected (this includes over 90 leachate sample analyses). While leaving these VOCs off the analyte list does potentially affect the interpretation of the monitoring results, the fact that they have never been detected in water samples from the site, including many leachate samples, indicates that the potential impact has been minimal.

- The issue of elevated Practical Quantitation Limits (PQLs) that may have been reported in the past has since been corrected.

While the information contained in this finding is mostly factual, RHR has worked with the CVRWQCB over the past few years to address requests for minor changes in the landfill monitoring reports. Including this finding in the CAO is redundant to previous correspondence and unnecessary. Thus, this finding should be deleted in its entirety.

Basis for Cleanup and Abatement Order

Finding #84

No Comment

Finding #85

Section 13304 speaks for itself. As previously stated, we do not believe the requirements in the Draft CAO are supported or warranted.

Regulatory Considerations

Finding #86

No Comment

Finding #87

No Comment

Finding #88

Note Comment

Finding #89

No Comment

Finding #90

No Comment

Finding #91

No Comment.

RESPONSES TO ORDERS

Order #1(a)

Per the Responses above, we do not believe the extensive changes to the prior Board-approved MRP, which is part of the 2008 WDRs, are appropriate for the Draft CAO.

Order #1(b)

This requirement should be removed since all compost material is stored within the 54-acre permitted area.

Order #1(c)

With respect to the first sentence, RHR has already agreed to address this issue, so it is not clear why an order is required. In any case, immediate stoppage of compost leachate and stormwater discharge to the western unlined ditch and western compost area pond is not practical. As proposed in Golder's *Response to February 27, 2014 CVRWQCB Meeting Comments* letter dated May 12, 2014, a lined ditch and sump on the western side of the compost area will be constructed by September 30, 2014 that will allow for the collection and pumping of compost leachate and stormwater to the high-flow pond.

With respect to the second sentence, the CVRWQCB's interpretation of WDR Discharge Specification B.13 is inconsistent with other sections of the WDR. WDR Finding #53 discusses the use of groundwater pumped from G-22 as dust control on lined waste modules. WDR Finding #96 discusses the use of water pumped from the borrow pit as dust control. Both of these sources are used as dust control on lined modules even though they are not generated in the composite lined landfill unit in which they are being used. Therefore, it can be assumed that Discharge Specification B.13 applies specifically to landfill leachate and LFG condensate and not the use of liquid as dust control. If dust control was intended to be included as part of Discharge Specification B.13, it would have been referenced accordingly. Additionally, RHR has previously informed CVRWQCB staff of use of compost water for dust control. Based on these circumstances, the requirement to cease disposal of compost leachate and stormwater on lined waste modules should be deleted.

Order #1(d)

As previously discussed in the response to Finding #16, the CVRWQCB was aware and approved the existing compost liquid management practices that include the commingling of water between the low-flow and high-flow ponds. As a result, it is recommended that the WDR be updated to more accurately reflect the compost liquid management practices (including the proposed lined ditch and sump to be constructed in the western side of the compost area). This should be done as part of a WDR revision. Based on this approach, the requirement to keep the discharge between the low-flow and high-flow pond separate should be deleted.

Order #1(e)

The groundwater separation requirement is already stipulated in the WDRs. Furthermore, as previously discussed in the response to Finding #52, the current level

of accuracy is sufficient to report on the separation. Based on these circumstances, including this mandate in the CAO is unnecessary and should be deleted.

Order #1(f)

The requirement that "any" liquid detected in a pan lysimeter, "regardless if liquid had been previously detected", should trigger the notification and testing requirements is excessive. The basis for this argument is that it is not practical to remove "all" the liquid in a pan lysimeter or LCRS sump, simply based on the pumping capabilities of standard pumps. Some residual liquid will always remain. Thus, the notification/testing requirements should be triggered by a measureable change in liquid levels that would be indicative of a new detection. As presented in the response to Finding #57, proposed revisions to the management of pan lysimeter liquids includes the measurement and recording of liquid levels following pumping. Such measurements will provide a baseline for determining future new discharges that would warrant the applicable notification/testing requirements.

Reference Footnote #30 of this order states than pan lysimeter liquids may not be discharged to a LCRS sump or onto any landfill unit. This represents an unnecessary constraint. In this regard, if the liquid in the pan lysimeter is determined to be leachate related based on analytical testing, then it should be able to be discharged back to the unit from which it came. Conversely, if the liquid is not leachate-related or impacted as determined from laboratory testing, then it is not clear why this type of restriction should apply. Thus, it is recommended that this footnote be deleted in its entirety.

Order #1(g)

The management of ADC materials at the site is performed in accordance with WDR Discharge Specification B.8. This order should be deleted from the CAO.

Order #1(h)

RHR has already proposed to implement the remedial measures, so there is no reason to include them in a CAO. In any case, the provision states that the *Notice of Intent and Corrective Action Program* dated April 4, 2014 was conditionally approved by CVRWQCB staff. However, in a letter dated May 22, 2014, the CVRWQCB suspended the application process on the basis that the application was incomplete and requested the submittal of additional information by June 22, 2014. As a result, the nature and scope of the proposed CAP remains unresolved. Based on these circumstances, any requirement for immediate implementation of corrective actions should be deleted until such time that a CAP has been approved.

As outlined above, the Discharger is currently in the process of applying for enrollment under General Order R5-2008-0149 for *In-Situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compounds, Perchlorate, Pesticides, Semi-Volatile Compound and/or Petroleum Hydrocarbons (In-Situ General Order)*. This has become necessary after the CVRWQCB's denial of other alternative corrective action measures (i.e., monitoring natural attenuation and permeable reactive barrier). Since the corrective action approach will be subject to the General Order, we do not agree that the corrective actions that are actively being pursued should be included as part of the CAO.

Order #1(i)

The facility cannot commit to "stopping" the intrusion of stormwater into the pan lysimeters within a given time frame. As previously outlined in the response to Finding #55, the act of repairing is an iterative process, where retrofits are made and subsequent monitoring is performed. However, determination as to whether the retrofits are successful cannot be confirmed until the occurrence of a heavy prolonged rainfall event. With that being said, RHR continues to implement an approved CAP for the liquid in the pan lysimeters and will investigate other options for "minimizing" the intrusion of stormwater, as necessary.

Order #1(j)

As detailed in this submittal, we do not believe the issues in Order #1 should to be included in a CAO. If a CAO is issued, the date needs to be modified to allow for sufficient time (such as 90 days) to complete the report.

Composting Operations

Order #2

See Response to Finding 3.

Order #3

See Response to Finding 4.

Order #4

Based on the information provided in the responses to the findings, we object to Order #4 in its entirety. It is our opinion that there is sufficient history and documentation which demonstrate that the composting operations have been implemented under proper regulatory oversight and that mandating revisions under a CAO is unnecessary.

