Letter Health Consultation

COMPUTER CIRCUITS

HAUPPAUGE, SUFFOLK COUNTY, NEW YORK

EPA FACILITY ID: NYD125499673

FEBRUARY 23, 2009

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

COMPUTER CIRCUITS

HAUPPAUGE, SUFFOLK COUNTY, NEW YORK

EPA FACILITY ID: NYD125499673

Prepared By:

State of New York Department of Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

STATE OF NEW YORK
DEPARTMENT OF HEALTH
Flanigan Square 547 River Street Troy, New York 12180-2216

Richard F. Daines, M.D.
Commissioner

Wendy E. Saunders
Executive Deputy Commissioner

February 17, 2009

Mr. Mark Dannenberg
Eastern New York Remedial Section
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region II
20th Floor, 290 Broadway
New York, New York 10007

Re: Computer Circuits
Letter Health Consultation
CERCLIS NO. NYD125499673
Smithtown, Suffolk County, New York
May 13, 2008 Soil Vapor Intrusion
Sampling Results

Dear Mr. Dannenberg,

In July of 2001, the New York State Department of Health (NYS DOH) and the Agency for Toxic Substances and Disease Registry (ATSDR) completed a Public Health Assessment (PHA) for the Computer Circuits site (ATSDR, 2001). At the time the PHA was completed, there were insufficient data on concentrations of site related contaminants in soil, groundwater and indoor air to determine if exposures were occurring. Because of this lack of data the NYS DOH and ATSDR concluded that the site represented an "Indeterminate Public Health Hazard" (ATSDR, 2001).

Since release of the PHA, indoor air and sub-slab soil vapor data have been collected that indicate soil vapor intrusion (SVI) into the on-site building was occurring, and Interim Remedial Measures (IRM) have been implemented to mitigate the SVI. This letter health consultation (LHC) evaluates these data, the effectiveness of the IRM, and addresses the public health implications of exposure to volatile organic compounds (VOCs) via SVI in the onsite building.

Background

The Computer Circuits Superfund site (Site) occupies a 2 acre parcel within an industrial park in the Hamlet of Hauppauge, Suffolk County New York. A 21,600 square foot one-story building, now utilized for office space, is located roughly in the center of the parcel.

The Computer Circuits company occupied the site from 1969 to 1977, and manufactured printed circuit boards. During this time, manufacturing waste liquids containing metals, acids, and

solvents were discharged to various industrial leaching pools located around the building. A photographic dark room and silk screening process discharged wastewater that included trichloroethelene (TCE) to a single industrial leaching pool located on the north side of the building. This leaching pool, and one located at the south-eastern corner of the building, appear to be the primary sources of volatile organic compound (VOC) contamination present in the sub-slab environment of the building.

The building was occupied by four different organizations between 1977 and 2002 for manufacturing and non-manufacturing purposes, however there is no specific information regarding waste disposal practices or potential exposures during this time frame. The building was partially reconfigured in 2005 for use as office space, and then occupied by a company employing approximately 15 individuals. Since 2005 phased renovations have completely re-configured the building for use as office space, with concurrent increase in the use of the building for this purpose.

In 1986, the New York State Department of Environmental Conservation (NYS DEC) included the Site on the New York Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 site. The Site was then included on the National Priorities List (NPL) in 1999, at which time the Environmental Protection Agency (EPA) initiated a Remedial Investigation (RI)/Feasibility Study (FS). The RI included sampling that addressed the lack of data regarding intrusion of VOCs into the building that in part, lead to the "Indeterminate Public Health Hazard" determination in the 2001 PHA (ATSDR, 2001).

In 2003, the consultant conducting the RI reported that several VOCs were detected in soil adjacent to and underneath the north end of the building, and conjectured that this contamination could affect the sub-slab soil vapor. At that time TCE was also found in the indoor air of the building, which was then unoccupied, at a level of 220 micrograms per cubic meter ($\mu g/m^3$). In response to this finding, a soil vapor extraction (SVE) system (including an extraction well under the slab at the north end of the building) was installed as an IRM to remediate the contaminated soil and to mitigate intrusion of contaminated soil vapor into the building. The SVE system was initially started in December of 2005, and has been operational since then, although monthly status reports document instances when the system was found to not be operating.

