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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation
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CIRCUITRON CORPORATION SITE PILOT SOURCE AREA TREATMENT SYSTEM

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REPORT TITLE

Site Management Report No. 06

REPORTING PERIOD

February 2014 - July 2014

CLIENT

New York State Department of Environmental Conservation

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Site

NYSDEC Site No. 152082, Circuitron Corporation Site, Pilot Source Area Treatment System. East Farmingdale, Town of Babylon, Suffolk County, New York. Refer to *Figure 1* for a site location map.

Project Background and Site Description

The Circuitron Corporation Site (Site) Pilot Source Area Treatment System (PSTS) consists of a single integrated groundwater circulation well with an in-well vapor stripping and soil vapor extraction (GCW/IVS/SVE) system. The system was placed into operation by the United States Environmental Protection Agency (USEPA) in March 2008 to address moderate levels of residual contamination (chlorinated solvents) within soil and groundwater in the southwest corner of the Site. The GCW/IVS/SVE system was operated and maintained by the USEPA through June 2011 when site management responsibilities were transferred to the New York State Department of Environmental Conservation (NYSDEC) consistent with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requirements. Site management activities are now performed by the NYSDEC with funds allocated under the New York State Superfund Program. A copy of the Site Transfer Agreement is provided in *Appendix A*. Under D&B's State Superfund Contract with the NYSDEC, D&B has been authorized to perform site management activities at the Site.

During this reporting period the only activities occurring at the Site were routine site inspections, semiannual on-site groundwater sampling, and annual off-site groundwater sampling. In response to recent equipment failures when the sparge compressor went off-line in January 2013, it was decided by the NYSDEC that portions of the PSTS system including the air sparge system and associated groundwater circulation well should remain off-line to evaluate the possibility of contaminant rebound in groundwater. It should be noted that the SVE blower was restarted on March 14, 2014 as per the direction of the NYSDEC project manager. As such, monitoring and reporting activities are limited this reporting period.

Pilot Source Area Treatment System Overview

The PSTS consists of a single integrated groundwater circulation well with an in-well vapor stripping and soil vapor extraction system. The overall process, which is an extension of the air sparging technology, involves the creation of groundwater circulation cells around a well through which contaminated groundwater is cycled. As can be seen on *Figure 2*, the groundwater circulation well installed at the Site consists of a single well with separate upper and lower screened intervals. Nitrogen

or air is injected at the base of the well, decreasing the density of the groundwater, driving it upward and out of the upper screened zone into the vadose and/or saturated zones while simultaneously drawing groundwater in through the lower screened zone. In the process, groundwater contaminants are transferred from the dissolved phase to the vapor phase by the rising air bubbles via air stripping. Once discharged, the air-stripped groundwater flows downward, eventually reaching the lower portion of the saturated zone where it is cycled back through the well, replacing the water that rose resulting from the density gradient. This process creates a circulation pattern or cell that allows continuous cycling of groundwater through the well and air stripping process.

The portion of the well screen above the saturated zone is utilized by the SVE system to extract contaminants stripped from the groundwater. Extracted vapor is directed through a moisture "knockout" drum to remove any entrained water/moisture. Extracted soil vapor is subsequently processed through a series of vapor phase carbon adsorption vessels to remove targeted contaminants prior to being discharged to the atmosphere. It should be noted, however, that the process piping was reconfigured in August 2011 to bypass the vapor phase carbon adsorption vessels per the direction of the NYSDEC based on historic low contaminant concentrations detected in extracted soil vapor.

All treatment system components are located on-site within a mobile trailer. The treatment system is equipped with instrumentation and controls to allow for automated start-up and operation, as well as an autodial remote notification system. This system however has been turned off due to equipment malfunctions and has remained off per the direction of NYSDEC. Refer to *Figure 3* for a schematic of the PSTS. Refer to *Figure 4* for a Process and Instrumentation Diagram of the PSTS.