If the CAO is issued, the submittal deadline requirement of June 30, 2014 for the various reports is not attainable.

Order #4(a)

See responses to Findings #12, 13 and #16. A water balance for the high-flow pond has already been performed. Thus, the scope of any water balance analysis should be limited to the low-flow pond, but a CAO is not appropriate. We do not believe there is a violation warranting a CAO, given that the CVRWQCB has long been aware of how the lined pond system works and there is no surface water discharge.

Further, the requirement to remove the low-flow pond contents prior to October 1st of each year is not advisable as some liquid must remain in the pond to maintain adequate biological activity and to allow for aeration. Finally, as discussed in the response to Finding #23, compost pond water has been used in the past for dust control, CVRWQCB staff have known about this practice for years, and this practice should remain intact.

Order #4(b)

RHR will submit an RoWD but a CAO is unnecessary. See Response to Finding #9.

Order #4(c)(1)

This is a simple administrative matter that is not appropriate for a CAO. RHR will provide the referenced map.

Order #4(c)(2)

We do not agree with the requirement of prohibiting the discharge of compost pond water from the low-flow pond to the high-flow pond. As discussed extensively herein, this practice has been in place for years under approval by the various regulatory agencies, including the CVRWQCB.

As outlined in the response to Finding #41, a workplan to upgrade the collection and control features for the western side of the compost facility (i.e., area identified in the CAO as being insufficient) was submitted on March 12, 2014 that includes the installation of a lined ditch that will discharge to a sump at the southwest corner of the compost facility. JPO has committed to completing these upgrades by September 30, 2014.

Since the provisions are currently in place to upgrade the compost facility's liquid management system, this requirement is no longer necessary and should be deleted.

Order #4(c)(3)

See Response to Finding #19.

Groundwater Monitoring

Order #5

As discussed in greater detail in the following responses, we do not agree that additional site characterization of nitrate impacts is necessary at the site and this should be deleted as a requirement of the CAO. As for the need to upgrade the groundwater monitoring network, the only upgrade that is considered warranted is the placement of monitoring wells downgradient of the low-flow and high-flow ponds. But the extensive, far-reaching revisions to Board-approved WDRs Monitoring & Reporting Program should be considered through revising the WDRs, not a CAO.

Order #5(a)

In addition to our overall objections to this Order, the following points of contention are provided with respect to the specific information presented:

- We do not agree with the statement that new detection monitoring points are needed to ensure compliance with the WDRs and Title 27. As previously discussed in the response to findings, the current CVRWQCB-approved monitoring network meets the requirements in the WDRs and Title 27.

- We do not agree with any of the aspects of Order #5(a)(1) pertaining to the need for new background monitoring wells. The CVRWQCB reviewed and approved the background wells for the landfill and incorporated them in to the existing WDR/MRP. While data has been restricted in some background wells to remove potential landfill influences, there is no reason to replace all the current background monitoring wells or install additional background monitoring wells to adequately monitoring the landfill.

- The request under Order #5(a)(2) to install new background lysimeters to comply with Section 20415(d)(2)(A) of Title 27 is inconsistent with the CVRWQCB-approved MRP. The existing MRP states .... "The Discharger shall establish concentration limits for the following monitored mediums as follows: 1. Unsaturated Zone – With the exception of VOCs and certain biosolids monitoring parameters (for which a non-statistical method is used to determine concentration limits), the concentration limits for COCs in the unsaturated zone shall be based on statistical evaluation of historical monitoring data for each monitoring point, as proposed by the Discharger. These concentration limits shall be updated semi-annually and included in each monitoring report." Based

on this specification, background lysimeters are not needed per the existing MRP.

- The requirement under Order #5(a)(3) to install new groundwater monitoring devices (wells or piezometers) as close as possible to each LCRS is unnecessary. As previously outlined in the response to comments for Finding #53, such provisions are not needed to perform the required evaluation of groundwater separation. The existing groundwater monitoring network provides sufficient information using standard hydrogeologic techniques to determine the separation. Previous work has shown that the slurry wall has minimal effect on groundwater and is not a factor in data analysis.

- The requirement under Order #5(a)(3) to replace monitoring well 4B and others with appropriately constructed monitoring devices is contradictory to past CVRWQCB directives and not advisable based on the local hydrogeology. Well 4BR was designed as a replacement for 4B. One of the reasons cited in the CVRWQCB-approved workplan for replacing well 4B was that the well was too shallow and did not contain enough groundwater to allow for standard monitoring (the well dried each sampling event) and the well seal may have been too short to provide an effective surface seal. Replacing the well in kind would have resulted in a poorly functioning well with potential for a poor surface seal. Wells are installed according to the conditions at the well location, not according to the conditions encountered 200 feet away. Based on these circumstances, the requirement as stated should be rescinded.

- The requirement under Order #5(a)(3) to install new Point of Compliance groundwater monitoring devices is not supported by the site groundwater flow conditions. Waste modules DM-1, DM-2.2, and the LTU have downgradient monitoring wells that were approved by the CVRWQCB. RHR proposed alternate monitoring for DM-4.3 in the CAP to avoid installing a groundwater monitoring well that would soon need to be destroyed to allow further landfill construction.

Order #5(b)

As outlined above, we do not agree that additional site characterization of nitrate impacts is necessary. The nitrate release(s) have been defined as reported in the 2013 investigation reports, engineering feasibility study (EFS), and 2014 CAP.

Compliance with Facility Specifications

Order #6

Our objections to the issuance of the CAO have been previously stated. In the event the CAO is issued, a single Facility Specifications Technical Report for all three items in

this order is not considered appropriate. While the slope stability analysis and berm height evaluation are more tangible, the extent of drainage improvements and the time required to practically implement any improvements will not be known until the analysis is complete. Any submittal should be separated into the following two reports:

- Facility Specification Technical Report (Slope Stability and Berm Evaluation) with a submittal deadline of 120 days following CAO adoption.

- Facility Specification Technical Report (Drainage Evaluation/Improvements). The drainage evaluation component can be completed in 90 days following CAO adoption. In regards to the actual improvements, the degree of improvements will dictate the length of time necessary to implement. Completing all improvements prior to the 2014-2015 wet season may not be practical.

In specific regard to Order 6(a), as previously outlined in the response to Finding #74, Section 21750(f)(5)(D) of Title 27 states "In lieu of achieving a factor of safety of 1.5 under dynamic conditions, pursuant to paragraph 21750(f)(5)(c), the discharger may use a more rigorous analytical method that provides a quantified estimate of the magnitude of movement." The more rigorous analytical method approach has been used at the site; if a CAO is issued, this provision should be revised to acknowledge this fact.

Order #7

As indicated in our submittal, we do not believe site conditions warrant the extensive requirements set out in the CAO, including the various reporting requirements under Order 7.

Order #7(a)

See our Responses to Findings #79-82 and to Order #5.

