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October 27, 1999

STID 1879

Ms. Madhulla Logan
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: Clarification of Development of Risk-Based Cleanup Standards
Harbert Transportation Site, 19984 Meekland Avenue, Hayward, Ca.

Dear Ms Berger:

Weber, Hayes and Associates reviewed AGI Technologies' September 25, 1998 report, *Development of Risk-Based Cleanup Standards 19984 Meekland Avenue, Hayward, Ca*[1]. ("*AGI's Report*") to address the additions requested by Alameda County Health Environmental Health Services (Environmental Health) in their letter dated June 17, 1999 (Appendix A). We understand that AGI has closed their San Francisco Bay area office.

Environmental Health requested that:

- The surface soil exposure pathway be evaluated as the sum of ingestion, inhalation and dermal exposure routes.
- The risk posed by volatile organic compounds detected at the site, such as tetrachloroethylene (PCE) be evaluated.
- The California slope factor for benzene (0.1) be used in all risk calculations.
- The rationale for selecting values for porosity and volumetric air content be provided, and
- The Risk-Based Cleanup Standards be compared to pertinent site concentrations.

In their June 17, 1999 letter, Environmental Health requested the above additions to the March 27, 1996 version of *AGI's Report, Final Report Development of Risk Based Cleanup Standards 19984 Meekland Avenue, Hayward, Ca*[1]. As we noted above, we reviewed the most recent version of the AGI report, dated September 25, 1998. We assume that a copy of the 1998 version of the *Report* has been submitted to Environmental Health. Differences between these versions are noted here where they apply to the issues listed by Environmental Health in their letter of June 17, 1999.

We address each of Environmental Health's questions below.

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[1] The 1998 Version of AGI's Report evaluates the site for commercial use, the 1996 version evaluates the site for residential use.

Surface Soil Exposure Pathway

Environmental Health indicated that the surface soil pathway was evaluated by using two exposure routes, i.e., inhalation and ingestion. Environmental Health requested that this pathway be evaluated as a combination (sum) of ingestion, inhalation and dermal routes.

AGI's Report states that "Samples from the 0 to 5.5 foot depth are considered representative of surface conditions. Toluene is the only compound detected in the samples from 0 to 5.5 feet in depth.. Toluene is the only Chemical of Concern (COC) in surface soil.".

We evaluated the risk posed by toluene in surface soils using Groundwater Services, Inc.'s (GSI's) *RBCA Tool Kit for Chemical Releases,* (RBCA Toolkit). This software is designed to complete all calculations required for Tiers 1 and 2 of the Risk-Based Corrective Action (RBCA) planning process as defined in the American Society for Testing and Materials (ASTM) PS-104 *Standard Provisional Guide for Risk-Based Corrective Action.* We used the RBCA Toolkit to calculate Site-Specific Target Levels (SSTLs) - the maximum concentrations of a chemical contaminant that may be left at a site that will not exceed the acceptable risk to human health (acceptable risk is defined as one excess cancer per million population, 1×10^{-6}).

We used the following characteristics of the site in our calculations, based on information provided in *AGI's 1998 Report*:

- Contaminated soil area (based on Figure 3) 35 ft X 25 ft — 875 sq. ft.
- Length of contaminated soil parallel to wind (maximum assumed) — 35 ft.
- Length of contaminated soil parallel to groundwater (maximum assumed) — 35 ft.
- Soil porosity — 0.38
- Depth to groundwater (minimum reported by AGI) — 24 ft.
- On-site/local shallow groundwater not used for drinking water (drinking water supplied by utilities from off-site sources
- Site use is commercial
- Distance to closest off-site residence (based on AGI Figure 3) — 75 ft.

The Site-Specific Target Level (SSTL) we calculated for toluene in surface soils that is within the acceptable limit of risk to human health for commercial use of the site is 110 milligrams per kilogram (mg/kg). This is the SSTL for surface soil volatilization to indoor air. The calculated combined SSTL for surface soil inhalation, ingestion and dermal contact is 5,300 mg/kg. The RBCA Toolkit output table for toluene in surface soils is presented as Appendix B. AGI's calculated site specific cleanup level for toluene in surface soil is 150 mg/kg.

