FINAL STATEMENT OF BASIS

REGION 9

ID# 8793

HITACHI GLOBAL STORAGE TECHNOLOGIES, INC.
San Jose, California
November 26, 2007

Facility/Unit Type: Treatment and Storage
Contaminants: Chloroform
Media: Groundwater and soil gas
Remedy: 2-Phase Extraction System

INTRODUCTION

In September 2006, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) prepared a Statement of Basis to discuss the proposed remedy for the Hitachi Global Storage Technologies, Inc. (Hitachi GST) "Redevelopment Property." The proposed remedy was to remove all contaminated soil at the Redevelopment Property above DTSC established cleanup levels. If excavation of contaminated soil was not feasible and the contaminants were volatile organic compounds (VOCs), other remedial actions such as soil vapor extraction (SVE) would be considered. The proposed remedy did not address potential groundwater contamination on the Redevelopment Property.

During a series of investigations of the Redevelopment Property beginning in November 2005, elevated concentrations of chloroform (a VOC) were identified in groundwater, soil, and soil gas. This chloroform-impacted area was discovered in the vicinity of former Building 028J in the southwest portion of the Redevelopment Property.

Hitachi GST has prepared the "Corrective Measures Study Report, Chloroform Release Area, Former Building 028J" (Chloroform CMS Report), dated August 29, 2007. The Chloroform CMS Report summarizes investigations in the vicinity of former Building 028J, develops corrective action objectives, evaluates remedial alternatives, and describes implementation of the proposed remedy. This Statement of Basis summarizes information that can be found in greater detail in the Chloroform CMS Report. Additional detail can be found in other documents contained in the administrative record for the Hitachi GST facility. DTSC encourages the public to review these documents in order to gain a more comprehensive understanding of the facility and corrective action activities that have been conducted there.

FACILITY DESCRIPTION

Facility Location and Description

Hitachi GST owns and operates a design, development, and manufacturing facility for computer storage products, such as hard disk drives and component heads and disks, located at 5600 Cottle Road, San Jose, California ("the Site"). The Site is located in a mixed industrial, commercial and

residential area near the intersections of Monterey Highway, Blossom Hill Road, and United States (US) Route 101, approximately seven miles southeast of downtown San Jose.

The Site is approximately 321 acres in size. Prior to 1955, the Site was agricultural land, primarily tree orchards, with associated residences. In 1955, International Business Machines (IBM) purchased the Site. The Storage Technology Division of IBM owned and operated the Site from 1955 through 2002. IBM designed, developed, and manufactured computer storage devices, including hard disk drives, read/write heads, and disk storage media at the Site. On or about January 1, 2003, Hitachi GST, a new company formed as a result of a strategic combination of IBM and Hitachi's storage technology businesses, bought the Site.

Approximately 30 buildings were present on the Site prior to commencement of redevelopment activities in August 2006. On-site buildings were used for a range of activities, including manufacturing, testing, assembly, research, development, wastewater treatment, reverse osmosis/deionized (RO/DI) water production, utilities, chemical storage, other storage, security, offices, and cafeteria. Exterior areas of the Site primarily consisted of landscaped areas, orchards, sidewalks, water fountains, asphalt parking lots, and paved private roads.

A portion of the Site has been rezoned and will be sold and redeveloped into a mixed residential, commercial, and recreational open space area. In addition, Hitachi GST will be transferring ownership of Endicott Boulevard/Tucson Way, which borders the Site to the north, to the City of San Jose. Collectively, the land selected for redevelopment and sale (approximately 143 acres) is referred to as "the Redevelopment Property." Hitachi GST plans to continue industrial operations on the remaining portion of the Site, termed "the Core Area". All manufacturing-related activities currently located on the Redevelopment Property have been moved to the Core Area under the redevelopment plan.

The Hitachi GST Site is a large quantity generator (LQG) of hazardous waste and also maintains a Resource, Conservation and Recovery Act (RCRA) Permit for on-site storage and treatment of hazardous waste. The RCRA Permit encompasses the full 321 acres of the Site. Hitachi GST is working with the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) to remove the Redevelopment Property from the RCRA Permit.

