

Lincoln Center Environmental Remediation Trust

June 23, 2011

Mr. Josh Palmer, P.E.
Mr. James Marshall, P.E.
Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, California 95650-6114

Subject: Tentative NPDES Permit No. R5-2011-XXXX, Lincoln Center, Stockton, California

Dear Mr. Palmer and Mr. Marshall:

On behalf of the Lincoln Center Environmental Remediation Trust ("the Trust"), Arcadis-US, Inc. (Arcadis) has provided me the attached letter detailing their comments to the Tentative NPDES Permit No. R5-2011-XXXX received on May 23, 2011.

The Trust has only one comment on the Tentative Permit. The Tentative Permit includes a significantly more stringent effluent limitation for 1,1-dichloroethylene (1,1-DCE), which we request be removed from the permit in favor of continued monitoring at this time.

If you have any questions, please contact me at 510-237-1782, or the ARCADIS contacts Lucas Goldstein at 510-596-9535 or Don Bradshaw at 512-895-0003.

Sincerely,



Mark A. Adams, P.G., Trustee
Lincoln Center Environmental Remediation Trust

Attachments:

ARCADIS June 23, 2011 Comment Letter on the Tentative NPDES Permit

cc: John Farr, Ph.D., P.E., Farr Associates
David Sadoff, CHARTIS
David B. Durrett, Cohen & Durrett
Phil Johnson, Sims Grupe Management
Joe Salazar Jr., Lewis Brisbois Bisgaard & Smith LLP
Katherine Wagner, Downey, Brand, Seymour & Rohwer
Roberto Cervantes, P.E., RWQCB, Central Valley Region



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Point Richmond, California 94801

ARCADIS U.S., Inc.
2000 Powell Street
Suite 700
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Tel 510 652 4500
Fax 510 652 4906
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Subject:

ARCADIS's Comments on the Tentative Waste Discharge Requirements Order for the Lincoln Center Environmental Remediation Trust Groundwater Treatment System, San Joaquin County (Order No. R5-2011-XXXX, NPDES No. CA0084255)

ENVIRONMENT

Dear Mr. Adams:

Date:

June 23, 2011

On behalf of the Lincoln Center Environmental Remediation Trust ("the Trust"), ARCADIS is transmitting these comments on the Tentative Waste Discharge Requirements Order No. R5-2011-XXXX for the renewal of National Pollutant Discharge Elimination System (NPDES) Permit No. CA0084255 ("the Tentative Permit") for the Lincoln Center Groundwater Treatment System (the Treatment System). ARCADIS has only one comment: the Tentative Permit includes a significantly more stringent effluent limitation for 1,1-dichloroethylene (1,1-DCE)—notably reduced by one order of magnitude from 0.5 micrograms per liter ($\mu\text{g/L}$) to 0.057 $\mu\text{g/L}$ —which we request that the Central Valley Regional Water Quality Control Board (RWQCB) remove from the permit in favor of continued monitoring at this time.

Contact:

Lucas Goldstein

Phone:

510.596.9535

Email:

lucas.goldstein@arcadis-us.com

In ARCADIS's opinion, the proposed water-quality based effluent limit (WQBEL) for 1,1-DCE could result in violations if the concentrations of this constituent increase in the future.

Our ref:

EM006750.0010.00323

ARCADIS notes that, in June 2002, the United States Environmental Protection Agency (USEPA) changed the classification of 1,1-DCE to non-carcinogenic due to the lack of observed carcinogenesis in both animal studies and epidemiological evaluations; the California EPA subsequently agreed to and adopted this change. We understand that the CTR—which was promulgated by the USEPA on May 18, 2000 and amended on February 13, 2001 (i.e., prior to June 2002)—does not reflect the new classification of 1,1-DCE as non-carcinogenic. In comparison, note that the CTR criterion for vinyl chloride, a known human carcinogen, is 2 $\mu\text{g/L}$, approximately two orders of magnitude greater than the CTR criterion for 1,1-DCE of 0.057 $\mu\text{g/L}$.