During the January 2013 system inspection, it was noted that the compressor for the air sparge system was not operating. NYSDEC was notified and determined that the compressor pump should not be repaired and the air sparge system should remain off-line to evaluate the potential for contaminant rebound. As a result, the air sparge system was not in operation during this reporting period. It should be noted that the SVE blower was turned back on during this reporting period on March 14, 2014 as per the direction of the NYSDEC project manager.

Regulatory Requirements/Cleanup Goals

In line with the objectives and requirements of the Operable Unit 1 (OU-1) Record of Decision (ROD) and Operable Unit 2 (OU-2) ROD included in *Appendix B*, the PSTS was constructed and put into routine operation focusing on the following goals:

OU-1 ROD

- Reduce the concentrations of contaminants in Site soil and sediment to levels which are protective of human health and the environment; and,
- Prevent further deterioration of the area groundwater.

OU-2 ROD

- Prevent potential future ingestion of site-related contaminated groundwater;
- Restore the quality of the groundwater contaminated from the site-related activities to levels consistent with the Federal and State drinking water and groundwater quality standards; and,
- Mitigate the off-site migration of the site-related contaminated groundwater.

System Performance Summary

Since several components of the PSTS system (e.g. sparge system) were off-line during this reporting period, a system performance evaluation was not undertaken. Review and evaluation of system performance will resume in future reports, as needed, based on the operational status of the PSTS system and the results of the groundwater sampling.

System Runtime/Downtime Summary

The total elapsed time for this reporting period was 4,344 hours (February 1, 2014 through July 31, 2014). Of this amount, the SVE component of the PSTS operated for 2,456 hours or approximately 57 percent of the total elapsed time. Since several components of the PSTS system (e.g sparge system) were off-line during this reporting period, the PSTS system runtime was significantly lower this reporting period. Also, the SVE component was off-line until March 2014, as a result the runtime was also significantly lower this reporting period. As previously discussed and per the direction of NYSDEC, the air sparge component did not operate this reporting period as a result of equipment failure and NYSDEC's decision to evaluate the possibility of contaminant rebounding in groundwater. System runtime/downtime for the SVE component is summarized below. Refer to *Table 1* for treatment system operation and maintenance logs, which identity specific information regarding alarm conditions, downtime and repairs.

In-Well Air Stripping System, SVE Component Runtime/Downtime Summary

	(Hours)	(Percentage)
SVE System Runtime - Current Reporting Period (1)	2,456	57.00%
SVE System Downtime - Current Reporting Period (1)	1,888	43.00%
Total SVE System Runtime To Date (2)	35,941	--

Notes:
1. Reported value based on the following: System start-up date of 8/24/2011; and total elapsed time 4,344 hours for the current reporting period
2. Reported value reflects system runtime since inception in July 2008, as recorded by the USEPA.

In-Well Air Stripping System, Nitrogen Sparging Component Runtime/Downtime Summary

	(Hours)	(Percentage)
System Runtime - Current Reporting Period (1)	0	0.00%
System Downtime - Current Reporting Period (1)	4,344	100.00%
Total System Runtime To Date (2)	26,635	--

Notes:
1. Reported value based on the following: System start-up date of 8/24/2011; and total elapsed time 4,344 hours for the current reporting period
2. Reported value reflects system runtime since inception in July 2008, as recorded by the USEPA.

A tentative schedule for the performance of routine system maintenance next reporting period is presented below.

Major System Component	Manufacturer	Model Number	Maintenance Frequency	Current Reporting Period (1)					
				Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14
Air Sparge Compressor	Quincy Compressor	QR-25® Series, Model F325	Bi-Monthly						
High Temperature Refrigerated Dryer	Parker	ZDHHT15-100 (60Hz)	Every Four Months						
Nitrogen Generator	O2N2 SITE Gas Systems	NM Model	Quarterly						
Vacuum Blower	Ametek	EN909BG72WL	Bi-Monthly			♦		♦	
Vapor Phase Carbon Adsorption Vessels	Carbtrol Corporation	G-3	As Needed						

