



Linda S. Adams
Secretary for
Environmental Protection



Department of Toxic Substances Control

Maureen F. Gorsen, Director
8800 Cal Center Drive
Sacramento, California 95826-3200



Arnold Schwarzenegger
Governor

January 14, 2009

Ms. Elizabeth Zimmermann
Manager, Environmental Programs
Hitachi Global Storage Technologies, Inc.
5600 Cottle Road (050/A168)
San Jose, California 95193

**REVIEW OF FINAL REMEDY COMPLETION REPORT AND DECEMBER 2008
SAMPLE REPORT, CHLOROFORM RELEASE AREA, REDEVELOPMENT
PROPERTY, HITACHI GLOBAL STORAGE TECHNOLOGIES, INC.**

Dear Ms. Zimmermann:

The Department of Toxic Substances Control (DTSC) has reviewed the following two reports for the Chloroform Release Area at the Hitachi Global Storage Technologies, Inc. (Hitachi GST) Redevelopment Property:

Final Remedy Completion Report, Chloroform Release Area at Former Building 028J, ENVIRON International Corporation, November 17, 2008, ("Completion Report").

Groundwater and Soil Gas Sampling Results – December 2008 Report, Chloroform Release Area at Former Building 028J, ENVIRON International Corporation, January 5, 2009, ("December 2008 Report").

Hitachi GST revised the Completion Report with a January 7, 2009, letter, "Response to Comments on Final Remedy Completion Report, Chloroform Release Area at Former Building 028J, Hitachi Global Storage Technologies, Inc., San Jose, California, ENVIRON Project No. 03-11903E." DTSC's final review comments for the Completion Report (as revised by the January 7, 2009 letter) and the December 2008 Report are in this letter and the attached memorandum from DTSC's Geological Services Unit (GSU), dated January 9, 2009.

DTSC has determined that these two reports are acceptable to support DTSC's proposed determination that corrective action is complete for the Chloroform Release Area. DTSC has prepared an updated Final Statement of Basis to describe changes to the approved remedy for the Chloroform Release Area as ultimately implemented and

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the basis for DTSC's proposed corrective action complete determination. The updated Final Statement of Basis and the remedy completion reports will be made available for public review and comments during a thirty (30) day comment period prior to the issuance of a final DTSC decision concerning the completion of corrective action at the Chloroform Release Area.

DTSC has also prepared an Addendum to the Negative Declaration for the Chloroform Release Area that describes the monitoring changes that occurred during implementation. It also explains why those changes did not result in any additional or significant impacts compared to those described in the August 2007 Initial Study and Negative Declaration for the corrective action project at the Chloroform Release Area.

The updated Final Statement of Basis and the Addendum to the Negative Declaration, along with a fact sheet and copy of the public notice will be sent to you when DTSC issues the public notice for the public comment period. If DTSC determines after the public notice that additional information is needed to clarify, modify, or supplement previously submitted material, DTSC reserves the right to request this information from Hitachi GST.

If you have any questions concerning this letter, please contact me at (916) 255-6677 or e-mail pruffin@dtsc.ca.gov.

Sincerely,

// original signed by //

Paul E. Ruffin, P.E.
Hazardous Substances Engineer
Legacy Landfills and Corrective Action Office

Enclosure

cc: Ms. Denise Lloyd
Environmental Engineer
Hitachi Global Storage Technologies, Inc.
5600 Cottle Road (050/A162)
San Jose, California 95193-0001

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cc: Mr. Stuart I. Block
Cox, Castle & Nicholson LLP
555 California Street, 10th Floor
San Francisco, California 94104

Mr. Peter S. Modlin
Gibson, Dunn & Crutcher LLP
One Montgomery Street #3100
San Francisco, California 94104

Mr. Gordon E. Hart,
Paul, Hastings, Janofsky & Walker LLP
55 Second Street, Twenty-Fourth Floor
San Francisco, California 94105-3441