Table 1 shows that indoor air concentrations of TCE have been fluctuating over the time the SVE system has been operating. At various times the air concentrations have exceeded both the typical indoor air level for TCE of less than 1 $\mu g/m^3$ cited by New York State (NYS DOH 2006a), and the NYS Air Guideline for TCE of 5 $\mu g/m^3$. This information, in combination with a reduction of indoor air sampling locations (from three in 2005 and 2006 to one in 2007) led the NYS DEC and NYS DOH to jointly request additional evaluation of the building for soil vapor intrusion.

In May of 2008, the US EPA collected sub-slab and indoor air samples within the building; sample locations and results are presented in Figure 1. This sampling (Lockheed Martin, June 2008) indicates that TCE and tetrachloroethene (PCE) contamination exist in the sub-slab environment of the building. Computer Circuits did not utilize PCE in its operations, and there is no information regarding PCE use by subsequent occupants of the building. Off-site, up-gradient sources of PCE are known to exist, and these sources are thought to be responsible for the PCE detected in the on-site building's sub-slab environment.

One indoor air sample collected in May of 2008 showed a TCE concentration of 6.07 µg/m^3 in air at a location in the southern end of the building (PCE was non-detect in this sample). This concentration is slightly above the NYS Air Guideline for TCE of 5 µg/m^3. The location of this sample roughly corresponds to the location (AS-3, Table 1) where one of the highest TCE concentrations (26.9 µg/m^3) was found during the sampling conducted between 2005 and 2007. The location of the 6.07 µg/m^3 indoor air sample also corresponds to the location of the May 2008 sub-slab sample that showed the highest PCE and TCE concentrations (5980 µg/m^3 and 25,100 µg/m^3, respectively).

Table 1
Indoor Air TCE Concentrations
(all concentrations in µg/m^3)

Date		Sample Results		
	Comments	SW Interior AS-1	N interior AS-2	SE Interior AS-3
2/18/2005	No SVE/HVAC system off	6.4	33	12
2/22/2005	No SVE/HVAC system on	17	23	17
12/12/05	SVE system start-up			
12/20/2005		3.5	4.6	5.9
1/17/2006		5.9	0.81	0.91
2/21/2006		1.5	1.9	1.8
3/21/2006		10	9.7	8.1
4/18/2006		0.97	0.45	0.21 U
5/16/2006		5.1	3.8	7
6/20/2006		0.75	0.37	5.4
7/18/2006		2.4	2.9	4.2
8/14/2006		1.07 U	5.91	5.91
9/19/2006		2.69	2.69	26.9
12/29/2006		NS	1.1 U	NS
2/19 – 2/22/2007	SVE system down *			
3/22/2007		NS	5.48	NS
4/20/2007		NS	NS	NS
5/14 – 5/16/2007	SVE system down *			
6/26/2007		NS	0.831	NS
9/28/2007		NS	2.39	NS
10/09/2007		NS	NS	NS
12/20/2007		NS	1.3	NS
2/28 – 3/19/2008	SVE system down			
5/13/2008		U	U	6.02

Notes:
NS – No sample collected
U – Indicates that analyte was not detected by laboratory.
HVAC – Heating, Ventilation, Air Conditioning
SVE – Soil Vapor Extraction
* - Estimated time frame system was down

P:\Sections\Long Island-ATSDR Region 1\ATSDR Documents\LHC\Computer Circuits LHC Table 1.doc

Indoor air samples taken in the northern end of the building (in the area where the existing sub-slab soil vapor extraction well is located) were non-detect for both PCE and TCE. Two indoor air samples at other locations in the north and south ends of the building showed only TCE at concentrations of 0.399 $\mu g/m^3$ and 0.661 $\mu g/m^3$.

EPA September 2008 Record of Decision

In September of 2008, the EPA issued a Record of Decision (ROD) describing remedial actions intended to address contamination at the Site and to mitigate the intrusion of contaminated soil vapor into the building. Prior to the release of the ROD, an additional SVE system was installed in the southern end of the building; this system began operation early in September of 2008. Following are the primary remedial actions specifically intended to address SVI:

- Treatment of Soils: Continued operation and maintenance of the two SVE systems. The SVE systems will remove contaminants from below the slab of the building and concurrently mitigate vapor intrusion into the building;
- Implementation of Institutional Controls: An environmental easement and/or restrictive covenant with Suffolk County requiring that use of the property be restricted to commercial or industrial purposes, and restricting new construction at the Site unless the potential for vapor intrusion is evaluated and mitigated;
- Development of a Site Management Plan (SMP): A SMP will be developed to ensure that conditions at the Site are monitored to ensure that remedial actions are successful, and that provide for proper management of all Site remedy components; and
- Implementation of Engineering Controls: Engineering controls will include components that ensure inadvertent SVE system shutdowns will be promptly identified and corrected.