Environmental Conditions and Land Use

Environmental Conditions

The Site is located within the Santa Teresa Basin in the southern end of the Santa Clara Valley. To the north and east are the Yerba Buena Hills and to the south and west are the Santa Teresa Hills. Exploratory borings on the Site reveal alluvial deposits of clays and silts interbedded with sand and gravel layers (aquifers). The alluvium generally contains more than five silty-clay layers, which vary from a few feet to more than 30 feet in thickness separating more than six aquifers. Fill materials at the Site are of variable thickness and properties. Moderately compacted fill ranging from depths of one to 18 feet have been encountered on-site. Beginning at the ground surface (or underlying surficial fill), there is a layer of medium plasticity clay that extends to a depth of about 5 to 10 feet below ground surface. Underlying deposits down to the water table vary across the Site, but primarily consist of additional clays and silts.

The aquifers are referred to as A, B, C, D, E, F, and G aquifers, with the A aquifer being the most shallow. The general depths of these aquifers below ground surface are as follows: A occurs between 20 to 50 feet; B lies between 50 and 95 feet; C is between 90 and 125 feet; D is between

140 and 160 feet; E is between 170 and 205 feet; F is between 230 and 260 feet; and G is between 270 and 275 feet. In some locations, the individual aquifers merge. All of these aquifer zones are hydraulically interconnected to some degree.

Groundwater measurements indicate that depths to shallow groundwater are currently approximately 30 feet or deeper, however, historically the recorded groundwater has been as shallow as 17 feet. This groundwater lowering is attributed to groundwater extraction throughout the Basin. Groundwater flow directions in aquifer zones vary across the Site, particularly in the A-aquifer zone. Groundwater movement in the A-aquifer zone varies from south to northwest, but exhibits stagnant conditions in the southwestern portion of the Site. Groundwater flow directions in the deeper aquifer zones are more consistent and generally trend to the northwest.

In the early 1980s, chlorinated hydrocarbons were detected in soil beneath an on-site underground tank farm. Site-wide investigations showed that volatile organic compounds (VOCs) were present in groundwater beneath and downgradient of the Site. Subsequently, the Site has undergone extensive remedial action including the remediation of solvent-impacted soil and extraction and treatment of on-site and off-site groundwater. Under an order from the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB-SF) (Order No. R2-2002-0082 – Final Site Cleanup Requirements, as amended by Order No. R2-2007-0004), IBM is obligated to remediate the groundwater. The requirements also include the development of deed restrictions to prevent human exposure to contaminated groundwater.

Land Use

The Site is located in a mixed industrial, commercial and residential area near the intersections of Monterey Highway, Blossom Hill Road, and United States (US) Route 101, approximately seven miles southeast of downtown San Jose. The vicinity includes the following:

- Cottle Road is located to the west, with a shopping center, other commercial buildings, a hospital/medical center, and a medium-high density residential area beyond.

- IBM Building 025 (formerly part of the Site), which is still owned by IBM, is located to the northwest. This parcel is the proposed location of a future Lowe's Store.

- Parcel O-6 (formerly part of the Site) is located to the northeast; bordering the Core Area and Endicott Boulevard/Tucson Way. Hitachi GST transferred ownership of Parcel O-6, which is approximately 11 acres, to the City of San Jose in November 2005. The planned land use for this parcel is a future City of San Jose Police Substation.

- Southern Pacific Railroad and Caltrain right-of-way, the Blossom Hill Caltrain Station, and Monterey Highway are located to the north, with medium to medium-low density residential, a commercial shopping area, and US Route 101 beyond.

- Highway 85 and the Cottle Road Light Rail Station are located to the south, with a hospital/medical center, library, and single-family residential area beyond.

Hitachi GST has moved its R&D and administrative office operations to a different location in San Jose (3403 Yerba Buena Road). In turn, most of the R&D and administrative office buildings at the Site (Buildings 010, 012, 018, 026, 028, 028J, and 051) have been demolished. Two

buildings, Buildings 009 (office) and 011 (cafeteria), on the Redevelopment Property are considered historically significant and will remain intact.

FACILITY INVESTIGATIONS

Extensive soil, soil gas and groundwater investigations have been conducted on the Redevelopment Property. In regards to Site-wide groundwater on the Redevelopment Property, IBM will continue remediation under the oversight of the RWQCB-SF. All soil investigation/ remediation has been completed on the Redevelopment Property, and no further action is recommended. The remainder of this section focuses on chloroform in soil, soil gas and groundwater in the Building 028J Area that was identified during the soil investigations.

