



Matthew Rodriguez
Secretary for
Environmental Protection



Department of Toxic Substances Control

Deborah O. Raphael, Director
700 Heinz Avenue
Berkeley, California 94710-2721



Edmund G. Brown Jr.
Governor

March 7, 2014

Ms. Eileen Fanelli
Remediation Program Manager
103 Montgomery Street,
P.O. Box 29052
San Francisco, California 94129

REVIEW OF "GROUNDWATER MONITORING, OPERATION AND MAINTENANCE PLAN AND GROUNDWATER LUC, NIKE FACILITY, PRESIDIO OF SAN FRANCISCO, CALIFORNIA." FEBRUARY 28, 2014

Dear Ms. Fanelli:

The Department of Toxic Substances Control (DTSC) has reviewed the "*Groundwater Monitoring, Operation and Maintenance Plan and Groundwater LUC, Nike Facility, Presidio of San Francisco, California.*" February 28, 2014, (O&M Plan). DTSC also reviewed the "*Evaluation of Post-Remediation Groundwater and Seep Water Monitoring Results, Nike Facility, Presidio of San Francisco, California,*" January 23, 2013. This evaluation and the proposed O&M Plan were also reviewed by DTSC's Geological Services Unit (GSU). Comments from GSU are presented in the attached email (3/3/2014) and attached memorandum (3/13/2013).

DTSC is hereby providing approval of the O&M Plan with the following modifications.

In addition to the wells at the Nike Facility and Swale, several down-gradient wells and a surface water location should be included in the evaluation. The following wells and seeps shall be included:

LF08GW06
LF08GW02B
LF08GW100
LF08GW03
Retaining wall seeps at the PSHH (if flowing)
LF10GW201
LF10GW204
LF10GW211

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DTSC will provide concurrence for well abandonment upon review of the initial sampling results and after GSU has completed review of the "*Evaluation of Post-Remediation Groundwater Monitoring results, Landfill 10 (LF10) and landfill 8 (LF8)*," 2013, prepared by Geosyntec Consultants.

If you have any questions concerning this letter or the project, please contact me by telephone at (510) 540-3751 or by email at Robert.Boggs@dtsc.ca.gov.

Sincerely,



Robert M. Boggs Jr., P.E.
Hazardous Substances Engineer
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control

Enclosures

cc: Mr. Brian Ullensvang
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Mr. Doug Kern
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MEMORANDUM

TO: Robert Boggs, P.E., Project Manager
Hazardous Substances Engineer
Cleanup Program, Berkeley Office
Brownfields and Environmental Restoration Program

FROM: Renato A. Medrano, PG 8653
Engineering Geologist, Geological Services Unit
Geological Services Branch
Brownfields and Environmental Restoration Program

CONCUR: Brian Lewis, PG 4287, CEG 1414, CHG 136
Senior Engineering Geologist, Unit Chief, Geological Services Unit
Geological Services Branch
Brownfields and Environmental Restoration Program

DATE: March 13, 2013

SUBJECT: **EVALUATION OF POST-REMEDATION GROUNDWATER AND
SEEP WATER MONITORING RESULTS, NIKE FACILITY,
PRESIDIO OF SAN FRANCISCO, CALIFORNIA**

PCA 12019 SITE 201239-11 WR 20016121

ACTIVITY REQUESTED

Geological Services Unit (GSU) reviewed:

- *Evaluation of Post-Remediation Groundwater and Seep Water Monitoring Results, Nike Facility, Presidio of San Francisco, California* (Letter Report), dated January 23, 2013, prepared by Amec Environment & Infrastructure, Inc. (Amec) for the Presidio Trust.

BACKGROUND

The Letter Report presents an evaluation of post-remediation groundwater and seep water monitoring at the Nike facility at the Presidio of San Francisco, California (Site). The

evaluation presents the results of three years of post-remediation groundwater monitoring pursuant to the final RAP.¹ Based on the analysis presented on this report, mercury has been consistently observed at concentrations above its cleanup level at one monitoring point (NKGW01) ranging from 0.21 micrograms per liter ($\mu\text{g}/\text{l}$) to 15.2 $\mu\text{g}/\text{l}$.