Public Health Implications

Long-term exposure to high levels of TCE in workplace air is linked to effects on the central nervous system, irritation of the mucous membranes, and reproductive effects (e.g., alterations in sperm counts in men). Studies of industrial workers also show an association between exposure to high levels of TCE in air and increased risks for certain types of cancer (e.g., kidney, liver, esophagus, and non-Hodgkin's lymphoma). Exposure to TCE is also linked to developmental effects in humans. Studies of women that consumed drinking water containing mixtures of chlorinated solvents (including TCE) during pregnancy showed evidence of increased risks for birth defects in children (e.g., neural tube defects, oral cleft defects, and congenital heart defects) and/or childhood leukemia (ATSDR, 1997). All of these studies have limitations with respect to exposure and/or poorly controlled confounding factors. Therefore, the available information suggests, but does not prove that exposure to TCE causes cancer or developmental effects in humans. In animal studies, exposure to high levels of TCE is associated with adverse effects on the central nervous system, liver and kidneys. Lifetime exposure to high levels of TCE causes cancer in laboratory animals. When pregnant animals were exposed by ingestion to large amounts of TCE, adverse effects on the normal development of offspring were observed.

Office workers began occupying the reconfigured building in late 2005 after the installation of the SVE system under the north end. Since that time, TCE levels in indoor air have, on average, exceeded the cancer comparison value for office workers exposed over a 25-year working lifetime (Table 2). The increased cancer risk from exposure to these levels over a working lifetime is

estimated to be low. In this case, however, the office workers have been working in the building for only about 3 years. Over this time period, the increased cancer risk from exposure to TCE is estimated to be very low. With respect to non-cancer health effects, the risks are estimated to be minimal since all of the sampling results were less than the non-cancer comparison value. For additional discussion on how the NYS DOH characterizes health risks please see Attachment A.

The sampling conducted in May, 2008 indicated that there is a potential for future exposures to TCE and PCE in indoor air at levels of public health concern. The levels of TCE (up to 25,100 $\mu g/m^3$) and PCE (up to 5980 $\mu g/m^3$) in sub-slab vapor under the southeast end of the building are well above those that would prompt the NYS DOH to recommend additional mitigation to minimize current and/or potential future exposures to TCE/PCE via soil vapor intrusion into indoor air (NYS DOH, 2006b). Subsequent indoor air sampling conducted in September of 2008, shortly after the new SVE system was installed, showed that indoor air levels throughout the building were below the NYS Air Guideline for TCE of 5 $\mu g/m^3$ (Lockheed Martin, November, 2008).

Table 2
Air Levels, Guidelines and
Public Health Assessment Comparison Values for Trichloroethene
(*All values in microgram per cubic meter ($\mu g/m^3$)*)

Sample Location	TCE Air Level Avg./Max.	Indoor Air Background Level*	New York State Air Guideline**	Comparison Values***			
				Cancer	Basis****	Noncancer	Basis****
AS-1 (Southwest Interior)	11.7 / 17[a] 3.0 / 10[b]	< 1.0	5	2.5	NYS DOH UR	28	NYS DOH CV
AS-2 (North Interior)	28 / 33[a] 2.9 / 9.7[b]						
AS-3 (Southeast Interior)	14.5 / 17[a] 6.6 / 26.9[b]						

*NYS DOH, 2006a.

**The NYS DOH guideline for TCE in air is 5 $\mu g/m^3$. This level is many times lower than the levels that have caused health effects in animals and humans. The purpose of the guideline is to help guide decisions about the nature of the efforts to reduce TCE exposure. Reasonable and practical actions should be taken to reduce TCE exposure when indoor air levels are above those typically found in indoor air, even when they are below the guideline of 5 $\mu g/m^3$. The urgency to take actions increases as indoor air levels increase, especially when air levels are above the guideline.