Order 7(b)

As previously outlined in the response to Order #5(b), we do not agree that additional site characterization of nitrate impacts is necessary. The nitrate release(s) have been defined as reported in the 2013 investigation reports, EFS, and 2014 CAP. Based on this circumstance, Order #7(b) should be deleted in its entirety.

Order #7(c)

As previously outlined in the response to Order #1(h), the CAP for the nitrate impacts at the site has not been approved by the CVRWQCB. With that being said, reporting on

the progress of corrective actions is a standard requirement in Title 27 and is implementable under the existing WDR. Quarterly reporting of the corrective action progress was included in the CAP submitted to the CVRWQCB. Based on these provisions, the requirement of this order is not necessary.

Order #7(d)

As stated previously, the intent of the CAP is to reduce the elevated nitrate concentrations in proximity of the source areas, not over the entire site area with nitrate above 5 mg/L. This is not an efficient implementation of corrective actions and would result in unnecessary costs and would not contribute meaningfully to the overall reduction of nitrate in site groundwater. Based on this circumstance, the requirement of this order is considered redundant to the current corrective action measures being proposed and should therefore be deleted.

Landfill Gas Monitoring

Order #8

The following points of contention are provided with respect to the requirement presented in this order:

- No findings are presented in the body of the CAO to support or provide the basis for requiring the requested LFG evaluation.

- The stated requirement of ensuring negative pressure throughout the entire unit is an unachievable directive as LFG extraction systems do not operate in this manner. The entire LFG extraction system must be maintained under negative pressure, but the entire disposal module cannot and should not be operated under negative pressure. This type of operation can lead to atmospheric infiltration into the waste and cause subsurface combustion, which is not allowed by regulation. Having the extraction system under negative pressure however ensures that there is an induced gradient at the extraction wells where LFG within the disposal module can flow toward the extraction well.

- Buried refuse is highly heterogeneous based on the variability of the materials, varying degrees of compaction and moisture contents, discontinuity resulting from daily cover placement, etc. As a result, conditions within the refuse mass can vary significantly from one location to another and over very short distances. Thus, installing a monitoring system to demonstrate negative pressure conditions throughout the entire unit is not practical.

- The requirement that negative pressure conditions must be "constantly" maintained is not practical. While most air permits require the LFG system to operate "24/7", periodic shutdowns are permitted to allow for routine maintenance and miscellaneous repairs. Routine maintenance is critical to maximize the operating life of the LFG system components (i.e., flare, blowers, etc.).

- The LFG system is currently regulated under Title 27 for perimeter and structure monitoring and Title 17 (Assembly Bill 32) for surface emissions, as well as a Permit to Operate and Title V Permit issued by the local air district. Each of these regulations and permits require comprehensive monitoring and reporting and are designed to ensure reliable and effective operation of the LFG system. Based on these circumstances, adding the requirement of an additional investigation and comprehensive reporting under the revised MRP is an unnecessary redundancy.

Based on the above factors and the provisions already in place for LFG system operation and monitoring, the requirement stipulated in this order should be deleted in its entirety.

Completion Reports

Order #9

Our objections to the issuance of the CAO have been previously stated. If the CAO is issued, the date needs to be modified to allow for sufficient time to implement the improvements after the respective assessments are completed. In regards to the slope stability and berm height improvements (if necessary), a completion report submittal date of 6 months after submittal of the *Facility Specification Technical Report (Slope Stability and Berm Evaluation)* is considered reasonable. As for the drainage improvements, an interim report documenting those improvements that could be completed prior to the 2014-2015 wet season should be submitted by February 28, 2015. A final report documenting the remaining improvements following completion of the 2014-2015 wet season should be submitted by August 30, 2015.

Further, if a CAO is issued, based on the previous responses to Orders #4(a) and #4(c)(2), the first two bullet items of this order should be deleted accordingly.

Order #10

Based on the previous response to Order #7(d), the second bullet item of this order pertaining to *Expansion of the In-situ Bioremediation Corrective Action Program Completion Report* should be deleted accordingly.

Order #11

As previously outlined in the response to Order #5(a), we do not agree that there is a need to replace or install additional background monitoring wells. As a result, preparation of a revised Water Quality Protection Standard (WQPS) Report to incorporate new background monitoring well data is not necessary. However, preparation of an updated WQPS Report as a means of assessing whether any revisions might be warranted based on recent data and findings is appropriate. The time to prepare an updated WQPS Report under this scenario would be 6 months following adoption of the CAO or WDR revision. In contrast, if new background monitoring points are mandated, the time required to prepare a revised WQPS Report would be 2 years following installation of the new background monitoring points.

Order #12(a)

As discussed previously in the response to Order #1(h), it is our opinion that this issue should be addressed as part of the In-Situ General Order and should therefore be deleted from this CAO. Furthermore, the statement that the Groundwater Concentration Report must document that a significantly decreasing trend in nitrate-N concentrations has occurred in all downgradient monitoring wells is not something that the Discharger can guarantee. While the intent of the nitrate CAP will be to eventually achieve this goal, it's impossible to guarantee that decreasing trends will be attained within a specific time frame.

As for the submittal deadline requirement of April 30, 2016, the nitrate CAP has yet to be approved, so it is premature to set a deadline for documenting potential trends. Regardless of the final decision as to whether this item remains part of the CAO or address under the In-Situ General Order, a submittal deadline of 2 years after approval of the nitrate CAP is considered reasonable.

Order #12(b)

This order should be deleted as the Discharger cannot guarantee that the nitrate concentrations will be reduced to below the concentration limit at each monitoring well within a specific time frame. While the intent of the nitrate CAP will be to eventually achieve this goal, it's impossible to make such a prediction.

Order #13

If the CAO is adopted, the following revisions should be considered:

- The following statement should be added to the end of this order … "In addition, the CVRWQCB will upload all of their correspondence to the web-based Geotracker database system."

- In the interest of being environmentally conscious, all future submittals should be paperless and submitted in a searchable Portable Document Format (PDF). Such a provision was recently mandated by the North Coast Regional Water Quality Control Board.

Order #14

The submittal of quarterly progress reports is excessive and unnecessary. Summarizing the progress of various projects mandated as part of the CAO on a semi-annual basis is considered reasonable and can be included with the routine semi-annual and annual monitoring reports generated under the MRP.

Order #15

This requirement is implicit for all work performed under the WDR/MRP and therefore does not need to be included as part of the CAO.

Order #16

This requirement already applies and is implicit in all work performed.

Order #17

We request that the WDR be modified to allow the facility's Responsible Person the authority to sign the various report submittals. This individual is directly and ultimately responsible for ensuring that the work is completed in accordance with the WDRs and CAO and is intimately familiar with the daily operations performed at the site. As with a number of items discussed in this response to comments, such a provision could be made as part of a WDR revision.