The clean-up level for mercury is 0.012 $\mu\text{g}/\text{l}$. The basis for the clean-up levels in the final RAP were based on the following criteria:

- Protection of Freshwater Seep Ecological Receptors: Groundwater at the NIKE Facility occurs as freshwater seeps. Both surface water and freshwater seep water quality criteria are used to assess potential impacts to freshwater organisms
- Protection of Human Health, Drinking water levels: Los Lobos Creek has been, and continues to be the source of 80 to 90 percent of the potable water at the Presidio. Accordingly, the more stringent of drinking water levels, maximum contaminant levels (MCLs), or background levels protective of Los Lobos Creek Groundwater Basin, are considered when evaluating potential impacts to human health.

The Letter Report recommends: discontinuation of post-remediation groundwater monitoring; no further action with respect to groundwater and seep water at the Nike Facility; and, removal of land use control for the groundwater at the Site. The Letter Report recommends discontinuation of monitoring because mercury and nickel observed in groundwater and seep water at the Site are not believed to be related to past Army practices: instead, mercury and nickel are believed to be naturally occurring due to serpentine bedrock underlying the Site. The Letter Report presented the following reasons to support the hypothesis that mercury is naturally occurring:

1. NKGW01 is dominantly screened in serpentinite.
2. Mercury detections are strongly correlated with both nickel and magnesium which are metals that occur naturally in serpentinite.
3. Mercury detections at the Site are strongly correlated to low dissolved oxygen which is consistent with a bedrock groundwater source.
4. Stiff diagrams indicate that the groundwater at the Site is magnesium-bicarbonate type indicative of a serpentinite source. The strongest magnesium-bicarbonate signature is evident at well NKGW01, indicating that the source of groundwater in that well is dominantly from fractured flow within serpentinite.
5. The highest concentrations of mercury detected in well NKGW01 are associated with low groundwater elevations where the dominant source of water would be from the bedrock rather than the overlying Colma Formation soils, beach dune sand, or fills.

¹ Mactec Engineering and Consulting, 2007. *Final Remedial Action Plan, Baker Beach Disturbed Areas 1 and 2A and Twenty- Six Other Sites, Presidio of San Francisco, California.* June.

6. Mercury is often associated with hydrothermal deposition along fractures in fault systems which are pervasive throughout the Bay Area. Weathering of these deposits can introduce mercury into groundwater.

7. There are no known past site practices that would have resulted in use of mercury at the Nike Facility.

8. During the Remedial Investigation at the Site, elevated mercury was detected in surface soil at two locations near storm drain pipelines (NISD06 and NISD02) and in shallow soil at one location (NSSB132). Soil from these areas was excavated and disposed off-site in 2008 during remedial action implementation. Because mercury was detected only in shallow soil, there is a low potential for mercury to have migrated from surface soil to groundwater because mercury has low mobility (high soil adsorption coefficient).

COMMENTS AND RECOMENDATIONS

Amec's justifications indicating that mercury could be naturally occurring are plausible. However, uncertainties with respect to the data set make it difficult to concur with the no further action recommendation of the Letter Report, as discussed below.

GSU has the following comments and observations:

1. Statement 7. While there may be no documented Nike facility practices that used mercury, the Presidio had: 1) hospitals that potentially used mercury, 2) gravesites which may contain mercury and 3) potential use of mercury switches. Therefore, disposal onto/into the ground cannot be ruled out.

2. Statement 8. The GSU recognizes that mercury has a high adsorption coefficient. However, because mercury was measured in both the upgradient soil (NSD06 and NSD02) and in groundwater close to contaminated soil, it is difficult to dismiss the upgradient soil as a potential source of elevated groundwater concentrations in NKGW01. Moreover, higher mercury concentration has also been observed in downgradient NSPZ03 which has elevated mercury levels in soil upgradient at NSSB132.

3. It is acknowledged that high variability is prevalent in environmental data, especially at lower concentrations where multiple factors contribute to the variability. For example, some potential factors include: change of analytical methods, field and laboratory sampling methods (e.g., filtering), use of aliquots, methods of collection in the field, frequent changes in groundwater rate of flow and elevations, changes of physical and chemical parameters of groundwater (e.g., pH, temperature, oxidation-reduction potential, conductivity, turbidity and preservation methods).