The maximum concentration of toluene detected in site surface soils was 0.069 mg/kg (AGI, 1998). This is far below the calculated site specific cleanup level of 150 mg/kg. **The concentration of toluene in surface soil appears to fall within the limits of acceptable risk to human health.**

Risk Posed by Volatile Organic Compounds

We evaluated the risk posed by the volatile organic compounds detected at the site: trichloroethene (TCE), tetrachloroethene (PCE), and 1,2-Dichloroethene (1,2-DCA) using GSI's RBCA Toolkit and the physical parameters described above.

We calculated the following SSTLs for these volatile organic compounds:

	Soil	Groundwater
TCE	0.17 mg/kg	170 micrograms per liter (ug/L)
PCE	0.49 mg/kg	540 ug/L
1,2-DCA	0.032 mg/kg	81 ug/L

The RBCA Toolkit output tables for these calculations are presented as Appendix C.

The maximum concentration of TCE detected in site soils was 0.2 mg/kg, and the average concentration of TCE detected in site soils was 0.013 mg/kg (AGI, 1998). TCE was not detected in the last round of groundwater samples collected at the site (AGI, 1998).

PCE was never detected in site soils(AGI, 1998). PCE was detected at a maximum concentration of 1.41 ug/L in the last round of groundwater samples collected at the site (AGI, 1998).

The maximum concentration of 1,2-DCA detected in site soils was 0.06 mg/kg, and the average concentration of 1,2-DCA detected in site soils was 0.005 mg/kg (AGI, 1998). 1,2-DCA was detected at a maximum concentration of 85 ug/L in the last round of groundwater samples collected at the site (AGI, 1998).

Based on the average concentration in soil and the most recent groundwater concentration data, TCE and PCE at the site appear to fall within limits of acceptable risk to human health.

Based on the average concentration in soil 1,2-DCA at the site appears to fall within the limits of acceptable risk. Based on the most recent groundwater concentration data (November 1994) 1,2-DCA in groundwater in well MW5 (85 ug/L) slightly exceeds the limit of acceptable risk to human health (1,2 DCA SSTL = 81 ug/L).

Groundwater analytical data from well MW8 and the absence of PCE from all soil samples at the site indicate an upgradient off-site source of PCE. Groundwater analytical data from well MW4 indicate some of the 1,2 DCA detected in on-site groundwater may be from an upgradient source.

Risk Calculations Using the California Slope Factor for Benzene

The 1998 version of *AGI's Report* uses the California Slope Factor for Benzene (0.1) in all risk calculations (Table 7; Appendix A, Table A-3 Sample Calculations), as requested by Environmental Health.

Rationale for Selection of Values for Porosity and Volumetric Air Content

Environmental Health wanted to know the rationale for using a porosity of 0.43 cm^3 and a volumetric air content of 0.133 cm^3 in Table 9 (Parameters and Values used to Calculate VF_{scsp}) of *AGI's 1996 Report*. The 1998 version of *AGI's Report* uses the following revised values for these parameters in Table 9:

Total soil porosity	0.38 cm^3/cm^3 of soil
Volumetric air content (in vadose zone soil)	0.26 cm^3 - air/cm^3 of soil

These are accepted values for these parameters, and are the default value for these parameters in the ASTM *Standard Guide for Risk-Based Corrective Action at Petroleum Release Sites* (1995, Table X2.6).

Comparison of Risk-Based Cleanup Standards to Pertinent Site Concentrations.

AGI's 1998 Report summarized their calculated Risk-Based Cleanup Levels for the site on Table 14 as follows:

	Risk-Based Cleanup Level		
Chemical of Concern	Surface Soil	Subsurface Soil	Groundwater
Benzene		0.118	3,820
Toluene	150	NC	NC
Ethylbenzene		NC	NC
Xylenes		NC	NC
1,2-DCA		NC	NC
TPH-G		1,000	12,500
TPH-D		1,000	15,000

Surface and Subsurface Soil concentrations in milligrams per kilogram (mg/kg)
Groundwater concentrations in micrograms per Liter (ug/L)
NC = No Concentration selected: Maximum concentration detected was below the risk-based concentration.