***Comparison values assume an office worker inhales 10 cubic meters of air per day at work, 5 days per week. The cancer comparison value is the air concentration that provides an intake corresponding to an increased lifetime cancer risk of one-in-one million and assumes an office worker inhales 10 cubic meters of air per day at work, 250 days per year for 25 years. The cancer comparison value is based on the highest of several estimates of cancer potency for TCE derived by the New York State Department of Health.

****NYS DOH UR: New York State Department of Health Unit Risk (NYS DOH, 2006a); NYS DOH CV: New York State Department of Health Criteria Value for non-cancer endpoints (NYS DOH, 2006a).

[a]Prior to installation of soil vapor extraction system under north end of building.

[b]After installation of soil vapor extraction system under north end of building.

Conclusions

Previous on- and off-site waste disposal practices resulted in TCE and PCE concentrations in the sub-slab environment of the on-site building that have resulted in, or could result in soil vapor intrusion. A SVE system was installed at one end of the building in 2005 to address vapor intrusion. Recent investigations found TCE in indoor air at levels that present a low increase in risk of cancer for the buildings office worker occupants over the course of a typical working lifetime (i.e. 25 years). In response to this an additional SVE system was installed in the building; subsequent sampling showed TCE and PCE levels to be below NYSDOH guidelines. The EPA issued a ROD in September of 2008 that specifies actions to ensure that concentrations of TCE and PCE in the building remain below State guidelines. The ROD also requires institutional controls and implementation of a site management plan (including ongoing indoor air monitoring to verify that vapor intrusion is not occurring). Successful and ongoing implementation of these actions should prevent VOCs from entering the building by soil vapor intrusion; therefore, ATSDR and the NYS DOH conclude that there is no apparent public health hazard to occupants of the on-site building due to inhalation of site-related contaminants located in the sub-slab environment.

Recommendations

EPA should continue to work with ATSDR and New York State to ensure that implemented remedial actions are successful in mitigating SVI at the on-site building, and that indoor air is appropriately monitored to ensure that this current and/or potential exposure pathway does not impact building occupants.

Sincerely,

Steve Karpinski
Public Health Specialist
Bureau of Environmental Exposure Evaluation
New York State Department of Health

cc:
G. Litwin / D. Miles / file
L. Graziano, ATSDR, NY
G. Ulrisch, ATSDR, GA
V. Minei, SCDHS
T. Johnson

Attachment A

NYS DOH PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS FOR CONTAMINANTS OF CONCERN

To evaluate the potential health risks from contaminants of concern associated with the Computer Circuits site, the New York State Department of Health assessed the risks for cancer and non-cancer health effects.

Increased cancer risks were estimated by using site-specific information on exposure levels for the contaminant of concern and interpreting them using cancer potency estimates derived for that contaminant by the US EPA or, in some cases, by the NYS DOH. The following qualitative ranking of cancer risk estimates, developed by the NYS DOH, was then used to rank the risk from very low to very high. For example, if the qualitative descriptor was "low", then the excess lifetime cancer risk from that exposure is in the range of greater than one per million to less than one per ten thousand. Other qualitative descriptors are listed below:

Excess Lifetime Cancer Risk

Risk Ratio	Qualitative Descriptor
equal to or less than one per million	very low
greater than one per million to less than one per ten thousand	low
one per ten thousand to less than one per thousand	moderate
one per thousand to less than one per ten	high
equal to or greater than one per ten	very high

An estimated increased excess lifetime cancer risk is not a specific estimate of expected cancers. Rather, it is a plausible upper bound estimate of the probability that a person may develop cancer sometime in his or her lifetime following exposure to that contaminant.

There is insufficient knowledge of cancer mechanisms to decide if there exists a level of exposure to a cancer-causing agent below which there is no risk of getting cancer, namely, a threshold level. Therefore, every exposure, no matter how low, to a cancer-causing compound is assumed to be associated with some increased risk. As the dose of a carcinogen decreases, the chance of developing cancer decreases, but each exposure is accompanied by some increased risk.

There is general consensus among the scientific and regulatory communities on what level of estimated excess cancer risk is acceptable. An increased lifetime cancer risk of one in one million or less is generally not considered a significant public health concern.