Building 028J Area

During a series of investigations beginning in November 2005, elevated concentrations of chloroform were identified in groundwater, soil, and soil gas outside and southwest of the chlorinated hydrocarbon impacted area discussed above, which IBM is currently remediating under order of RWQCB-SF. This chloroform-impacted area was discovered in the vicinity of former Building 028J, an approximately 2,000-square foot chemical storage building constructed in 1971 and demolished in September 2006 during redevelopment activities. It is believed that the source of the chloroform was an underground spill containment tank formerly located east of Building 028J. This tank was removed in early 1982; however, remediation of the area was not performed at that time.

CONTAMINATION DETECTED AND CLEANUP GOALS

Media	Impacted Area	Contaminant	Maximum Detected Concentrations 2005-2007	Cleanup Goals
Soil	50 by 100 feet	Chloroform	31 µg/kg	8.7 µg/kg
Soil Gas	100 by 150 feet	Chloroform	28 µg/L	1.1, 1.9, and 8.9 µg/L at 5, 10, and 15 feet, respectively
Groundwater	150 by 175 feet	Chloroform	920 µg/L	80 µg/L

Site-specific risk-based target concentrations (RBTCs) were developed for the chemicals of concern in the Redevelopment Property. RBTCs represent the concentration of a chemical that can remain in the environment and still be protective of human health for future land use; therefore, the RBTCs represent the cleanup goals for the Site. The RBTC for chloroform in soil under a future residential land use scenario is 8.7 micrograms per kilogram (µg/kg). The RBTCs for chloroform in soil gas under a future residential land use scenario are 1.1, 1.9, and 8.9 micrograms per liter (µg/L) at a depth of 5, 10, and 15 feet, respectively. The RBTC for chloroform in groundwater under a future residential land use scenario (vapor migration into a building) is 380 µg/L; however, the RWQCB-SF Groundwater Cleanup Standard for chloroform is 80 µg/L (RWQCB-SF Order No. R2-2002-0082 – Final Site Cleanup Requirements, as amended by Order No. R2-2007-0004). Therefore, in the case of groundwater, the Cleanup Goal for the Site is the RWQCB-SF Groundwater Cleanup Standard of 80 µg/L.

Subsurface investigations of the Building 028J Area conducted in 2005 through 2007 identified concentrations of chloroform in soil slightly above the RBTC with detections ranging from 5.0 to 31 µg/kg. In general, chloroform-impacted soil is limited to an area of approximately 50 by 100 feet and to depths below 15 feet. Soil gas with concentrations of chloroform exceeding RBTCs is limited to an area of approximately 100 by 150 feet with detected concentrations ranging from 0.094 to 28 µg/L in the unsaturated soil zone. Chloroform-impacted groundwater is limited to an area of approximately 150 feet by 175 feet with detected concentrations ranging from 1.8 to 920 µg/L. Concentrations of chloroform exceeding the RWQCB-SF Cleanup Standard of 80 µg/L are limited to the shallow A-aquifer which is encountered at a depth of approximately 32 feet below ground surface in the Building 028J Area.

It appears that the dominant fate and transport process for chloroform of volatilization and groundwater leaching have diminished soil concentrations in the vicinity of Building 028J. Therefore, it is likely that the majority of the remaining mass of subsurface chloroform exists in groundwater; thereby providing a source of chloroform in soil gas.

EXPOSURE PATHWAYS

The proposed land use for the Redevelopment Property is residential, commercial, and open space (or park) use. Based on this proposed future land use, populations that could potentially be exposed to chemicals remaining in environmental media include residents, commercial workers, and park visitors. Additional populations on the Redevelopment Property could include short-term construction/maintenance workers during redevelopment or other short-term maintenance activities. RBTCs were calculated for each of these populations for all chemicals detected in groundwater, soil gas and soil. The cleanup goals listed above represent the RBTCs for the most conservative future land use; residential.

As shallow groundwater from the A-aquifer is not used for consumption and chloroform-impacted soil is generally limited to depths below 15 feet, ingestion and dermal contact are unlikely to be significant pathways for exposure. The primary exposure pathway for future populations is inhalation via vapor migration into a building.

SELECTED REMEDY

The selected remedy for treating chloroform-impacted soil, soil gas, and groundwater in the Building 028J Area is 2-PHASE™ Extraction. This technology is widely used and is relatively easy to implement. 2-PHASE™ Extraction involves applying a vacuum to the subsurface via conventional groundwater wells. The vacuum is applied by a motor-driven blower that induces air flow in the subsurface to remove VOCs from soil, soil gas, and groundwater. Based on the results of a pilot test, 2-PHASE™ Extraction will be effective in removing chloroform from the subsurface in the Building 028J Area.