According to the Tentative Permit, the proposed WQBEL of 0.057 $\mu\text{g/L}$ for 1,1-DCE was established in accordance with Section 1.3 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP), and based on:

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- The California Toxics Rule [CTR] criterion for the protection of human health;
- The observation that 1,1-DCE was detected twice in the influent; and
- The assumption that immediate compliance with the effluent limitation was feasible because 1,1-DCE was not detected in the effluent.

Given the rationale summarized above and based on the results of further evaluation, ARCADIS believes that there are insufficient data to select an appropriate effluent limitation for 1,1-DCE at this time. Data are not sufficient to conclusively state whether or not a WQBEL should be required according to Section 1.3 of the SIP, which specifies that:

If data are unavailable or insufficient...to conduct [Steps 1 through 7] for the pollutant, or if all reported detection limits of the pollutant in the effluent are greater than or equal to the [water quality objective] C value, the RWQCB shall require additional monitoring for the pollutant in place of a WQBEL...If, upon completion of the monitoring required by Step 8 and the subsequent analysis in Steps 1 through 7, a specific pollutant was not detected in any effluent or if ambient background sample and applicable detection limits are greater than or equal to the C value, the RWQCB may require periodic monitoring of the pollutant.

Available data are also not sufficient to conclusively determine whether immediate compliance with the proposed WQBEL is feasible. Although the Tentative Permit correctly states that 1,1-DCE was not detected in the system effluent, the current laboratory method detection limit (MDL) for 1,1-DCE (typically 0.5 µg/L) exceeds the proposed WQBEL (0.057 µg/L) by approximately one order of magnitude. ARCADIS conducted an evaluation to assess the expected removal efficiency of 1,1-DCE via air stripping or carbon adsorption given current Treatment System parameters and the demonstrated removal efficiency of tetrachloroethylene from the influent groundwater (see Attachment 1). This evaluation indicated the following:

- Given the current Treatment System configuration and historical influent concentrations, effluent concentrations of 1,1-DCE are unlikely to exceed the proposed effluent limit due to the high strippability of this constituent;
- However, 1,1-DCE may be of concern if concentrations of this constituent increase in the future.

We note that the RWQCB's findings in the Tentative Permit demonstrate that the mere possibility of exceedance of the CTR-based objective for 1,1-DCE would threaten drinking water supplies. In considering and adopting a mixing zone for barium and arsenic, the substantial distance to any drinking water supplies has been specifically noted. Because a finding of reasonable potential is not required for 1,1-DCE under the SIP, the RWQCB has discretion to consider such additional information and find that an effluent limit is not necessary at this time. Accordingly, ARCADIS believes that the most appropriate action at this juncture is to implement regular monitoring for 1,1-DCE. ARCADIS understands that if additional data, obtained through ongoing effluent monitoring, indicate that a WQBEL is necessary, the permit may be reopened and modified with an appropriate effluent limitation.

If you have any questions or comments, please call Lucas Goldstein at 510-596-9535 or Don Bradshaw at 512-451-1188.

Sincerely,

ARCADIS U.S., Inc.



Lucas Goldstein, P.G., P.E.
Principal Engineer



Emily Sheu, E.I.T.
Staff Engineer

Attachments:

Attachment 1: Evaluation of 1,1-Dichloroethylene Removal Efficiency for the Lincoln Center Groundwater Remediation System, Stockton, California

Copies:

Ms. Katharine Wagner, DowneyBrand



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ENVIRONMENT

Subject:
Evaluation of 1,1-Dichloroethylene Removal Efficiency for the Lincoln Center
Groundwater Remediation System, Stockton, California

Dear Mr. Adams:

Date:
June 15, 2011

On behalf of the Lincoln Center Environmental Remediation Trust (“the Trust”), ARCADIS has prepared this letter summarizing the results of our evaluation of the expected removal efficiency of 1,1-dichloroethylene (1,1-DCE) via air stripping or carbon adsorption as part of the Lincoln Center Groundwater Extraction and Treatment System (the Treatment System).