Education

MS, Geology, California State University, Hayward, California , 1986

BS, Geology, San Jose State University, San Jose, California, 1979

Certifications

Professional Geologist, California, #4496, 1988

Certified Engineering Geologist, California, #1763, 1993

Golder Associates Inc. – Sunnyvale

Professional Synopsis

Kris Johnson is a senior consultant responsible for conducting and managing hydrogeologic and engineering geologic projects for landfill and industrial sites. Responsible for client development, project management, and communicating with regulatory agencies. He has primary expertise in regulatory compliance and water quality issues at solid waste sites; and the implementation of detection monitoring, evaluation monitoring, and corrective actions.

Specific projects completed by Kris include closure and rescission of waste discharge requirements for a small landfill in Santa Clara County, California; corrective action design and implementation for a large methyl tertiary-butyl ether (MTBE) groundwater plume; corrective action evaluation and community involvement participation to reduce groundwater impacts from a closed, unlined landfill; storm water and groundwater related litigation support, including negotiations with litigant and regulatory agencies; design of perimeter landfill gas migration monitoring plans for several landfills, including one of the first alternative siting approvals from the regulatory agency; development of reasonable foreseeable release scenarios and corrective action cost estimates for several solid waste landfills; managing ongoing self-monitoring programs for several California and Nevada landfills, including evaluation of potential impacts and developing corrective actions as needed; closure of an underground storage tank leak site; development and approval of vadose zone monitoring plan for a Class II landfill in Nevada; preparation of a National Pollutant Discharge Elimination System (NPDES) permit for a 500 gallon per minute (gpm) discharge to surface water; assessment for corrective action evaluation of waste units at a former gold mine; and stability evaluation investigations for mine rock storage facilities and quarry pit slope stability.

Employment History

Conor Pacific/Einarson, Fowler & Watson – Mountain View, CA

Senior Engineering Geologist (1994 to 2004)

Senior engineering geologist responsible for implementation and management of technical services for a full range of environmental projects. Provided expertise in the evaluation and characterization of groundwater, soil, and landfill gas and acted as liaison for clients with regulatory agencies. Project responsibilities included ongoing water quality evaluation, design and implementation of geologic and hydrogeologic investigations at solid waste disposal, industrial, and LUFT facilities and subsequent development and negotiation of appropriate remedial solutions.

Pacific Environmental Group, Inc. – San Jose, CA

Senior Geologist (1990 to 1994)

Responsible for geologic, hydrogeologic, and geotechnical projects for refinery sites. Provided quality assurance controls of field work and technical reports, logging exploratory borings, design and installation of monitoring wells, design of

monitoring systems and plans, and project budgeting and administration. Supervised a team of several staff- and project-level geologists, engineers, and technicians devoted to refinery sites.

Representative project experience included: solid waste management unit investigations, monitoring, and corrective action; hydrocarbon and chemical spill investigations and remediation; operation, maintenance, and verification reporting for several groundwater extraction systems; site-wide monitoring and groundwater control programs; investigation and analysis of slope stability; support for EIR and RCRA facility permitting; mapping, restoration, and monitoring of wetlands; and planning, permitting, and implementation of excavated soil management programs.

EMCON Associates – San Jose, CA
Senior Project Geologist (1986 to 1990)

Responsible for conducting and managing hydrogeologic and engineering geologic projects for landfill, industrial, and municipal sites. Conducted petroleum tank leak, solvent leak, fault activity, landfill expansion, report of waste discharge, and solid waste assessment test report investigations. Designed and installed monitoring systems for several municipal landfills Implemented hydrogeologic investigations for landfill expansions in Sacramento and Santa Clara counties, and assessment and remediation of a 500,000 gallon diesel tank leak.

U.S. Geological Survey – Menlo Park, CA
Geologist (1979 to 1986)

Operational geologist for the Pacific-Arctic Branch of Marine Geology. Worked on sea-floor mapping, marine geotechnical studies, and environmental research projects off the coasts of Alaska, California, Oregon, Washington, New Zealand, and Antarctica. Interpreted soils engineering and sedimentological test results, seismic stratigraphy, and geophysical surveys, with emphasis on engineering properties, geologic hazards, and stratigraphic correlation.

SELECTED PROJECT EXPERIENCE

Landfill Closure and WDR Rescission
Santa Clara County, California

Revised the site Report of Waste Discharge, incorporated up-to-date information, and prepared a Request for Waiver of the landfill's Waste Discharge Requirements (WDRs). Evaluated historical groundwater monitoring data and made recommendations to obtain current data. Prepared a request for waiver from the WDR Monitoring and Reporting Program based on an assessment that the site does not significantly affect the water quality. The Regional Water Quality Control Board (RWQCB) terminated WDR coverage for the closed landfill.

Landfill Corrective Actions
San Mateo County, California

Implemented an Evaluation Monitoring Program that evaluated water infiltration into the closed portion of a landfill through rainfall and golf course irrigation. Developed a corrective action plan (CAP) that effectively reduced surface infiltration, cleaning up groundwater impacts downgradient of the landfill. Prepared a Corrective Action Evaluation and Community Environmental Activities Fact Sheet that resulted in regulatory approval to continue monitoring the reduction of groundwater impacts. Provided surface water and groundwater-related litigation support, including overseeing litigant sampling and negotiations with other parties and the regulatory agency.

Perimeter Landfill Gas Migration Monitoring
Central Valley, California

Prepared and successfully negotiated approval for a revised perimeter landfill gas migration monitoring plan. This was one of the first monitoring plans approved by the state under the new 2008 regulations. Proposed probe depths were based on site-specific conditions, which included shallow groundwater, multiple permeable zones, an adjacent stream that intersects the vadose zone, and a subsurface slurry-trench cut-off wall. The plan included construction alternatives that reduced the number of perimeter probes required.

Landfill Expansion
Yuba County, California

Project manager for a detailed hydrogeologic characterization of 1000-acre plus landfill expansion. The investigation included detailed subsurface characterization using cone penetration testing (CPT) methods, continuous coring and instrumentation, data logging, and isotopic analyses of multiple groundwater flow zones.

Landfill Engineered Alternative Evaluation
Solano County, California

Developed a conceptual and numerical groundwater flow models to evaluate regional and site-specific groundwater flow to evaluate the future effects of extensive groundwater extraction; and the interaction of several hydrogeologic features, including a subsurface clay-barrier cutoff wall, a groundwater extraction trench, and a 70-foot-deep dewatered soil borrow pit. The modeling provided the basis for the acceptance of an engineered alternative to the landfill siting criteria.

Fault Activity Evaluation for Landfill Expansion
San Jose, California

Evaluated activity of the Shannon fault in a proposed landfill expansion area. Work included excavation and logging of two trenches across the fault trace, collecting samples for radiocarbon age dating of the most recent surface displacement of the fault, and evaluating the regional seismicity of the region as it related to the fault.