Mr. Max Shahbazian, P.G.
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Mr. Mohinder S. Sandhu, P.E.
Supervising Hazardous Substances Engineer II
Department of Toxic Substances Control
8800 Cal Center Drive, 2nd Floor
Sacramento, California 95826-3200

Ms. Marilee Hanson
Senior Staff Counsel
Office of Legal Counsel
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

Mr. Buck King, P.G., C.H.G.
Engineering Geologist
Geological Services Unit
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721



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Maureen F. Gorsen, Director
700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721



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MEMORANDUM

TO: Paul Ruffin, PE
Hazardous Substance Engineer
Legacy Landfills and Corrective Action Office
Brownfields and Environmental Restoration Program

FROM: Buck King, PG, CHG
Engineering Geologist, Geological Services Unit (GSU)
Geology and Remediation Engineering Branch
Brownfields and Environmental Restoration Program

CONCUR: Brian Lewis, CHG, CEG
Senior Engineering Geologist, GSU
Geology and Remediation Engineering
Brownfields and Environmental Restoration Program

DATE: January 9, 2009

SUBJECT: FINAL REMEDY COMPLETION REPORT, CHLOROFORM RELEASE AREA
AT FORMER BUILDING 028J, 5600 COTTLE ROAD, SAN JOSE, SANTA
CLARA COUNTY

PCA: 22120 Site: 201476-48 MPC: 37-HWMP GSU: 620234

DOCUMENTS REVIEWED

Final Remedy Completion Report, Chloroform Release Area at Former Building 028J, dated November 17, 2008. Report prepared by Environ International Corporation for Hitachi Global Storage Technologies, Inc. (Completion Report)

Groundwater and Soil Gas Sampling Results – December 2008 Report, Chloroform Release Area at Former Building 028J, dated January 05, 2009. Report prepared by Environ International Corporation for Hitachi Global Storage Technologies, Inc. (December 2008 Report)

INTRODUCTION

As you requested, the GSU of the Department of Toxic Substances Control (DTSC) has

reviewed the Completion Report and December 2008 Report. This memorandum provides GSU's review on both reports. If you have questions, please contact me at (510) 540-3955 or Brian Lewis at (916) 255-6532.

DISCUSSION

Overview of Remedial Activities

The Completion Report describes the investigation, remediation, and monitoring activities that have been completed to address chloroform in the subsurface near former Building 028J. Prior to remediation, chloroform concentrations in groundwater and soil gas posed an unacceptable human health cancer risk through hypothetical indoor air exposure based on health risk exposure modeling. Groundwater and soil gas chloroform cleanup levels protective of human health under a residential exposure scenario and a one-in-a-million increased cancer risk were developed for the site to be 1.1 µg/l in soil gas at a depth of 5-feet below ground surface (bgs), 1.9 µg/l in soil gas at a depth of 10-feet bgs, 8.9 µg/l in soil gas at a depth of 15-feet bgs and 380 µg/l in A-aquifer groundwater beneath the site.

Chloroform remediation consisted of soil vapor and groundwater vacuum extraction from contaminated soil and the groundwater zone using 4-inch diameter extraction wells installed to the top of the A/B Aquitard at about 38 feet bgs. The dual phase soil vapor extraction was selectively conducted using 12 of 18 extraction wells installed to optimize mass removal performance. System operation lasted 56 weeks or almost 13 months with a one month shut down occurring after approximately three months of system operation. During the approximately 7,968 hours of operation, the dual phase extraction system removed 68.7 million cubic feet of soil vapor and extracted 535,000 gallons of groundwater. The average system vapor extraction rate was 169 cubic feet per minute and the groundwater pumping rate was 1.2 gallons per minute.