During 2-PHASE™ Extraction, groundwater and vapors drawn into the well by the vacuum are removed from the well casing through a specifically-sized and positioned suction pipe or “stinger”. The induced vacuum draws vapor into the tip of the stinger at a velocity sufficiently high to entrain water and convey a water/vapor spray up the stinger and to the surface. The vapor and water phases are separated at the surface prior to treatment. The extraction of entrained water maintains the wells in a dewatered state, creates an unsaturated zone, and through continual dewatering of the wells desiccates the soil adjacent to the wells. This desiccation creates new air

flow pathways, and enhances VOC removal rates, especially as soil particles with sorbed VOCs become exposed.

The flexibility of 2-PHASE™ Extraction allows installation of a well field consisting dual-use wells that can be easily switched from extraction to monitoring and vice versa. To maximize treatment efficiency and minimize treatment time, a well field consisting of 15 wells was developed for the Building 028J Area capable of treating the entire impacted area, or alternatively pulsing discrete zones while monitoring periphery wells.

2-PHASE™ Extraction system consists of a Rietschle VLR-500 high vacuum blower package with a pump-down vapor/liquid separator. This unit is capable of producing vacuums of up to 25 inches of mercury, vapor flow rates of up to 300 cubic feet per minute (cfm), and groundwater extraction and transfer rates of up to 15 gallons per minute (gpm), although the anticipated groundwater extraction rate is likely only 1 to 2 gpm. The unit is skid-mounted and is installed near the extraction well field. The extraction unit is connected to a treatment system consisting of two 1,000-pound vapor-phase granular activated carbon (GAC) vessels installed in series to treat the extracted vapors. The supplied GAC consists of virgin coconut shell carbon. The extraction unit is equipped with a heat exchanger for humidity control to increase the efficiency of carbon adsorption. Extracted groundwater is contained in closed-top holding tanks for subsequent treatment, reuse, and/or disposal.

INNOVATIVE TECHNOLOGIES CONSIDERED

Numerous technologies were identified and subjected to a technical screening. The primary screening criteria consisted of the technology's effectiveness with chloroform and its potential limitations given the Site conditions. Other factors considered in the analysis included cleanup time and cost.

In addition to the selected remedy, removal technologies considered included soil vapor extraction, groundwater extraction, and air sparging. Removal technologies consist of those intended to physically remove VOCs from the subsurface soil, soil gas, and/or groundwater. In general, removal technologies are not stand alone remediation alternatives, but require a means of treating VOCs following removal from the subsurface. Treatment is typically accomplished aboveground where the treatment processes are easier to monitor and control. Removal technologies are considered advantageous in this case because of their ability to potentially overcome the stagnant hydrogeologic conditions in the Building 028J Area.

Both Soil Vapor Extraction and 2-PHASE™ Extraction were retained as suitable alternatives for concurrent soil and groundwater remediation at the Building 028J Area. These technologies are widely used and are generally nonselective for removal of VOCs in the vadose zone. Furthermore, the high Henry's Law contant of chloroform indicates that significant mass transfer will occur from the aqueous phase to the vapor phase during treatment. 2-PHASE™ Extraction was selected because it can further expedite treatment by removing contaminated groundwater from the A-aquifer in the Building 028J Area and increasing flow through soil pore spaces formerly occupied by groundwater.

Groundwater Extraction (also known as, "Pump & Treat") and Air Sparging were rejected as remedial alternatives during technical screening. Groundwater Extraction was rejected because the low-flow conditions within the A-aquifer in the Building 028J Area would limit removal rates. Furthermore, an additional alternative would be necessary to address vadose-zone contamination.

Air Sparging was rejected due to the potential for mobilizing chloroform in the subsurface thereby causing migration of chloroform to other areas of the Site.

Aboveground treatment technologies considered included chemical/ultraviolet treatment and thermal oxidation. Chemical/Ultraviolet (UV) Oxidation and Thermal Oxidation were rejected as remedial alternatives during technical screening. Chemical/UV Oxidation was rejected because of its complexity of operation and the need for a separate vapor treatment alternative. Thermal Oxidation was rejected based on its marginal effectiveness with low influent vapor concentrations. Carbon Adsorption was retained as an alternative for aboveground treatment of chloroform-contaminated vapor and groundwater. This is a relatively low cost and reliable treatment technology for treatment of VOC-contaminated water and vapor.