Landfill Closures
Martinez, California

Project manager for the evaluation of corrective action and closure alternatives for 14 waste units at a major petroleum manufacturing facility. Work included determining the nature and extent of waste disposal, evaluating potential groundwater impacts, working with project engineers to select and design corrective actions and closure alternatives, evaluating slope stability, and designing corrective actions. Managed a site-wide groundwater monitoring program that included over 300 monitoring and extraction wells.

Engineering Feasibility Studies
Central Valley, California

Project manager for the investigation of indications of landfill leaks and preparation of engineering feasibility studies to provide corrective actions for remediation at several landfills. The work included investigations to determine the nature and extent of landfill leakage, including landfill leachate and landfill gas. Investigations included vadose zone and groundwater sampling and analysis for leakage constituents and stable and radioactive isotopes, hydraulic testing and leak detection analyses, and transport modeling in both the vadose zone and groundwater. Corrective action recommendations included excavation of impacted soils, installation of groundwater extraction wells, installation of landfill gas extraction systems (both active and passive), modifications to landfill module containment system design and construction standards, and improvements to landfill operations and maintenance activities.

Landfill Monitoring
Northern California

Project manager for the implementation of groundwater, vadose zone, surface water, leachate, and landfill gas detection, evaluation, and corrective action monitoring programs at over 20 municipal and hazardous waste landfills. The landfills include small rural sites and large regional facilities, both closed and active. Clients include public agencies and large national landfill firms. Coordinated the sampling, laboratory analysis, statistical analysis of data, and timely quarterly and semi-annual reporting of monitoring results.

Fault Activity Evaluation for Landfill Expansion
San Luis Obispo County, California

Evaluated the activity of the Indian Knob fault in a proposed landfill expansion area. Work included excavation and logging of two trenches across the mapped fault trace. The soil and bedrock were evaluated to determine the timing of the most recent surface rupture on the fault.

MTBE Plume Investigation
Livermore, California

Project manager for the investigation and remediation of a half-mile long MTBE groundwater plume in an urban setting. The work included extensive geologic and hydrogeologic investigations utilizing innovative tools, technologies, and site characterization methodology. The off-site investigation involved work on adjacent private property and encroachment on City right-of-way for multiple soil borings, CPTs, depth-discrete groundwater samples, conventional well installation, and installation of multi-level monitoring wells. Pioneered an innovative electronic reporting method for the local oversight agency. Demonstrated that the MTBE was degrading naturally and the plume was stable. Installed and operated an ozone groundwater treatment system.

Underground Storage Tank (UST) Site Closure and No Further Action
San Mateo County, California

Project manager for an off-site investigation to characterize the potential impact to soil and groundwater downgradient of a former (redeveloped) gas station. The off-site investigation included collecting soil and groundwater samples from locations on a California State highway, a main arterial road, and an active commuter rail line. The field work required obtaining permits from CalTrans (the state transportation agency), rigorous traffic controls, and working at night during low traffic times. The off-site characterization was complicated by multiple contamination sources and co-mingled plumes. Based on the results of this investigation, the site received closure from the County Department of Health Services, with no further action required.

UST Site Closure & No Further Action
San Mateo County, California

Project manager for the removal of USTs from a former gasoline station in East Palo Alto, California. The station was part of the State Water Resources Control Board Emergency, Abandoned, and Recalcitrant site program. Golder worked with the San Mateo County Environmental Health Department to remove the site underground storage tanks, pumps, and piping, perform overexcavation, obtain confirmation soil samples, and sample groundwater monitoring wells. Based on the results of this investigation, the site received closure from the County Department of Health Services, with no further action required. The on and off-site monitoring wells were then properly destroyed under permit with the County.

Publications

Johnson, Kris and Jennifer Panders. 2005. *Methyl Tert-Butyl Ether Degradation to Tert-Butyl Alcohol in Landfill Leachate Under Methanogenic Conditions*. Sardinia Tenth International Waste Management and Landfill Symposium.

Johnson, K. and J. Panders, How Do Modern Landfills Leak?, Proceedings Sardinia 2003 Ninth International Waste Management and Landfill Symposium, ed. Christensen, T. H., Cossu, R., Stegman, R.

Cochrane, D. and Johnson, K., Evaluation and Mitigation of Potential Ground Rupture Hazards Owing to Surface Faulting as MSW Landfills, Proceedings Sardinia 2001 Eighth International Waste Management and Landfill Symposium, ed. Christensen, T. H., Cossu, R., Stegman, R.

Johnson, K., Einarson, M., Fowler, W., and Gambelin, D., An Expensive Lesson: Hydrogeologic Characterization Is The Key to Inward Gradient Landfill Design, Proceedings SWANA's 2nd Annual Landfill Symposium, Sacramento, California, 1997 and in: Water Quality International, November/December 1997, p. 43-45.

Education

M.Sc. Geological Engineering, University of Idaho, 1987

B.Sc. Geological Engineering, Washington State University, 1985

Certifications

Registered Professional Engineer, California

Golder Associates Inc. – Sacramento

Employment History

Golder Associates – Roseville, CA

Staff Engineer to Principal Engineer (1987 to Present)

Mr. Haskell has 27 years of experience with a variety of solid waste, mining and other civil and geotechnical engineering projects. Mr. Haskell's solid and hazardous waste experience has included the design of numerous municipal solid waste and hazardous waste landfill liners, covers, and impoundment facilities. He has been the engineer-of-record for more than 40 landfill base liner, landfill final cover, and leachate impoundment design and/or construction projects. These waste containment projects have included design and construction of landfill base liner and leachate collection and removal systems, final cover systems, and leachate impoundment liners located at 14 landfill facilities in California.

Mr. Haskell's landfill experience encompasses: Permitting new facilities and landfill expansions; preparation of construction plans, specifications and bid documents; permitting and designing engineered alternative liner and cover systems including evapotranspirative (ET) soil covers; preparing master development plans and fill sequence plans for several large solid waste facilities; evaluating clay sources for use in low-permeability soil liners; and providing construction quality assurance for base liner systems and cover systems.

Mr. Haskell has provided expert testimony/third party review of projects involving cost allocation in the development of tipping fees for landfills, and remediation of liner and cover systems. He has also provided engineering and environmental due diligence support for the acquisition of more than 10 landfill facilities located in the California, Nevada, Oregon, and Washington.

Rockwell, Basalt Waste Isolation Project

Staff Engineer (1986)

Scheduled laboratory and in situ rock mechanics tests, assisted in the preparation of subsurface site characterization study plans.

Department of Geological Engineering, University of Idaho

Research Assistant (1985 to 1986)

Statistical evaluation of the effect of rock discontinuity properties on groundwater flow in an underground lead-zinc mine.