Remedial System Monitoring

Extracted soil vapor chloroform concentrations were monitored on an approximately weekly basis during system operation to evaluate system performance and estimate soil vapor mass removal. The maximum extracted chloroform concentration observed during system startup was 14 µg/l. Extracted chloroform concentrations decreased to levels less than 1.1 µg/l during Week 12 of operation with two exceptions of 1.6 µg/l chloroform detected during Week 20 following the four week shutdown period and 1.1 µg/l chloroform detected during Week 27. With the exception of the two instances described, the extracted vapor concentrations were below the 1.1 µg/l soil gas goal during the final 36 weeks of system operation. The extracted chloroform concentration variably ranged between 0.39 to 1.0 µg/l, displaying an asymptotic pattern during the final 36 weeks of system operation.

Subsurface Monitoring During Remedial System Operation

Progress on the chloroform remediation was documented by soil, soil gas, and groundwater sampling and analysis.

Soil Matrix Samples

Soil samples were collected from eight borings installed in the vapor source area during Week 40 of system operation. Additional soil samples were collected during installation of extraction wells during Week 36 and Week 44 of system operation. Soil sample chloroform

concentrations were generally not detectible in unsaturated soils in the source area originally defined by detectible soil chloroform concentrations. Capillary fringe soils contained residual chloroform mass with maximum observed chloroform concentrations of 33 µg/kg in capillary fringe soil, 220 µg/kg in A-Aquifer soil, and 1400 µg/kg in A/B-Aquitard soil.

Soil Gas Samples

Soil gas samples were collected at 5 and 10 foot depths from 12 monitoring points located between extraction wells to represent areas most minimally affected by soil vapor extraction and representative of residual soil vapor mass. Soil gas sampling conducted to evaluate remediation progress occurred after 8 weeks and 16 weeks of system operation and to evaluate post remedial conditions 1 week and 8 weeks following system shutdown on August 12, 2008. Soil gas sample results from the four soil gas monitoring events indicate that chloroform soil gas concentrations decreased to levels below 1.1 µg/l in soil gas at a depth of 5-feet bgs and 1.9 µg/l in soil gas at a depth of 10-feet bgs after the first approximate 2 months of system operation.

Groundwater Samples

Groundwater samples were collected from site wells periodically throughout the system operation during eleven separate monitoring events occurring approximately during Weeks 8, 16, 27, 32, 37, 42, 46, 51, of system operation and during Weeks 1 and 8 after system shutdown. The relatively high resolution chloroform plume delineation provided by up to 18 monitoring wells and up to 11 separate systematic sampling events (Completion Report, Figure 8) clearly shows groundwater concentrations decreasing and the chloroform plume shrinking in size to the final area exceeding the 80 µg/l maximum contaminant level (MCL) concentration criteria in wells EW-5, EW-9, EW-10 and EW-16 of approximately 4,000 square feet centered on the approximate original source area.

Groundwater monitoring resolution was improved during remediation by addition of one additional A-aquifer well (EW-16) and two A/B Aquitard wells (EW-17 and EW-18). Perimeter wells installed for potential system operation were never operated and provide unbiased evidence of system operation reducing groundwater plume concentrations. The post remediation groundwater chloroform data do not show any significant concentration rebound effects and indicate that concentration declines are representative of aquifer conditions. The pre-remediation groundwater chloroform 95 percent upper confidence limit (95 UCL) mean concentration using data from 15 wells was 610 µg/l. The 8-week post-remediation groundwater chloroform 95 UCL mean concentration using data from 18 wells which include a sample from underlying A/B Aquitard was 133 µg/l. The 8-week post-remediation 95 UCL mean concentration of 133 µg/l is well below the target risk-based cleanup goal of 380 µg/l and clearly documents achievement of groundwater remediation risk-based cleanup goal.

REVIEW OF THE COMPLETION REPORT

Remedial efforts documented in the Completion Report were extensive and indicated compliance with the corrective action objectives for the project. GSU concerns regarding the ability to determine attainment of the risk-based objectives resulted in a subsequent site groundwater and soil gas sampling event in December 2008.

