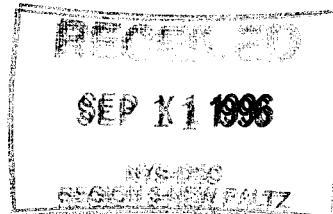




GROUNDWATER SCIENCES CORPORATION

2601 Market Place Street, Suite 310
Harrisburg, PA 17110-9307
(717) 652-6832
Fax (717) 657-1611

September 10, 1996



Mr. Keith Browne
New York State Department of Environmental Conservation
Region 3 - Division of Hazardous Waste Remediation
21 South Putt Corners Road
New Paltz, New York 12561-1696

Re: *Former Cavalier Gage and Electronics Co., Site Number 314092,
Salt Point, Dutchess County, Groundwater Sampling and Indoor Vapor Results*

Dear Mr. Browne:

Results for groundwater samples collected in April, May, June and July are presented on the attached summary tables. These data indicate that concentrations in the most recent samples for WSW-2, WSW-3 and 30 Hibernia Road are lower than or comparable to historical levels.

Indoor air samples were collected in July. Results of this sampling event and Environmental Standards' interpretation of these results that the indoor air at the Rainbow's End Facility does not present unacceptable health impacts is also attached.

If you have any questions or need additional information, please do not hesitate to call me.

Very truly yours,
GROUNDWATER SCIENCES CORPORATION

Lawrence F. Roach, P.G.
Senior Hydrogeologist

LFR:imp
Attachment

cc: Ms. Betty J. Wagner, Cavalier Gage and Electronics Company
Mr. Eugene Quarrie, Esquire

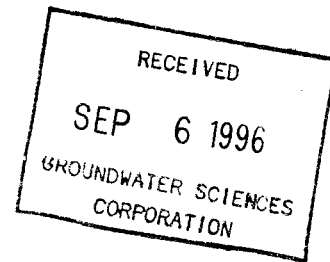
<i>Former Water Supply Well to South of Building</i>					
Date	Parameter				Collected By
	TCA	1,1-DCA	1,1-DCE	1,2-DCA	
01/25/92	130	200	18	<1.0	GSC
06/02/92	110	220	13	0.76	GSC
01/31/95	2.6	81	7.7	<0.5	GSC
03/27/95	3.8	67	8.0	<0.5	GSC
05/23/95	3.3	85	6.6	<0.5	GSC
07/27/95	2.7	72	6.6	<0.5	GSC
09/26/95	5.7	83	8.3	<0.5	GSC
11/28/95	3.3	62	9.2	<0.5	GSC
01/29/96*	3.6	86	12	<0.5	GSC
05/29/96	5.2	79	10	<0.5	GSC
07/25/96	4.5	87	7.6	<0.5	GSC
* Vinyl chloride detected at 0.9 µg/l					

WSW-3 (On-Site) Current Water Supply Well to Northwest of Building					
Date	Parameter				Collected By
	TCA	1,1-DCA	1,1-DCE	1,2-DCA	
07/16/92	<0.5	<0.5	<0.5	<0.5	GSC
11/16/92	<0.5	<0.5	<0.5	<0.5	GSC
03/10/93	<0.5	<0.5	<0.5	<0.5	GSC
09/08/93	7.3	<0.5	<0.5	<0.5	Cavalier
10/08/93	37	<0.5	<0.5	<0.5	Cavalier
12/16/93	5.3	<0.5	<0.5	<0.5	Cavalier
04/06/94	1.6	<0.5	<0.5	<0.5	Cavalier
01/31/95	2.3	0.5	<0.5	<0.5	GSC
02/22/95	1.8	0.6	<0.5	<0.5	Cavalier
03/27/95	<0.5	<0.5	<0.5	<0.5	GSC
04/21/95	1.9	<0.5	<0.5	<0.5	Cavalier
05/23/95	<0.5	<0.5	<0.5	<0.5	GSC
06/07/95	<0.5	<0.5	<0.5	<0.5	Cavalier
07/27/95	4.5	0.5	<0.5	<0.5	GSC
09/01/95*	12	1.9	<0.5	<0.5	Cavalier
09/26/95	34	4.4	<0.5	<0.5	GSC
10/11/95	40	4.2	<0.5	<0.5	Cavalier
11/28/95	5.5	2.1	<0.5	<0.5	GSC
12/11/95	9.6	3.7	1.3	<0.5	Cavalier
01/29/96	3.6	2.0	<0.5	<0.5	GSC
02/28/96	2.2	1.3	<0.5	<0.5	Cavalier
04/30/96	1.6	1.1	<0.5	<0.5	Cavalier
05/29/96	1.4	1.2	<0.5	<0.5	GSC
06/28/96**	0.8	0.6	<0.5	<0.5	RE
07/25/96	1.8	1.0	<0.5	<0.5	GSC
* Methylene chloride detected in sample at 0.7 µg/l and trip blank at 0.7 µg/l. ** Methylene chloride detected in sample at 1.0 µg/l.					