PROJECT EXPERIENCE – LANDFILL

Tri-Cities Landfill Closure
Freemont, California

Project Manager and engineer-of-record for the design of the final closure for the Tri-Cities Landfill. The landfill measures 110-acres and was closed with a prescriptive soil cover. Construction documents and an updated Closure Plan were prepared and approved by the regulatory agencies.

City of Palo Alto Landfill
Palo Alto, California

Project Manager and engineer-of-record for the design of the third and final phase of closure for the City of Palo Alto Landfill. The final phase of closure measures 50 acres in area and includes an evapotranspirative soil cover. The landfill is designed to be a public park following closure.

Guadalupe Landfill,
San Jose, California

Project Manager and Engineer-of-Record for the preparation of Joint Technical Document, Master Plan, and Preliminary Closure/Postclosure Maintenance Plan for the Guadalupe Landfill. As part of this project, the cover system was also redesigned to provide a technically superior and more cost effective closure. Master planning address construction sequencing, relocation of a waste-to-energy facility, design of a new access road, and soil balance. Engineer-of-record and CQA engineer-of-record for the construction of three base liner expansion projects.

Lined Dedicated Land Disposal Project
Sacramento County, California

Project Manager and engineer-of-record for the base liner and leachate collection system design for the design and construction quality assurance of lined, dedicated land disposal units (L-DLD) at the Sacramento Regional Waste Water Treatment Plant. Sacramento County constructed three 40-acre L-DLD units to allow continued land application/treatment of biosolids. Golder was retained as part of the design team to provide expertise on the design and construction quality assurance of the base liner and leachate collection system.

Rock Creek Landfill Closure, Calaveras County, California

Project Director responsible for technical review of the final closure design of the first 10-acre phase of closure for the Rock Creek Landfill. Closure construction included the installation of a landfill gas collection and control system and a landfill gas flare.

Buena Vista Landfill Closure Remediation,
Amador County, California

Project Manager and engineer-of-record for the remediation of the closure design and construction of an 8-acre landfill closure that was rejected by State regulatory agencies as not complying with California regulations. Golder was retained by the County to investigate and work with the regulatory agencies to develop a remediation plan. Remediation involved the removal and reconstruction of the geomembrane layer on the top deck. Remediation activities were completed in 2009 and approved by the regulatory agencies in 2010.

Yolo County Landfill
Yolo County, California

Project Manager and Engineer-of-Record for the design of a Class III solid waste landfill expansion at the Yolo County Central Landfill. Completed plans, specifications, and bid documents for a 10-acre cell and obtained regulatory approval within 90 calendar days. The landfill was also designed with the flexibility to operate as a bioreactor. Also completed plans, specifications, and bid documents for the subsequent 12-acre cell.

Pacheco Pass Landfill Closure
Gilroy, California

Project Director responsible for technical review of the construction quality assurance that was being performed for the construction of a 25-acre, geomembrane final cover system at the Pacheco Pass Landfill.

Crazy Horse Landfill Closure
Salinas, California

Project Director responsible for technical review of the design of a 65-acre landfill closure using a geomembrane on the top deck and a ClosureTurf geosynthetic cover on the side slopes.

Class II Surface Impoundments Closure
Lawrence Livermore, California

Project Manager and engineer-of-record for the clean closure of two wastewater impoundments at the Lawrence Livermore National Laboratories Site 300 Facility. The project also involved the design of a network of open-top storage tanks to replace the impoundments.

Avenal Landfill Liner Performance Demonstration
Avenal, California

Project Manager and Engineer-of-Record for the completion of liner performance demonstration for the proposed expansion of the Avenal Landfill. The Regional Water Quality Control required demonstration that the proposed liner system would comply with the requirements of Title 27 of the California Code of Regulations.

Ostrom Road Landfill
Yuba County, California

Project Manager for the design of a Class II solid waste landfill expansion at the Ostrom Road Landfill. Engineer-of-Record for the completion of construction plans, specifications, and bid documents for construction of an eight-acre base liner (1998), ten-acre base liner (1999), seven-acre base liner (2002), and 12-acre base liner (2004). CQA Engineer-of-Record for base liner projects completed in 2002, 2004, and 2008. Developed a revised cover grading plan and prepared an associated Joint Technical Document for a vertical expansion. Performed master planning for future fill sequencing.

Hay Road Landfill Closure Design
Vacaville, California

Project Manager and Engineer-of-Record for the preparation of a Preliminary Closure/Postclosure Maintenance Plan for the Hay Road (formerly known as B&J) Landfill in Vacaville, California. The PCPMP addressed and Engineered Alternative Design for the cover system that included a one-foot thick foundation layer and substitution of a geosynthetic clay layer in place of a compacted clay layer.

Hay Road Landfill
Vacaville, California

Prepared construction plans, specifications and bid documents for multiple base liner projects and served as the Construction Quality Assurance Engineer for three of the base liner construction projects. Developed clay compaction recommendations for the use of on-site clay as clay liner material.

Landfill Flood Control Levee
Novato, California

Project manager and engineer-of-record for the design of a flood control levee at the Redwood Landfill.

Municipal Solid Waste Landfill Expansion
Anderson, California

Project manager and CQA engineer-of-record for the construction of the Waste Management Unit 2Ba base liner and leachate collection removal system. Also served and the design engineer and CQA engineer-of-record for a leachate impoundment.

Lake County Landfill Expansion
Lake County, California

Project Manager and Engineer-of-Record for the design of a Class III solid waste landfill expansion at the Eastlake Sanitary Landfill in Lake County. Project involved the permitting and design of geosynthetic clay liner as an engineered alternative design to the State prescriptive standard liner requirements. The project also included the preparation of the construction plans, specifications, and bid documents for the initial 6-acre cell (1999) and current design of the next 7-acre cell (2002). CQA Engineer-of-Record for the 7 acre-base liner project constructed in 2003.

Scale Facilities Design
Lake County, California

Design engineer for the development of a new access road, scale facilities, and bag-dump area for the Eastlake Landfill. The design accommodated 150 tpd of disposal and included pavement design and layout of the facilities and utilities.

Compost Pad Expansion
Vacaville, California

Project Manager and Engineer-of-Record for the five-acre expansion of compost pad at the Hay Road Landfill in Vacaville, California. Project included grading design, preparation of plans and specifications and construction quality assurance.

Altamont Landfill Expansion
Livermore, California

Design engineer for the development of a 120-acre landfill that included both a vertical expansion over existing refuse and a lateral expansion over native ground. The project involved a comprehensive design effort that consisted of an evaluation of alternative base grades and cell geometries; a cost-benefit analysis of the various alternatives; and the design of the liner and leachate collection and removal systems, groundwater collection system, gas collection system, surface water control facilities, closure cover system, and construction sequencing. The project provided several technical challenges that included the design of a liner system over refuse, design of an underdrain system to control groundwater, and upgrading the site's surface water control facilities to accommodate a 1,000-year storm. The design required regulatory variances for a proposed engineered alternative to the State's groundwater separation requirement, and for an alternative liner system that utilized a geosynthetic clay liner in place of two feet of compacted clay. Engineer-of-Record for four base liner expansion projects completed between 1995 and 2002.