Major System Component	Manufacturer	Model Number	Maintenance Frequency	Subsequent Reporting Periods (2)					
				Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15
Air Sparge Compressor	Quincy Compressor	QR-25® Series, Model F325	Bi-Monthly	⌛		⌛		⌛	
High Temperature Refrigerated Dryer	Parker	ZDHHT15-100 (60Hz)	Every Four Months	⌛				⌛	
Nitrogen Generator	O2N2 SITE Gas Systems	NM Model	Quarterly	⌛			⌛		
Vacuum Blower	Ametek	EN909BG72WL	Bi-Monthly	⌛		⌛		⌛	
Vapor Phase Carbon Adsorption Vessels	Carbtrol Corporation	G-3	As Needed						

Notes:
1. Limited preventive maintenance activities (i.e., lubrication, filter replacements) were completed for major system components as noted. During this reporting period the air sparge compressor was not in operation (off-line since 1/3/2013), as a result no maintenance was performed for this component.
2. The following represents tentative schedules for performance of routine maintenance of major system components, assuming all components are on-line.

Vapor Phase Discharge Summary

Vapor-phase discharge samples were not collected this reporting period due to the system being partially shut-down. Review and evaluation of sample results will resume in future reports, as needed, based on the operational status of the PSTS system and the results of the groundwater sampling. All historic samples exhibited VOCs well below the site-specific effluent limit of 0.5 lbs/hr, which was developed in consultation with the NYSDEC as a means to monitor the vapor-phase VOCs associated with the operation of the GCW/IVS/SVE. Refer to *Table 2* for historic analytical results.

Operational Cost Summary

Operational costs this reporting period include monthly utility, maintenance, and engineering charges. Capital construction costs and NYSDEC project management effort are not included in the evaluation.

The total operational cost incurred during the period from February 1, 2014 through July 31, 2014 was approximately $34,489. Of this amount, approximately $27,330 was related to engineering charges and approximately $7,159 was related to utilities and laboratory charges. Operational costs were not evaluated relative to the pounds of VOCs removed since several components of the PSTS system (e.g sparge system) were off-line this reporting period. Operational costs will be evaluated during future reporting periods to evaluate efficiency and effectiveness of the treatment system.

Groundwater Monitoring Summary

Seventeen "on-site" groundwater monitoring wells were sampled during this reporting period on June 12, 2014 to determine groundwater quality at the Site and evaluate if rebounding was occurring. Groundwater samples were collected from six monitoring wells (GW-N15S, GW-N15M, GW-N15D, GW-N45S, GW-N45M, and GW-N45D) located upgradient of the GCW/IVS/SVE system, eight monitoring wells (MW-4S, MW-4D, GW-SW45S, GW-SW45M, GCW-SPY-S, GCW-SPY-D, GW-SE07S, and GW-SE15S) in the vicinity of the GCW/IVS/SVE system, and three monitoring wells (GW-SE30S, GW-SE30M, and GW-SE30D) downgradient of the GCW/IVS/SVE system. It should be noted that monitoring well GW-SW45D was not sampled this reporting period due to an obstruction within the well casing. Groundwater samples were collected from shallow, intermediate, and deep zones. All samples were analyzed for VOCs. The location of the groundwater monitoring wells and GCW/IVS/SVE system are depicted on *Figure 5*.

VOCs were detected in excess of SCGs in one of the seventeen "on-site" groundwater samples. In particular, the VOC 1,1,1-trichloroethane was detected in excess of its SCG (5 µg/L) in GW-SE07S at the concentration of 24 µg/L from the shallow groundwater zone. *Table 3* presents tabulated analytical results relative to SCGs. *Figure 5* summarizes exceedances of SCGs in groundwater by well location.