The Completion Report indicated that soil gas samples collected at 8 weeks after system shutdown showed a slight rebound (concentration increase) and inlet concentrations for the remedial system were asymptotic with detectible concentration of approximately 0.5 µg/l. The

soil gas rebound and the asymptotic detectable concentrations in extracted soil vapor suggested the need for additional verification and evaluation. GSU recommended additional subsurface testing to evaluate the following issues:

- 1) Rebound of soil gas concentrations.
- 2) Whether "deeper" soil gas concentrations exceed risk-based cleanup goals.
- 3) Whether soil gas sample collection was potentially biased by the "post-run tubing" sampling method.
- 4) Better identification of the location of any residual contaminant mass in the subsurface.

Accordingly, a work plan (Environ, 2008) was submitted to DTSC to address the above technical concerns about the attainment of the soil gas risk-based cleanup goals for vapor intrusion exposure. The work plan also included the collection of a third round of post remediation groundwater samples from the site.

DECEMBER 2008 REPORT

The December 2008 Report describes the December 2008 results from the collection of 10 additional groundwater samples from the existing well network and the collection of 24 soil gas samples from 7 locations using semi-permanent soil gas probes. The soil gas sample results represented conditions at 19 weeks (approximately 4 months) following remediation system shutdown.

Soil gas concentration rebound was not observed in the December 2008 sample results and the data indicated concentrations collected at 8 and 19 weeks post remediation were relatively stable. All soil gas samples collected in December 2008 were below their respective risk-based cleanup goals set for the 5-foot depth, 10-foot depth and previously unevaluated 15-foot depth. The December 2008 soil gas data set along with the groundwater data set clearly describe the distribution of the chloroform in chloroform plume area (December 2008 Report Figure 1 and Figure 2) and demonstrate that concentrations are stable and significant rebound is not occurring.

The December 2008 soil gas data includes sampling from the 15-foot bgs and approximately 25-foot bgs, thus clarifying the conceptual model that the majority of the residual chloroform mass is in general equilibrium in A-aquifer groundwater and soil gas and that soil gas is below the risk-based cleanup goals for the 5, 10 and 15 foot depth criteria. The December 2008 results clearly indicate that deeper soils and their soil gas concentrations were below the health risk based cleanup goals.

The December 2008 soil gas sample results collected using permanently installed monitoring points were similar to soil gas sample collected using "post-run tubing" sampling method where the locations coincided. The permanently installed sample point results and the "post-run tubing" results collected 8 and 19 weeks following system shutdown were similar and indicated that the "post-run tubing" sample collection method was adequate for the site. The December 2008 sampling event also collected samples from areas previously sampled and areas that had never been previously disturbed by sampling activities located in relative equal vicinity to the original chloroform source area. The results from new and previously sampled locations were relatively similar and indicated that replicate sampling from a single location was approximately equivalent to sampling from a previously unsampled location.

The December 2008 soil gas results along with the groundwater monitoring results describe residual chloroform distribution and do not indicate the presence of additional chloroform mass that would require additional investigation or remediation.

The December 2008 groundwater sampling showed continual decreasing groundwater concentrations in 9 of 10 sampling results. The groundwater data was consistent with the site conceptual model of (1) post remediation groundwater chloroform concentration reduction occurring in response to seasonal recharge of clean groundwater and (2) the presence of residual chloroform in the underlying A/B Aquitard. The average A-aquifer groundwater concentration monitored in December 2008 was 72 µg/l, which is well below the groundwater risk-based cleanup goal for vapor intrusion of 380 µg/l and slightly below the drinking water MCL of 80 µg/l.

The December 2008 Report data confirmed previous conclusions made in the Completion Report that the risk based corrective action objectives for soil, soil gas, and groundwater have been achieved.

RECOMMENDATION

The GSU recommends that the Completion Report and December 2008 Report be approved and used as the basis for determination that the corrective action in the Chloroform Release Area at Former Building 028J is complete.

REFERENCES

Environ International Corporation. 2008. Work Plan for Additional Groundwater and Soil Gas Sampling at the Former Building 028J Chloroform Release Area, Hitachi GST: San Jose, California, Environ Project No. 03-11903E. December 17, 2008.