For non-carcinogenic health risks, the contaminant intake was estimated using exposure assumptions for the site conditions. This dose was then compared to a risk reference dose (estimated daily intake of a chemical that is likely to be without an appreciable risk of health effects) developed by the US EPA, ATSDR and/or NYS DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptions for
Noncarcinogenic Health Risks

Ratio of Estimated Contaminant Intake to Risk Reference Dose	Qualitative Descriptor
equal to or less than the risk reference dose	minimal
greater than one to five times the risk reference dose	low
greater than five to ten times the risk reference dose	moderate
greater than ten times the risk reference dose	high

Non-carcinogenic effects unlike carcinogenic effects are believed to have a threshold, that is, a dose below which adverse effects will not occur. As a result, the current practice is to identify, usually from animal toxicology experiments, a no-observed-effect-level (NOEL). This is the experimental exposure level in animals at which no adverse toxic effect is observed. The NOEL is then divided by an uncertainty factor to yield the risk reference dose. The uncertainty factor is a number which reflects the degree of uncertainty that exists when experimental animal data are extrapolated to the general human population. The magnitude of the uncertainty factor takes into consideration various factors such as sensitive sub-populations (for example, children or the elderly), extrapolation from animals to humans, and the incompleteness of available data. Thus, the risk reference dose is not expected to cause health effects because it is selected to be much lower than dosages that do not cause adverse health effects in laboratory animals.

The measure used to describe the potential for non-cancer health effects to occur in an individual is expressed as a ratio of estimated contaminant intake to the risk reference dose. A ratio equal to or less than one is generally not considered a significant public health concern. If exposure to the contaminant exceeds the risk reference dose, there may be concern for potential non-cancer health effects because the margin of protection is less than that afforded by the reference dose. As a rule, the greater the ratio of the estimated contaminant intake to the risk reference dose, the greater the level of concern. This level of concern depends upon an evaluation of a number of factors such as the actual potential for exposure, background exposure, and the strength of the toxicologic data.

References:

ATSDR (Agency for Toxic Substances and Disease Registry). 1997. Toxicological profile for Trichloroethylene. Atlanta, GA. US Department of Health and Human Services, Public Health Service. Available online at: http://www.atsdr.cdc.gov/toxprofiles/tp19.html.

ATSDR (Agency for Toxic Substances and Disease Registry). 2001. Public Health Assessment for Computer Circuits, Hauppauge, Suffolk County, New York. U.S. July 20, 2001. Prepared by the New York State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry.

NYS DOH (New York State Department of Health). 2006a. Trichloroethene Air Criteria Document. Troy, NY. Center for Environmental Health, Bureau of Toxic Substance Assessment. Available online at:
http://www.nyhealth.gov/environmental/chemicals/trichloroethene/docs/cd_tce.pdf.