4. The analytical method has a reporting limit (RL) of $<0.20 \mu\text{g/l}$ which is higher than the cleanup objective for mercury which is 0.012 micrograms per liter ($\mu\text{g/l}$). Therefore, the

current sampling and analysis program cannot confirm whether the cleanup objective has been met.

Recommendations

Because of the concerns discussed above, GSU cannot concur with Amec's recommendation for no further action (NFA) at this time. To support a possible NFA finding in the future, the following actions should be considered:

1. Employ statistical approaches to evaluate the data sets. For example, use a central tendency (mean, median) to smoothen the variability of the observed data sets. Determine the normality of data sets to know which statistical tests to be used. Determine if there are potential outliers. If there is a valid reason to remove an outlier, propose removal of specific outliers to the project team. If the data set is not sufficiently robust for statistical analysis, continue sampling at a lesser frequency than the prescribed quarterly frequency until such time that the data set is sufficient for reliable statistical analysis. If trend is to be used, the GSU recommends to use only the data sets after remedial activity was performed (e.g. soil removal).
2. Evaluate alternative analytical approaches that can achieve RLs less than cleanup objectives for mercury. If this is not possible, evaluate and propose alternative measures how to confirm that cleanup goals are met.

If you have any questions or comments regarding this memorandum, please contact me at (510) 540-3947 or Renato.Medrano@dtsc.ca.gov or Brian Lewis at (510) 540-3950 or Brian.Lewis@dtsc.ca.gov.

Peer reviewer: Eileen Hughes, PG 8170
Engineering Geologist, Geological Services Unit
Geological Services Branch
Brownfields and Environmental Restoration Program

Boggs, Robert@DTSC

From: Medrano, Renato@DTSC
Sent: Monday, March 03, 2014 11:46 AM
To: Boggs, Robert@DTSC
Subject: Mercury in GW Nike Facility and Swale, Presidio

To: Bob Boggs, P.E.

From Renato Medrano, P.G.

March 3, 2014

Subject: Mercury in Groundwater evaluation for the Nike Facility/Nike Swale, Presidio of San Francisco.

Per our discussions on 2/27/2014, it is recommended that the following wells be sampled and analyzed as part of the Mercury in groundwater evaluation and/or operations and maintenance (O&M) plans and activities related to the Nike Facility/Swale. In addition to the wells at the Nike Facility and Swale, several down-gradient wells and a surface water location should be included in the evaluation. Specifically, the following wells and seeps should be included:

LF08GW06

LF08GW02B

LF08GW100

LF08GW03

Retaining wall seeps at the PSH (if flowing)

LF10GW201

LF10GW204

LF10GW211

Rational for well selection is as follows:

LF08GW06 was selected because it is the down-gradient well most near to the Nike Facility/Swale.

LF08GW02B and LF08GW100 were selected as the most eastern and western wells (potentially cross-gradient) immediately down-gradient of the Nike Facility/Swale. These wells will help define the lateral extent of mercury migration if it has occurred.

LF08GW03 was selected as being the next well further down-gradient (along the axis) from GW06 and the Nike Facility/Swale.

The retaining wall seeps were identified because they represent an expression of GW (day-lighting/surfacing-like a spring) and also immediately down-gradient from the Nike Facility/Swale.

Similarly, and yet further down-gradient, LF10GW201 was selected as the LF10 well closest to the Nike facility/Swale. LF10GW204 is the most westerly down-gradient well and LF10GW211 is the most easterly well in the LF10 area. Additionally, LF10GW204 is the well closest to Lobos Creek, a drinking water source at the Presidio.

Analytical parameters can be limited to mercury, manganese, nickel, dissolved oxygen, ORP, field pH and any other parameters the Trust wishes to monitor as part of the evaluation.

Recommendations for well abandonment will be completed upon review of the initial sampling results and after GSU has completed review of the "Evaluation of Post-Remediation Groundwater Monitoring results, Landfill 10 (LF10) and landfill 8 (LF8)," 2013 prepared by Geosyntec Consultants.

Please feel free to contact me, if you have any questions. Thank you.

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