<i>Off-Site</i> <i>30 Hibernia Road</i>					
Date	Parameter				Collected By
	TCA	1,1-DCA	1,1-DCE	1,2-DCA	
02/14/92	<0.5	<0.5	<0.5	<0.5	DCDOH
01/31/95	<0.5	<0.5	<0.5	<0.5	GSC
03/27/95	<0.5	<0.5	<0.5	<0.5	GSC
05/23/95	<0.5	<0.5	<0.5	<0.5	GSC
07/27/95	<0.5	<0.5	<0.5	<0.5	GSC
09/26/95*	<0.5	<0.5	<0.5	<0.5	GSC
11/28/95	<0.5	<0.5	<0.5	<0.5	GSC
01/29/96	<0.5	<0.5	<0.5	<0.5	GSC
05/29/96**	<0.5	<0.5	<0.5	<0.5	GSC
07/25/96	<0.5	<0.5	<0.5	<0.5	GSC
* Methylene chloride detected in sample at 0.6 µg/l and trip blank at 0.6 µg/l.					
** Methylene chloride detected in sample at 1.2 µg/l.					



Setting the Standards for Innovative
Environmental Solutions



August 22, 1996

Ms. Betty Wagner
P.O. Box 214
Salt Point, NY 12578

Dear Ms. Wagner:

Environmental Standards, Inc. (Environmental Standards) was retained by Rainbow's End Daycare and Activity Center to provide indoor air sampling services at their facility located in Salt Point, New York. The sampling was performed by Environmental Standards on July 20 and 21, 1996, to assist in qualitatively and quantitatively characterizing vapor intrusion into the facility basement and occupied areas from contaminated subsurface soils and groundwater. The resulting samples were analyzed at a certified laboratory for Bromodichloromethane, Chloroform, 1,1-Dichloroethane, 1,1-Dichloroethene, and 1,1,1-Trichloroethane (see Attachment 1 for laboratory results).

A brief human health risk evaluation has been performed to evaluate the impact of vapor infiltration to children and care givers associated with activities performed at the Daycare Center.

Overview of Sampling Methodology

The sampling program consisted of the collection of three 24-hour integrated air samples using SUMMA[®] canisters as the collection media. Samples were collected at three locations within the facility, one in the basement area near an existing well, one in what is referred to as the Infant's Room, and one in a play room. Both of the upstairs rooms were located directly above the basement area. Based on information about the facility provided to Environmental Standards, these areas seemed to represent the most likely areas of vapor intrusion to the facility. A 24-hour integrated sampling method was used to characterize chronic exposure conditions to the vapors most likely encountered at the facility. The sampling method was based on US EPA's Method TO-14, SUMMA[®] Passivated Canister Sampling with Gas Chromatography.

At the request of Environmental Standards, representatives of Rainbow's End Daycare Center closed all windows at the facility and turned off the air conditioning system on the

evening before sampling began. This procedure minimized the air exchange rate within the facility, thereby ensuring maximum possible contaminant concentrations for sampling.