AGI interpreted this data as follows,

> "The concentrations of toluene in all samples taken from 0 to 5.5 feet (defined as surface soil) are below the risk-based concentration selected as the cleanup level.
>
> The majority of concentrations of benzene detected in subsurface soil are below the selected cleanup level. Eleven samples (out of 29 detections and 62 total analyses) had concentrations exceeding the 0.118 mg/kg cleanup level. The sample locations, sample dates, sample depths, and concentrations are as follows:

Sample Location	Sample Date	Sample Depth (ft)	Concentration (mg/kg)
T1-W	8/89	11	12
T3-E	8/89	13	1.9
ABW-12-12	12/89	12	0.2
B1	10/90	25.5	1.2
MW3	11/89	20.5	0.13
MW3	11/89	25.5	0.44
MW3	11/89	30.5	0.54
MW5	8/90	20.5	9.6
MW7	10/90	Auger	0.31
MW9	2/91	20	0.15
MW9	2/91	30	0.18

> Comparing the risk based cleanup levels to the last four groundwater monitoring events for each monitoring well indicates benzene concentrations detected in three wells: MW1, MW5, and MW6 exceeded the selected cleanup level of 3.82 mg/L. Samples collected from April 1992 through November 1992 in MW1, June 1993 through November 1994 in MW5, and November 1994 in MW6 have benzene concentrations that exceed the cleanup level.
>
> TPH-G concentrations detected in sample from three wells (MW1, MW5, and MW6) exceeded the selected cleanup level of 12.5 mg/L. Most samples from MW1, MW5, and MW6 exceed the cleanup level during the last four monitoring events. Only one sample, taken from MW1 in July 1992, exceeded the selected cleanup level of 15 mg/L for TPH-D."

AGI stated in their report that "Risk-based concentrations for TPH-G and TPH-D could not be estimated due to the lack of physical/chemical parameters to describe these mixtures. In Table 8 AGI

indicates that 1,000 mg/kg is a regulatory cleanup level for TPH-G and 10,000 mg/kg is a regulatory cleanup level for TPH-D. In Table 14 AGI states "The cleanup level selected for TPH-D in soil is the same as TPH-G since the product identified as TPH-D is actually weathered gasoline." AGI also states in Table 14 that "The most stringent concentration (of TPH-G/d) was not selected for groundwater because derivation using the dermal exposure route is too uncertain."

Summary and Recommendations

Surface soils were defined by AGI as extending from 0 to a depth of 5.5 feet. Toluene was the only contaminant detected in surface soils, at a maximum concentration of 0.069 mg/kg. We calculated a site specific target level for toluene in surface soils of 110 mg/kg. **The concentration of toluene in surface soils is within the acceptable limits of risk.**

TCE and PCE at the site appear to fall within limits of acceptable risk

1,2-DCA in soil at the site appears to fall within the limits of acceptable risk. 1,2-DCA was detected at a concentration of 85 ug/L in groundwater in well MW5 in November 1994. This slightly exceeds the limit of acceptable risk we calculated for 1,2-DCA in groundwater of 81 ug/L.

Groundwater analytical data from well MW8 and the absence of PCE from all soil samples at the site indicate an upgradient off-site source of PCE. Groundwater analytical data from well MW4 indicate some of the 1,2 DCA detected in on-site groundwater may be from an upgradient source.

AGI used the California slope factor for benzene in its 1998 risk calculations.

AGI used established literature values for porosity and volumetric air content in its risk calculations.

Eleven soil samples collected between 1989 and 1991 contained concentrations of benzene that exceed AGI's proposed cleanup level for the site of 0.118 mg/kg. The highest concentrations were in the tank removal samples and in soil samples from well MW5, located close to the removed underground storage tanks.

Concentrations of TPH-G and benzene in wells MW1, 5 and 6 during the most recent sampling event for these wells (November 1994) exceeded AGI's proposed cleanup levels of 12.5 and 3.28 mg/L, respectively.

We recommend:

- The site specific cleanup levels proposed in *AGI's 1998 Report* and by us in this report be approved by Environmental Health.
- A limited soil sampling program be developed to determine the current concentrations of benzene in subsurface soils at the site. The program should be reviewed and approved by Environmental Health.
- A groundwater sampling program be initiated to collect current data on TPH-D, TPH-G and BTEX groundwater concentrations.
- The soil and groundwater data should be evaluated to determine if additional cleanup or groundwater monitoring is necessary.