Seventeen "off-site" groundwater monitoring wells were sampled during this reporting period on June 13, 2014 to determine groundwater quality in the vicinity of the Site and evaluate if rebounding was occurring. Groundwater samples were collected from two monitoring wells (MW-1S and MW-1D) located upgradient of the Site, three monitoring wells (MW-3S, MW-3D, and MW-15) in the immediate vicinity of the Site, and twelve monitoring wells (MW-5D, MW-6S, MW-6D, MW-7S, MW-7D, MW-13, MW-14, MW-16, MW-17, MW-18, MW-19S and MW-19D) downgradient of the Site. Groundwater samples were collected from shallow and deep zones. All samples were analyzed for VOCs. The groundwater monitoring well locations are depicted on *Figure 6* and *Figure 7*.

VOCs were detected in excess of SCGs in three of the seventeen "off-site" groundwater samples. In particular, the VOCs 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, and toluene were detected in excess of SCGs in at least one sample at concentrations ranging from 6.6 µg/L to 74 µg/L. The VOCs were detected in samples collected from the shallow and deep groundwater zones. 1,1-Dichloroethene was detected in excess of its SCG (5 µg/L) in one downgradient deep well (MW-19D) at a concentration of 6.6 µg/L. 1,1-Dichloroethane was detected in excess of its SCG (5 µg/L) in one downgradient shallow well (MW-13) at a concentration of 8 µg/L. 1,1,1-Trichloroethane was detected in excess of its SCG (5 µg/L) in one shallow well (MW-13) in the vicinity of the Site at concentration of 74 µg/L. Trichloroethene was detected in excess of its SCG (5 µg/L) in one downgradient deep well (MW-19D) at a concentration of 9.8 µg/L. Toluene was detected in excess of its SCG (5 µg/L) in one deep well (MW-13) in the immediate vicinity of the Site at a concentration of 11 µg/L. *Table 4* presents tabulated analytical results relative to SCGs. *Figure 6* and *Figure 7* summarize exceedances of SCGs in groundwater by well location.

Data Validation Summary

Seventeen on-site and seventeen off-site groundwater samples were collected this reporting period. All groundwater samples were analyzed by ConTest Laboratories, Inc. in accordance with USEPA 8260 for VOCs.

The data packages were reviewed for contract and method compliance to determine the usability of the sample results. The findings of the review process are summarized below:

Groundwater Samples

1. June 12, 2014 and June 13, 2014

Laboratory performance was acceptable, with the follwowing exceptions:

- The laboratory noted that sample GW-N45S may have possible carryover for cis-1,2-dichloroethylene and vinyl chloride. The sample was rerun outside of holding time. The original analysis was reported and cis-1,2-dichloroethylene was qualified as estimated (J).
- The %R was below QC limits in the MS and/or MSD for dichlorodifluoromethane (Freon 12), tert-butyl alcohol (TBA) and 1,4-dioxane associated with all samples. The RPD was above QC limits for 1,4-dioxane associated with all samples. Dichlorodifluoromethane (Freon 12), tert-butyl alcohol (TBA) and 1,4-dioxane were qualified as an estimated detection limit (UJ) in all samples.
- The %R was above QC limits in the LCS for bromoform. It was not detected in the associated samples therefore qualification of the data was not necessary.

No other problems were found with the sample results and all results are deemed usable for environmental assessment purposes as qualified above.

All analytical data associated with the Site has been submitted to the NYSDEC in the required EQuIS format and within 30 days of receipt of the data from the laboratory.

Findings, Conclusions and Recommendations

Findings:

- The site management activities performed this reporting period include routine site inspections, semiannual on-site groundwater sampling, and annual off-site groundwater sampling. In response to recent equipment failures when the sparge compressor was taken off-line in January 2013, it was decided by the NYSDEC that portions of the PSTS system including the air sparge system and associated groundwater circulation well should be remain off-line to evaluate the possibility of contaminant rebound in groundwater. As such, monitoring and reporting activities are limited this reporting period.
- The SVE system was turned back on-line on March 14, 2014. The SVE system was shut-down on several occasions during this reporting period for routine and non-routine maintenance. The system was shut down in March and April 2014 for non-routine maintenance due to a malfunctioning auto dialer. The system was also shut down in June for groundwater sampling.
- An evaluation of system performance was not performed this reporting period since several components of the PSTS system were shut-down. Instead, the sample results were evaluated to determine if any rebounding was occurring based on the sparge system being shut down.
- Vapor-phase discharge samples were not collected this reporting period.
- Total operational cost during the period from February 2014 through July 2014 was approximately $34,489 and included engineering, utility and subcontractor costs. However, not all components of the PSTS operated this reporting period.
- Seventeen groundwater samples were collected and analyzed for VOCs in June 2014 from “on-site” wells. The VOC 1,1,1-trichloroethane was detected in excess of its SCG at a concentration of 24 ug/L. This was detected in a sample collected from the shallow groundwater zone.
- Seventeen groundwater samples were collected and analyzed for VOCs in June 2014 from “off-site” wells. The VOCs 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene and toluene were detected in excess of SCGs in at least one sample at concentrations ranging from 6.6 µg/L to 74 µg/L. The VOCs were detected in samples collected from the shallow and deep groundwater zones.

Conclusions:

- 1,1,1 – Trichloroethane levels in on-site monitoring wells were lower this reporting period than the previous reporting period.
- 1,1 – Dichloroethene, 1,1,1 – trichloroethane, chlorobenzene, trichloroethene and tetrachloroethene levels in off-site monitoring wells were slightly lower this reporting period than the previous reporting period.
- The PSTS system was partially on-line during this reporting period and based on a comparison of the sample results from June 2013 and October 2013 there is no evidence of rebounding.
- The PSTS system has been effective at reducing contaminant levels in groundwater on-site. However, contaminant levels remain elevated above site cleanup goals in on-site and off-site groundwater. 1,1,1 - Trichloroethane was detected at a concentration of 74 ug/L or one order of magnitude higher than the cleanup standard in an off-site downgradient monitoring well MW-13. Given the current data set, it is unclear if the PSTS system is capable of achieving OU-2 cleanup goals, which pertain to restoration of groundwater quality to levels consistent with federal and state drinking water and groundwater standards and prevention of off-site migration of groundwater contamination.

Recommendations:

- Based on the data from the June 2014 sampling event, rebounding of chlorinated VOC concentrations within both on-site and off-site wells was not evident. At this time, D&B recommends that the following actions be taken in support/consideration of the GCW/IVS/SVE system currently installed at the site:
  - ◊ Schedule more frequent sampling events of on-site and off-site wells.
  - ◊ Continue to coordinate with the NYSDEC for the injection of sodium permanganate to polish the downgradient groundwater in an effort to remove the residual contamination.
  - ◊ Evaluate decommissioning of the existing GCP/IVS/SVE system based on an evaluation of the groundwater results.

Reclassification/Delisting Evaluation

USEPA finalized the NPL Listing for the Site on March 31, 1989. Since that time, completion of the following project phases has occurred, as summarized below:

Project Phase	Completion Dates
Operable Unit 01A	
IRM Waste Removal	04/1989
Operable Unit 01	
Remedial Investigation	03/1991
Remedial Design	09/1994
Remedial Action	01/1997
Operable Unit 02	
Remedial Investigation	09/1994
Remedial Design	09/1996
Remedial Action	06/2000

Given the above, NYSDEC reclassified the Site pursuant to the requirements identified in 6 NYCRR §375-2.7 as a Class 4 Site on July 21, 2011 since the residual contamination does not appear to constitute a significant threat to public health or the environment based on remedial efforts performed to date. Site delisting is not feasible at this time, as all remediation and post-remediation activities have not been completed.

Report Certification:

I have personally examined and am familiar with the information submitted in the referenced Report. To the best of my knowledge and belief, and based upon my inquiry of those individuals immediately responsible for obtaining the information reported therein, I certify that the submitted information is true, accurate, and complete.

Project Director: _____ 11/25/14
Richard M. Walka — Date
Senior Vice President

Project Manager: _____ 11/25/14
James Van Horn — Date
Project Manager