The sampling equipment consisted of three clean 6-liter laboratory-certified SUMMA[®] canisters equipped with laboratory-certified clean flow controllers. The SUMMA[®] canisters were shipped to Environmental Standards' office and transported to the site for sampling. Each SUMMA[®] canister arrived from the laboratory with an internal vacuum pressure of approximately -30 psia. The flow controllers were calibrated at the laboratory to provide flow to the SUMMA[®] canisters at a rate that allows a sample to be collected over a 24 hour period. Upon completion of sampling, the SUMMA[®] canister should be just less than full, such that a slight vacuum pressure remains in the canister. The vacuum provides a method to check against canisters that may leak during transport to the laboratory following sampling.

Representatives of Environmental Standards arrived at the facility on the morning of Saturday, July 20, and proceeded to commence with the sampling effort. The SUMMA[®] canisters were fitted with the flow controllers on site and placed in position for sampling. The canister placed in the basement was positioned near the existing well and in close proximity to an open container of purge water that was assumed to be removed from the water table via the well. The remaining two SUMMA[®] canisters were placed in the Infant Room and play room, respectively, normally occupied by children and adult care givers as part of the facility's day care operations. The rooms were selected based on their locations approximately directly over the basement.

Once in place, the regulator valves on each of the canisters were turned to the open position, and sample collection was initiated. The Environmental Standards representative then left the premises and returned 24 hours later to close the regulator valves and collect the canisters for shipment to the laboratory. Each sample was provided a unique identifier and such information as sample start and stop times and the type of analysis to be performed. The information was attached to the sample prior to shipment to the laboratory. The laboratory analyzed the samples for Bromodichloromethane, Chloroform, 1,1-Dichloroethane, 1,1-Dichloroethene, and 1,1,1-Trichloroethane using gas chromatography. Only 1,1,1-Trichloroethane was detected in the samples. A summary of the laboratory results is provided in Table 1.

Risk Characterization

An assessment of inhalation exposure to indoor air concentrations of 1,1,1-Trichloroethane was conducted for daycare workers and children at the Rainbow's End Daycare and Activity Center, Salt Point, New York. For the adult daycare worker scenario, it was assumed that the worker was employed by the daycare facility for 25 years and would be on site for 250 days per year (5 days per week for 50 weeks per year) and that exposure would occur via inhalation. The child exposure scenario was



based on the assumptions that children might be exposed to indoor air up until school age (approximately until the child was 6 years old). Although it is unlikely that daycare workers or children at the facility would be exposed to indoor air concentrations for eight hours per day over 25 and 6 years, respectively, especially during the warmer eight months of the year, these conservative assumptions were used in the risk assessment to ensure protection of human health. Inhalation rates were obtained from the US EPA Exposure Factors Handbook for moderate activity, 2.5 m³/hr for adult males and 2.0 m³/hr for children. The inhalation intakes were calculated using the paradigm recommended by the US EPA, and the results were compared to inhalation RfDs which are estimates of daily exposures that are not likely to produce human health impacts. The chronic inhalation RfD for 1,1,1-Trichloroethane was used to estimate hazard for the adult scenario, and a provisional subchronic RfD was used to estimate the hazard for children.

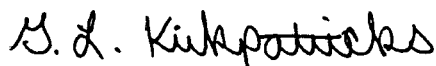
The Hazard Quotients for adults and children exposed to 1,1,1-Trichloroethane via inhalation at the Rainbow's End Daycare Facility were estimated to be 0.01 and 0.002, respectively. Hazard quotients that are less than 1 are not considered to be of concern for potential noncancer effects.

Summary of Results

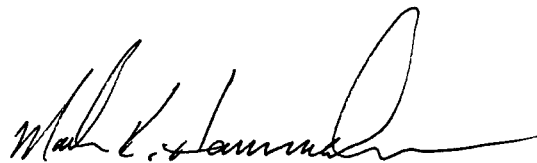
This conservative assessment demonstrates that concentrations of constituents in indoor air at the Rainbow's End Daycare Facility do not present unacceptable health impacts.

If you have any questions, please do not hesitate to call at 610-935-5577.