Limitations

Our service consists of professional opinions and recommendations made in accordance with generally accepted geologic and engineering principles and practices. This warranty is in lieu of all others, either expressed or implied. The analysis and conclusions in this report are based on sampling and reporting by others. We make no warranty on the accuracy of that data. All sampling and testing are necessarily limited. Additional data from future work may lead to modification of the opinions expressed herein.

If you have any questions about this project, please call me at (831) 722 - 3580.

Sincerely,

Weber, Hayes and Associates

By:_____
Craig Drizin
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
CRAIG B. DRIZIN
No. C 054081
Exp. 12-31-99
CIVIL
STATE OF CALIFORNIA

And:_____
Joseph Hayes
Principal Hydrogeologist

REGISTERED GEOLOGIST
JOSEPH P. HAYES
No. 1629
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Appendices

Appendix A: Alameda County Environmental Health Services letter dated June 17, 1999
Appendix B: RBCA Toolkit Output Table for Toluene in Surface Soils
Appendix C: RBCA Toolkit Output Table for Volatile Organic Compounds

c: Mr. Jeff Lawson - Reed, Elliott, Creech and Roth

Appendix A

Alameda County Health Environmental Health Services letter dated June 17, 1999

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

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ENVIRONMENTAL HEALTH SERVICES
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
(510) 337-9335 (FAX)

June 17, 1999

Ms. Laurie Burger
99 Almaden Boulevard 8th floor
San Jose, CA - 95113

Ref: Durham Property, Meekland Avenue Site, 19984 Meekland Avenue, Hayward, CA

Dear Ms. Burger:

I am in receipt of the final risk assessment, dated March 27, 1996 prepared by AGI Technology for the above mentioned site. Based on review and phone conversations with AGI consultants the following additions/modifications of the risk assessment is required:

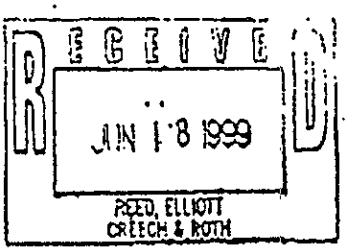
- Surface soil pathway was evaluated for future resident by using two exposure routes, i.e. inhalation and ingestion. The results of this evaluation are provided in Table 8 of the risk assessment report. However, this pathway should be evaluated as a combination (sum) of ingestion, inhalation and dermal routes.
- Volatile Organics, including PCE that has been identified in the groundwater should also be evaluated in the risk assessment.
- Based on the information provided in Table 11 of the report, the federal slope factor was used to calculate the cleanup levels for benzene. This department requires that the California slope factor for benzene be used.
- Provide a rationale for using a porosity of 0.43 cm^3 and a volumetric air content of 0.133 cm^3 as mentioned in Table 9 of this report to calculate the indoor air pathway.

This risk assessment has been prepared for the purpose of establishing cleanup levels. However, to evaluate the site for closure, the final risk based cleanup numbers (subsequent to approval) should be compared with pertinent site concentrations to determine the potential risk to future residents. A excess lifetime cancer risk of one in one hundred thousand (10^{-5}) is acceptable. If you have any questions, you may reach me at (510) 567-6764.

Sincerely,

Madhulla Logan

Madhulla Logan
Hazardous Material Specialist



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Appendix B

RBCA Toolkit Output Table for Toluene in Surface Soils

RBCA SITE ASSESSMENT

Site Name: Herbert Transportation | Completed By: Craig Drizin | Job ID: H9042

Site Location: 19984 Meekland Ave, Hayward, CA | Date Completed: 25-Oct-99

SOIL (0 - 5.5 ft) SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" If Complete)

			Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			X Soil Vol. to Indoor Air	X Soil Volatilization and Surface Soil Particulates to Outdoor Air				X Surface Soil Inhalation, Ingestion,Dermal Contact		Applicable SSTL	SSTL Exceeded ?	Required CRF
CONSTITUENTS OF CONCERN		Representative Concentration	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	On-site (0 ft)		Off-site 1 (75 ft)	Off-site 2 (0 ft)	On-site (0 ft)				Only if "yes" left
CAS No.	Name	(mg/kg)	None	None	None	Commercial	Commercial	Construction Worker	Residential	None	Commercial	Construction Worker	(mg/kg)	"X" If yes	
108-88-3	Toluene	7.0E-2	NA	NA	NA	1.1E+2	>7.5E+2	NA	>7.5E+2	NA	5.3E+3	NA	1.1E+2	☐	<1

">" indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

Appendix C

RBCA Toolkit Output Tables for Volatile Organic Compounds

RBCA SITE ASSESSMENT

Site Name: Harbert Transportation
Site Location: 19984 Meekland Ave, Hayward, CA

Completed By: Craig Drizin
Date Completed: 25-Oct-99

Job ID: H9042

SOIL (10 - 25 ft) SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" If Complete)

			Soil Leaching to Groundwater Ingestion / Discharge to Surface Water			X Soil Vol. to Indoor Air	X Soil Volatilization and Surface Soil Particulates to Outdoor Air				X Surface Soil Inhalation, Ingestion,Dermal Contact		Applicable SSTL	SSTL Exceeded ?	Required CRF
CONSTITUENTS OF CONCERN		Representative Concentration	On-site (0 ft)	Off-site 1 (0 ft)	Off-site 2 (0 ft)	On-site (0 ft)	On-site (0 ft)		Off-site 1 (75 ft)	Off-site 2 (0 ft)	On-site (0 ft)				Only If "yes" left
CAS No.	Name	(mg/kg)	None	None	None	Commercial	Commercial	Construction Worker	Residential	None	Commercial	Construction Worker	(mg/kg)	"□" If yes	
79-01-6	Trichloroethene	1.3E-2	NA	NA	NA	1.7E-1	1.4E+2	NA	3.0E+2	NA	1.3E+0	NA	1.7E-1	□	<1
127-18-4	Tetrachloroethene	1.0E-3	NA	NA	NA	4.9E-1	>3.5E+2	NA	>3.5E+2	NA	1.9E+0	NA	4.9E-1	□	<1
107-06-2	Dichloroethane, 1,2-	5.0E-3	NA	NA	NA	3.2E-2	9 4E+0	NA	2.0E+1	NA	1.1E+0	NA	3.2E-2	□	<1

">" Indicates risk-based target concentration greater than constituent residual saturation value. NA = Not applicable. NC = Not calculated.

RBCA SITE ASSESSMENT

Site Name: Harbert Transportation
Site Location: 19984 Meekland Ave, Hayward, CA

Completed By: Craig Drizin
Date Completed: 25-Oct-99

Job ID: H9042

GROUNDWATER SSTL VALUES

Target Risk (Class A & B) 1.0E-6
Target Risk (Class C) 1.0E-5
Target Hazard Quotient 1.0E+0

Groundwater DAF Option:

SSTL Results For Complete Exposure Pathways ("X" If Complete)

				Groundwater Ingestion / Discharge to Surface Water			X	GW Vol. to Indoor Air	X	Groundwater Volatilization to Outdoor Air			Applicable SSTL	SSTL Exceeded ?	Required CRF
CONSTITUENTS OF CONCERN		Representative Concentration	On-site (0 ft)	Off-site 1 (75 ft)	Off-site 2 (0 ft)		On-site (0 ft)		On-site (0 ft)	Off-site 1 (75 ft)	Off-site 2 (0 ft)			Only if "yes" left
CAS No.	Name	(mg/L)	None	None	None		Commercial		Commercial	Residential	None		(mg/L)	"■" if yes	
79-01-6	Trichloroethene	2.0E-5	NA	NA	NA		1.7E-1		1.1E+1	1.1E+1	NA		1.7E-1	☐	<1
127-18-4	Tetrachloroethene	4.0E-5	NA	NA	NA		5.4E-1		5.3E+1	5.3E+1	NA		5.4E-1	☐	<1
107-06-2	Dichloroethane, 1,2-	2.0E-2	NA	NA	NA		8.1E-2		5.9E+0	5.9E+0	NA		8.1E-2	☐	<1

">" indicates risk-based target concentration greater than constituent solubility value. NA = Not applicable. NC = Not calculated.