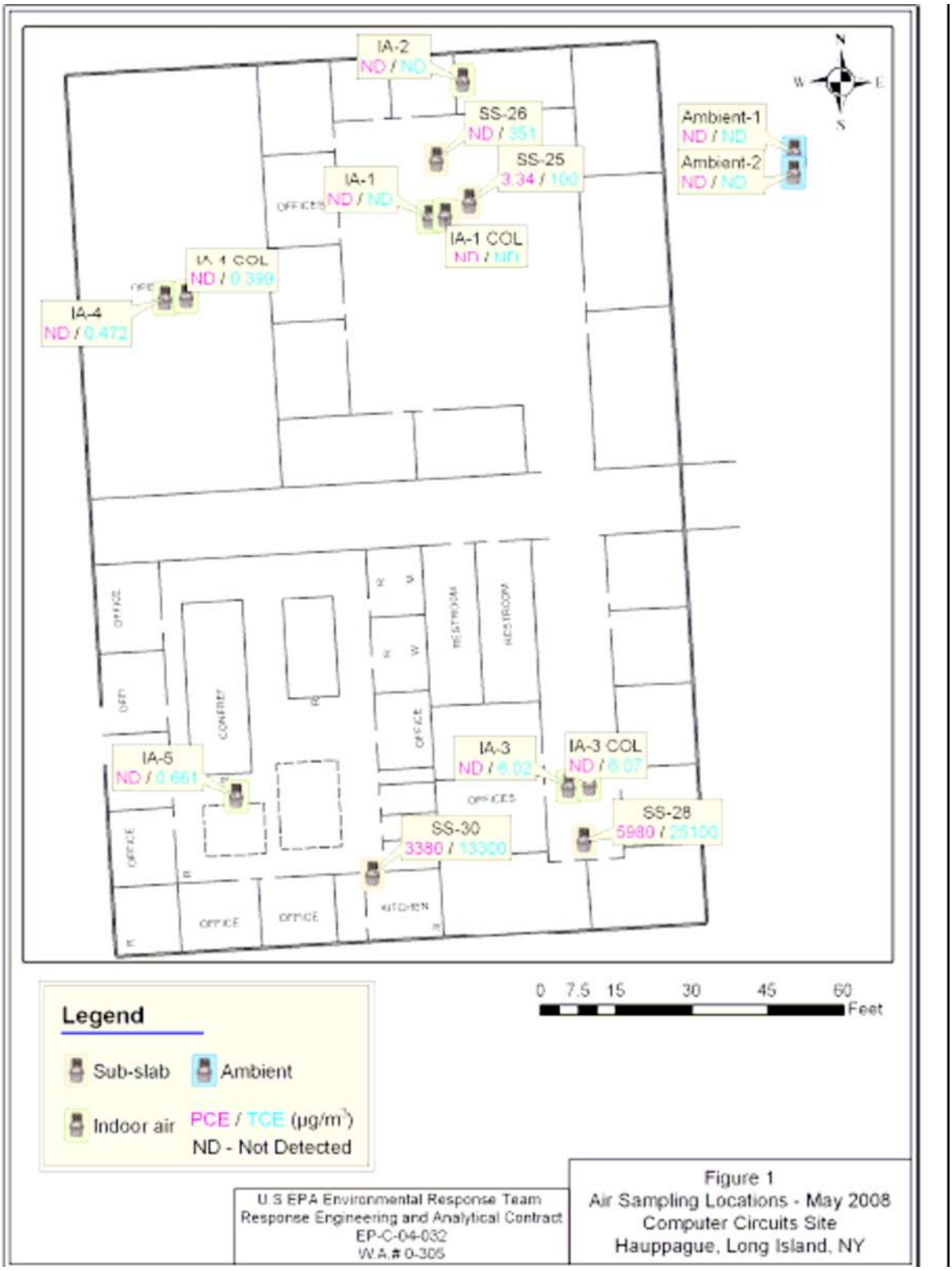
NYS DOH (New York State Department of Health). 2006b. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Troy, NY. Center for Environmental Health, Bureau of Environmental Exposure Investigation. Available online at:
http://www.health.state.ny.us/environmental/investigations/soil_gas/svi_guidance/

US EPA (United States Environmental Protection Agency). 2008. Superfund Proposed Plan, Computer Circuits Superfund Site, Hauppauge, Suffolk County, New York. August 2008.

Lockheed Martin Technology Services/Environmental Services/REAC. 2008. Document Transmittal Under Work Assignment # 0-35. June 6, 2008

P.W. Grosser Consulting Inc. 2007. Final Remedial Investigation Report, Former Computer Circuits Superfund Site, 145 Marcus Boulevard, Hauppauge, Suffolk County, New York. February 9, 2007.

Lockheed Martin Technology Services/Environmental Services/REAC. 2008. September 2008 Soil Vapor Intrusion Sampling Work Assignment # EAC00305 -. November, 2008


IA-2
ND / ND
SS-26
ND / 351
SS-25
3.34 / 100
IA-1
ND / ND
IA-1 COL
ND / ND
Ambient-1
ND / ND
Ambient-2
ND / ND
IA-1 COL
ND / 0.399
IA-4
ND / 0.472
IA-5
ND / 0.661
IA-3
ND / 6.02
IA-3 COL
ND / 6.07
SS-30
3380 / 13300
SS-28
5980 / 25100
OFFICE
OFFICES
CONFER
RESTROOM
KITCHEN
N
S
E
W
0 7.5 15 30 45 60
Feet
Legend
Sub-slab
Ambient
Indoor air
PCE / TCE (µg/m³)
ND - Not Detected
U.S EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
W.A.# 0-305
Figure 1
Air Sampling Locations - May 2008
Computer Circuits Site
Hauppague, Long Island, NY

CERTIFICATION

The letter health consultation for the Computer Circuits Corporation site was prepared by the New York State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.

Technical Project Officer, CAT, CAPEB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation, and concurs with its findings.

Team Leader, CAT, CAPEB, DHAC, ATSDR