Scale Facilities Design
Livermore, California

Design engineer for the development of a new 3,700 foot long access road, scale facilities, and wheel-wash units for the Altamont Landfill. The design accommodated 6,000 tpd of waste disposal and included pavement design and layout of the facilities and utilities.

Bioreactor Feasibility Study
Yuba County, California

Project Manager for a feasibility study for converting and operating the Ostrom Road Sanitary Landfill as a bioreactor. The project involved the development of a degradation model to predict landfill stabilization and gas generation rates. The study evaluated the optimum cell configuration and construction sequencing, conceptual leachate recirculation and management design, conceptual gas collection system design, and calculation of increased airspace. In addition, a life-cycle cost analysis was developed that included annual costs for operation and maintenance, construction, design, and additional revenue due to increased airspace.

Neal Road Landfill Expansion
Butte County, California

Project Manager for the design of a Class III horizontal landfill expansion and Class II leachate evaporation impoundment at the Neal Road Landfill in Butte County, California. Performed a feasibility study to maximize soil balance, airspace, and minimize costs. Project includes the permitting of a GCL as an engineered alternative design liner system to the State prescriptive standard liner design, and the preparation of a design report, construction plans and bid documents for the initial 10-acre cell. Design plans were prepared for the subsequent next 5 phases of liner development.

Mixed-Waste Landfill Closure
Lawrence Livermore, California

Design Engineer for the closure of the Pit 6 Landfill at Site 300, Lawrence Livermore National Laboratories. The Pit 6 landfill is a mixed-waste disposal facility containing numerous drums, glove boxes, and tanks, and other containers that have resulted in the development of voids at the landfill surface. To address the development of voids under the cover, the design incorporated a geogrid layer for support and a geosynthetic clay liner as a substitute for low-permeability soil to minimize the weight of the cover. The resulting design resulted in construction costs that were less than half of the closure costs that were previously permitted and constructed similar landfills at the site.

Hazardous Waste Landfill Closures
Kettleman City, California

Design of cover systems to close four hazardous waste disposal areas ranging from 15 to 50 acres in size. Responsibilities included performing design calculations, and preparing construction drawings and specifications. Prepared a report recommending a design methodology for estimating settlements for landfills comprised primarily of liquid filled drums and for landfills comprised of compacted, solid wastes.

Landfill Closures
Presidio of San Francisco, California

Project Manager for the investigation and closure design for two abandoned landfills. The closures are part of a remediation and restoration program at Presidio military facility under the direction of the U.S. Army Corp of Engineers. Responsible for overall project management including field program and closure cover design. Field investigation includes the use of geophysics (ground penetrating radar and electromagnetic surveys) to define the limits and depth of waste.

Municipal Solid Waste Landfill Expansion
Fairfield, California

CQA engineer-of-record for the construction of a base liner expansion project at the Potrero Hills Landfill.

Leachate Impoundments
San Jose, California

Project manager and engineer-of-record for the design and CQA of two leachate impoundments at the Kirby Canyon Landfill.

Municipal Solid Waste Landfill Expansion
Las Vegas, Nevada

Provided internal technical review of design plans for the construction of base liner and leachate collection and removal system at the Apex Landfill.

Municipal Solid Waste Landfill Acquisition Due Diligence
Panaca, Nevada

Provided engineering and environmental due diligence support for the acquisition of the Crestline Landfill.

Municipal Solid Waste Landfill Acquisition Due Diligence
Monterey County, California

Provided engineering and environmental due diligence support for four separate landfills involved in the change of contracted landfill operators. This support included an assessment of the environmental controls, operating practices, and establishment of base line conditions. Recommendations were provided for modification of future operations where appropriate.

Confidential Landfill Audit
California

Completed due diligence site audit for a landfill acquisition located Northern California. Reviewed the engineering design, operational practices, potential environmental concerns, confirmed the capacity and the expansion potential for the facility, and projected facility development and closure costs.

Municipal Solid Waste Landfill Acquisitions Due Diligence
Oregon

Completed due diligence site audit for a proposed active landfill acquisition and a completed acquisition of a materials recycling facility that had a closed landfill within the acquired property. Reviewed the engineering design, operational practices, potential environmental concerns, and provided independent assessment of the closure and postclosure maintenance cost estimates.

Municipal Solid Waste Landfill Acquisition Due Diligence
Washington

Completed due diligence site audit for a proposed landfill acquisition located Washington. Reviewed the engineering design, operational practices, potential environmental concerns, confirmed the capacity and the expansion potential for the facility, and projected facility development and closure costs.

Class III Landfill Litigation Support
Eureka, California

Expert witness for litigation support for a landfill closure project and related remediation measures implemented for a Class III landfill. The project involved the construction of a toe buttress as part of closure plan to increase slope stability, and construction of an upgradient groundwater interceptor trench. The project involved additional costs for engineering and remediation of excessive settlement cracks that developed in the toe buttress, and installation of second interceptor trench due to inadequate grades designed for the initial trench. Golder's reviewed the project and assessed cost allocations for the various parties involved.

MICHAEL A. DELMANOWSKI, P.G., C.E.G., C.Hg.
SENIOR HYDROGEOLOGIST

PROFESSIONAL CERTIFICATIONS/MEMBERSHIPS

Certified Hydrogeologist, California
Certified Engineering Geologist, California
Professional Geologist, California

OSHA 40-Hour Hazardous Waste Activities Training
OSHA 8-Hour Hazardous Waste Activities Management Training
8-Hour Competent Person Awareness - Trench Shoring Safety

Association of Groundwater Scientists and Engineers of NGWA

EDUCATIONAL BACKGROUND

California State University, Fresno, CA
M.S. Geology (Groundwater Emphasis)

University of Redlands, Redlands, CA
B.S. Geology

EXPERIENCE SUMMARY

Mr. Delmanowski is a certified hydrogeologist and engineering geologist with over 27 years of experience in the fields of hydrogeology and environmental geology. Prior experience includes technical and management services for a wide range of hydrogeologic, environmental, and solid waste projects. The nature and scope of these projects have included: hydrogeologic characterization investigations, surface and subsurface geologic investigations, remedial investigation/feasibility studies (RI/FS), remedial action design/implementation of soil, groundwater, and landfill gas (LFG) corrective action programs, construction quality assurance (CQA) monitoring, storm water management, landfill closure design/management, and solid waste permitting services.