Sincerely yours,



Gerald L. Kirkpatrick, P.G., CGWP
Managing Director of Geosciences
and Risk Assessment/Principal



Mark Hammaker, P.E.
Environmental Engineer

RJF/MKH:hb

cc: Robert J. Fares, Environmental Standards, Inc.

Table 1
Analytical Results

Sample 01A (basement)

<u>Compound</u>	<u>Detection Limit (ppbv)</u>	<u>Amount (ppbv)</u>
Chloroform	0.84	Not Detected
1,1,1-Trichloroethane	0.84	9.8
1,1-Dichloroethene	0.84	Not Detected
1,1-Dichloroethane	0.84	Not Detected
Bromodichloromethane	3.4	Not Detected

Sample 02A (in front)

<u>Compound</u>	<u>Detection Limit (ppbv)</u>	<u>Amount (ppbv)</u>
Chloroform	0.81	Not Detected
1,1,1-Trichloroethane	0.81	Not Detected
1,1-Dichloroethene	0.81	Not Detected
1,1-Dichloroethane	0.84	Not Detected
Bromodichloromethane	3.2	Not Detected

Sample 03A (front)

<u>Compound</u>	<u>Detection Limit (ppbv)</u>	<u>Amount (ppbv)</u>
Chloroform	0.96	Not Detected
1,1,1-Trichloroethane	0.96	Not Detected
1,1-Dichloroethene	0.96	Not Detected
1,1-Dichloroethane	0.96	Not Detected
Bromodichloromethane	3.8	Not Detected



ATTACHMENT 1

AIR TOXICS LTD.

SAMPLE NAME: CGEC#1-Basement/Well

ID#: 9607232-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	5072705	Date of Collection: 7/21/96
Dil. Factor:	1.68	Date of Analysis: 7/27/96

Compound	Det. Limit (ppbv)	Amount (ppbv)
Chloroform	0.84	Not Detected
1,1,1-Trichloroethane	0.84	9.8
1,1-Dichloroethene	0.84	Not Detected
1,2-Dichloroethane	0.84	Not Detected
Bromodichloromethane	3.4	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	102	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	100	70-130

AIR TOXICS LTD.

SAMPLE NAME: CGEC#2-Infant Room

ID#: 9607232-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	5072706	Date of Collection: 7/21/96
Dil. Factor:	1.61	Date of Analysis: 7/27/96

Compound	Det. Limit (ppbv)	Amount (ppbv)
Chloroform	0.81	Not Detected
1,1,1-Trichloroethane	0.81	Not Detected
1,1-Dichloroethene	0.81	Not Detected
1,2-Dichloroethane	0.81	Not Detected
Bromodichloromethane	3.2	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	100	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	100	70-130

AIR TOXICS LTD.

SAMPLE NAME: CGEC#3-Front Room

ID#: 9607232-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 5072707
Dil. Factor: 1.91

Date of Collection: 7/21/96
Date of Analysis: 7/27/96

Compound	Det. Limit (ppbv)	Amount (ppbv)
Chloroform	0.96	Not Detected
1,1,1-Trichloroethane	0.96	Not Detected
1,1-Dichloroethene	0.96	Not Detected
1,2-Dichloroethane	0.96	Not Detected
Bromodichloromethane	3.8	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	99	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	100	70-130

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9607232-04A

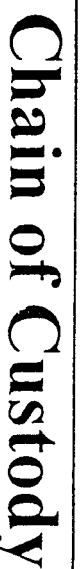
EPA METHOD TO-14 GC/MS Full Scan

File Name:	5072704	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/27/96

Compound	Det. Limit (ppbv)	Amount (ppbv)
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
1,2-Dichloroethane	0.50	Not Detected
Bromodichloromethane	2.0	Not Detected

Container Type: NA

Surrogates	% Recovery	Method Limits
Octafluorotoluene	99	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	98	70-130



Journal of Management Inquiry, Vol. 17 No. 1, March 2008
DOI: 10.1177/1056492607312111
© The Author(s) 2008