Contact:
Lucas Goldstein

Phone:
510.596.9535

This evaluation was conducted in response to the new proposed water-quality based effluent limit for 1,1-DCE of 0.057 micrograms per liter ($\mu\text{g/L}$), specified in the draft of the proposed NPDES permit (No. R5-2011-XXXX, the “Draft Permit”) for the Lincoln Center Site. A review of historical effluent data collected over the past five years demonstrates that 1,1-DCE has not been detected above the current laboratory method detection limit (MDL); however, the proposed effluent limit for 1,1-DCE is of potential concern for the following reasons:

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Our ref:
EM006750.0010.00323

- The current MDL for 1,1-DCE (typically $0.5 \mu\text{g/L}$) exceeds the proposed effluent limit ($0.057 \mu\text{g/L}$) by approximately one order of magnitude.
- 1,1-DCE was detected above the MDL in 6 of 59 system influent samples analyzed over the past five years; the maximum detection of 1,1-DCE was $1.4 \mu\text{g/L}$ (estimated concentration reported above the MDL but below the reporting limit).
- 1,1-DCE was detected in 10 of approximately 60 groundwater monitoring well samples analyzed over the 2010 calendar year; the maximum detection was $4 \mu\text{g/L}$. However, it is difficult to evaluate the actual extent of 1,1-DCE at concentrations above $0.057 \mu\text{g/L}$ because the laboratory performs dilutions on

Imagine the result

samples with elevated tetrachloroethylene (PCE) concentrations; therefore raising the MDL of 1,1-DCE to as high as 100 µg/L in diluted samples

The objectives of this evaluation were to: (1) assess the strippability and adsorbability of 1,1-DCE relative to other constituents of concern [i.e., PCE and trichloroethylene (TCE)] in the influent groundwater; and (2) to evaluate the effectiveness of the air stripper versus the GAC system at treating 1,1-DCE.

In order to assess the relative strippability of 1,1-DCE, ARCADIS calculated the theoretical removal efficiencies of three constituents (1,1-DCE, PCE, and TCE) via air stripping as a function of the air to water ratio. Model results, presented in Figure 1 (below), indicate that a significantly higher removal efficiency can be achieved for 1,1-DCE at a given air flow rate (i.e., 1,1-DCE has a higher strippability than TCE or PCE due to a higher Henry's law constant).

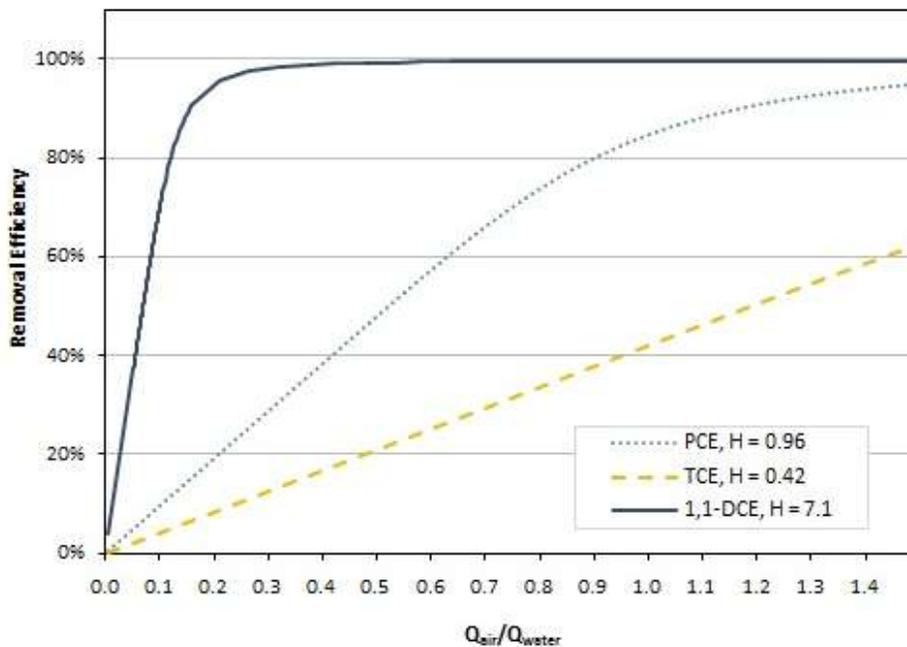


Figure 1: Removal efficiency as a function of the air to water ratio for an air stripper. The following design parameters were used in the calculations: a water flow rate (Q_{water}) of 0.43 MGD, a packing depth of 4 meters, and a cross-sectional area of 3 square meters. H is the dimensionless Henry's law constant (at 20 degrees Celsius).