In-situ treatment technologies considered included bioremediation by gaseous substrate injection, anaerobic bioremediation, chemical oxidation, and chemical reduction with zero valent iron (ZVI). In-situ Anaerobic Bioremediation and In-situ Bioremediation via Gaseous Substrate Injection were both rejected due to the problems caused by elevated chloroform concentrations in the subsurface. Above certain concentrations, chloroform becomes toxic to anaerobic and aerobic microorganisms. In the absence of toxicity from other solvents, chlorinated hydrocarbons, or heavy metals, and where chloroform concentrations are below approximately 100 µg/L, both aerobic and anaerobic bacteria can degrade chloroform; however, deviations from these ideal conditions lead to low removal efficiencies. In-situ Chemical Oxidation was rejected due to its limited effectiveness with chloroform and the potential need for high doses of oxidants. In-situ Chemical Reduction via Zero Valent Iron (ZVI) was rejected because of potentially slow reaction rates and the requirement of a separate remedial approach for chloroform-contamination in the vadose zone.

PUBLIC PARTICIPATION

DTSC held a 45-day public comment period from August 31, 2007, through October 15, 2007, to seek public comments on the draft modified permit and proposed corrective actions. A public notice regarding the public comment period and public hearing was published in the San Jose Mercury News on August 31, 2007. The notice was broadcast three times on radio station KBAY (FM 94.5) on August 31, 2007. A fact sheet regarding the proposed remedy was mailed to approximately 6,900 persons, organizations, and addresses on the facility mailing list. A public hearing was held, starting at 6:30 PM on Tuesday, October 9, 2007, at the Southside Community Center in San Jose. Seven members of the public attended the public hearing but no comments were received. No written or verbal comments were received during the public comment period.

The CMS Report and the full administrative record are available for public review at:

Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710
(510) 540-3800 Call for appointment

Some project documents are also available on DTSC's web site, www.dtsc.ca.gov. To obtain additional information or if you have questions regarding the Redevelopment Property at the Hitachi GST facility, please contact Mr. Paul Ruffin at (916) 255-6677 or pruffin@dtsc.ca.gov.

NEXT STEPS

In order to expedite cleanup of their property, Hitachi GST installed 15 extraction/monitoring wells in April and May 2007, conducted a pilot-scale test in June 2007, and started full-scale operation of the 2-Phase™ Extraction system on July 25. 2007. The extraction system will be operated, to the extent practicable, until the cleanup goals are met. The primary performance criteria will be the concentrations of chloroform in extracted vapor and groundwater. If extracted concentrations of chloroform decrease significantly, the system may be shut down temporarily or permanently.

Decisions on shutdown will be based on a review of the extracted chloroform concentrations and secondary performance criteria, which include vapor flow rates, applied vacuum, vacuum radius of influence, groundwater extraction rates, and water table drawdown. These criteria will be used to decide whether changes in operation, including temporal or zone pulsing of the system, may increase removal rates or improve the effectiveness of the cleanup. If changes are not likely to improve the cleanup, temporary system shutdown will be followed by interim monitoring of soil gas and groundwater.

Interim monitoring will consist of monthly monitoring of groundwater collected from the monitoring/extraction wells and soil gas collected from temporary or semi-permanent soil gas probes placed at intermediate points between the monitoring/extraction wells. If chloroform concentrations meet the cleanup goals for three consecutive months, DTSC will evaluate whether the extraction system will be permanently shut down and the equipment demobilized.

Concentrations in groundwater and soil gas tend to increase or “rebound” to some extent several months after shut down of 2-Phase™ Extraction. Post-remedial monitoring will be implemented for an additional three months after equipment demobilization to assess rebound of chloroform concentrations. If after three months of post remedial monitoring, the risk assessment for this area shows risks are within acceptable ranges for residential land use, the cleanup will be determined to be complete. If rebound is unacceptable, the extraction system may be returned to operation. If the cleanup goals cannot be met by continued operation of the 2-Phase™ Extraction system, then an alternative remedial approach will be considered.

On November 20, 2007, DTSC issued a Corrective Action Consent Agreement to Hitachi GST for cleanup of the chloroform impacted area. DTSC modified Hitachi GST’s Hazardous Waste Facility Permit on November 26, 2007, to incorporate this Consent Agreement. The permit modification also included a determination that corrective action was complete for the Redevelopment Property, except the chloroform impacted area, and removed the Redevelopment Property from the permitted facility boundary. The facility “Core Area” remains subject to corrective action requirements.

KEY WORDS

Hitachi, Redevelopment Property, chloroform, 2-Phase, extraction, soil gas, soil vapor extraction, SVE

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