Mr. Delmanowski has been employed with EBA Engineering (EBA) since 1995 and serves as the company's senior hydrogeologist. At EBA, Mr. Delmanowski is responsible for developing and implementing a wide variety of groundwater-based investigations, including water availability studies, salt water intrusion studies, groundwater dewatering projects, and site characterization/remediation investigations for solid waste landfills and commercial facilities (i.e., fueling stations, dry cleaners, etc.). Mr. Delmanowski also oversees all of EBA's groundwater monitoring programs for solid waste landfill sites and other waste facilities. In addition to groundwater issues, Mr. Delmanowski is also extensively involved in solid waste

management projects that entail the preparation of permitting documents, development of design parameters and specifications for landfill closure and expansion projects, design of LFG monitoring networks, active collection systems and monitoring programs, and CQA management services.

Prior to joining EBA Engineering, Mr. Delmanowski conducted a wide range of hydrogeologic and environmental geology studies in California while employed with The Twining Laboratories, Inc. of Fresno, California. These studies included waste disposal, regulatory compliance, and site assessment/remediation at locations throughout the San Joaquin Valley, Sierra Nevada foothills, Los Angeles Basin, and San Francisco Bay area.

REPRESENTATIVE PROJECTS

- Currently serves as the Project Manager for environmental sampling and reporting services at four (4) landfill/surface impoundment sites regulated by the Central Valley, North Coast and San Francisco Bay Regional Water Quality Control Boards. Responsibilities include scheduling and management of EBA staff and subcontractors, data review and analysis, report preparation or review, project tracking, budgeting, and client and regulatory liaison.

- Performed numerous groundwater availability studies throughout Sonoma County to comply with Policy WR-2e of the Sonoma County General Plan's (SCGP's) Resource Conservation Element. Services provided as part of these studies have included site reconnaissance to evaluate geologic and hydrogeologic conditions, review of water well driller's reports, determination of cumulative impact areas, performance of water balance calculations, evaluation of projected drawdown characteristics and well interference, and preparation of Geologic Reports in accordance with County of Sonoma, Permit and Resource Management Department (CS-PRMD) requirements.

- Performed salt water intrusion studies at a number of sites in Sonoma County to comply with Policy WR-1u of the SCGP. Services included site reconnaissance to evaluate geologic and hydrogeologic conditions, groundwater sampling, water chemistry data analysis, performance of aquifer pumping test and data reduction, water balance calculations, and report preparation in accordance with CS-PRMD requirements.

- Performed a comprehensive water balance analysis for a man-made pond in southeast Sonoma County under the regulatory oversight of CS-PRMD. The scope of work included a detailed accounting of on-site water use, research and acquisition of historical climate data, development of spreadsheet model to simulate water level fluctuations in pond due to seasonal rainfall and evaporation, and preparation of summary report.

- Developed a dewatering program for a quarry site in Sonoma County to allow for rock extraction while minimizing drawdown effects on adjacent properties. Services included site reconnaissance to evaluate geologic and hydrogeologic conditions, installation of monitoring well networks, performance of aquifer pumping tests, evaluation of various

drawdown scenarios using computer software, performance of water balance calculations, and evaluation of post-operation surface water and groundwater conditions.

- Project manager responsible for managing and performing engineering feasibility studies for leachate management and groundwater remediation at a municipal solid waste landfill in Sonoma County. Responsibilities included management of project staff, coordination of field activities, performance of research and evaluations, report preparation and oversight, and client and regulatory liaison.

- Project manager responsible for development and implementation of a Corrective Action Plan (CAP) to address groundwater degradation issues at a municipal solid waste landfill in Sonoma County. Responsibilities included regulatory liaison, research of site characteristics, implementation of field operations, data reduction and interpretation, development of corrective action measures, and report preparation.

- Assistant project manager of a comprehensive groundwater and LFG monitoring program for eight solid waste landfill sites in Sonoma County. Responsibilities included technical supervision of sampling personnel, scheduling, and general project management. In addition, provided technical review and certification of required reporting documents.

- Provided expert witness consultation for the defense in a mediation process involving a contaminated dry cleaner facility in Northridge, California. EBA was contracted by an insurance company to evaluate previous site characterization work and remedial actions proposed by the plaintiff's environmental consultant. Scope of services included the evaluation of previous site characterization work, technical review of proposed remedial action measures and development of recommended alternatives, analysis of previous and projected cost expenditures, and technical consultation during the mediation process.

- Project manager responsible for managing and performing Evaluation Monitoring Program (EMP) and CAP for groundwater assessment and remediation at a closed municipal solid waste landfill in Alameda County, California. Also responsible for managing ongoing groundwater and surface water monitoring as part of the facility's Detection Monitoring Program. Responsibilities include management of project staff, implementation of field activities, performance of research and evaluations, report preparation and oversight, and client and regulatory liaison.

- Senior hydrogeologist responsible for evaluating the effectiveness of corrective action measures being employed at a municipal solid waste landfill in Stanislaus County, California. Responsibilities included historical research of site conditions, evaluation of the local hydrogeology, performance of groundwater pumping tests, and development of corresponding conclusions and recommendations.

- Senior hydrogeologist responsible for preparation of a groundwater contingency plan to abate shallow groundwater conditions at a Class III landfill in Kings County, California. Responsibilities included historical research of site conditions, evaluation of the local

hydrogeology, and the development of contingency mitigation measures for periods of shallow groundwater conditions.

- Project manager for conducting a vadose zone and hydrogeologic investigation of suspected waste contamination at a Class II surface impoundment in Yuba County, California. Responsibilities included development and implementation of a soil and groundwater sampling program, evaluation of groundwater quality data, and preparation of pertinent documents and reports.

- Project manager of an emergency response action in Mariposa County, California to abate the seepage of gasoline into a creek. The gasoline was derived from a nearby gasoline service station. Responsible for overall project coordination, supervision of emergency response crews, and implementation of site characterization activities. The response action and subsequent characterization work included the installation of groundwater interceptor trenches along the creek, implementation a pump-and-treat operation using the interceptor trenches, installation of groundwater monitoring wells and product recovery wells, performance of groundwater "slug" tests, and preparation of pertinent documents and reports.

- Project manager for the development of a storm water management program for an industrial facility located in the Sierra Nevada foothills, Madera County, California. Program focused on bringing the facility into compliance with Waste Discharge Requirements. Responsibilities included site reconnaissance to identify erosional source areas, development of a surface water sampling program, and preparation of problem abatement procedures and documents.

- Project manager of a groundwater monitoring program to monitor and assess potential effects of a recreational and residential development on underlying groundwater supply and groundwater quality at a site in the Sierra Nevada foothills, Fresno County, California.

- Supervised and managed numerous projects while employed with The Twining Laboratories, Inc. associated with groundwater contaminated sites throughout California. Responsibilities included the scheduling and supervision of staff, coordination of field and laboratory activities, development of groundwater sampling programs, implementation and analysis of aquifer pumping tests, preparation and/or technical review of Remedial Investigation work plans and reports, and client and regulatory liaison. Also was responsible for developing groundwater treatment programs.