Based on historical influent and effluent data collected during treatment system monitoring, the existing air stripper removes PCE with approximately 99.6% efficiency. Applying this value to 1,1-DCE, the existing air stripper could theoretically achieve the proposed effluent quality objective of 0.057 µg/L with influent 1,1-DCE concentrations as high as approximately 14.2 µg/L. Note that: (1) the 14.2 µg/L is a conservative estimate as the removal efficiency of 1,1-DCE via air stripping is expected to be greater than 99.6% due to the constituent's higher strippability when compared to PCE; and (2) historically, 1,1-DCE has only been detected sporadically in the influent, and the detected concentrations were significantly lower than the calculated 'theoretical maximum influent' concentration.

In order to assess the relative adsorbability of 1,1-DCE, ARCADIS plotted Freundlich sorption isotherms for 1,1-DCE, PCE, and TCE (Figure 2). As shown in Figure 2 (below), the sorbed concentration of 1,1-DCE is lower for any given solute concentration (i.e., 1,1-DCE exhibits poor adsorbability in comparison to PCE and TCE).

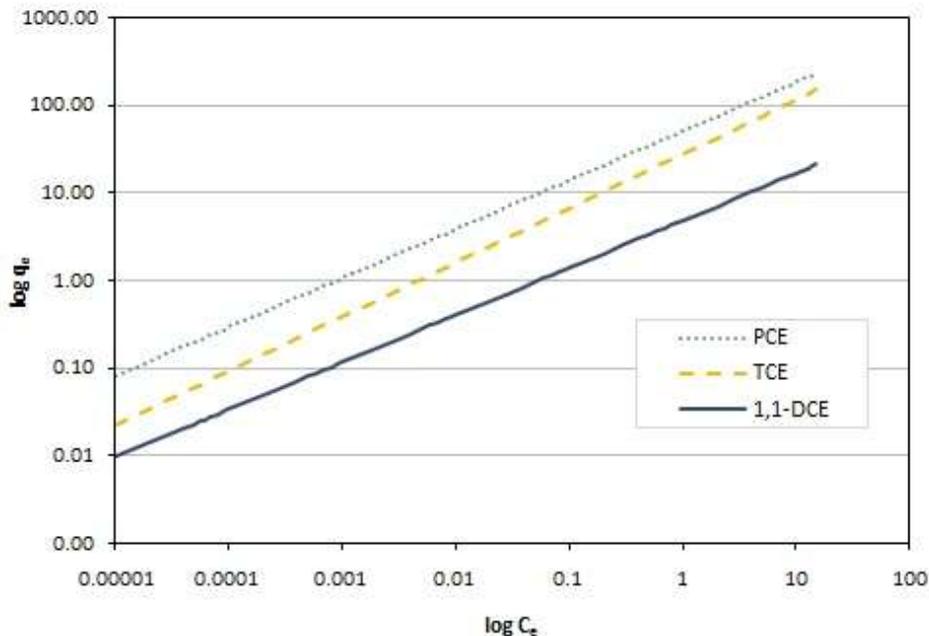


Figure 2: Freundlich sorption isotherms. C_e is the solute concentration at equilibrium, and q_e is the sorbed concentration at equilibrium.

Based on the results of this investigation, ARCADIS has concluded the following:

- Given the current Treatment System configuration and historical influent concentrations, effluent concentrations of 1,1-DCE are unlikely to exceed the proposed effluent limit due to the high strippability of this constituent. However, 1,1-DCE may be of concern if concentrations of this constituent increase in the future.
- Air stripping is the dominant mechanism for 1,1-DCE removal; consequently, discontinued use of the air stripper as part of the Treatment System (e.g. switch to a carbon-only system configuration) may result in undesirably high effluent concentrations of this constituent. In the future, impacts to effluent 1,1-DCE levels should be considered when proposing modifications to the Treatment System design.

If you have any questions or comments, please call Lucas Goldstein at 510-596-9535 or Don Bradshaw at 512-451-1188.

Sincerely,

ARCADIS U.S., Inc.



Lucas Goldstein, P.G., P.E.
Principal Engineer



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