



June 1, 2011

0636-569011.200

Mr. Ervin Lane, Hydrogeologist
Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605
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**RE: GROUNDWATER ASSESSMENT WORK PLAN
JMN/CLEVELAND CONTAINER LANDFILL, PERMIT NO. 23-02
CLEVELAND COUNTY, NORTH CAROLINA**

Dear Mr. Lane:

On behalf of Republic Services of NC, LLC (Republic), Golder Associates North Carolina, Inc. (Golder) is submitting this Groundwater Assessment Work Plan (Work Plan) for the above referenced facility. The purpose of this Work Plan is to detail the investigation of the potential source(s) of volatile organic compounds (VOCs) that have been detected at concentrations above North Carolina (NC) 2L Drinking Water Standards (2L Standards) in groundwater samples collected from monitoring well MW-8 at the JMN/Cleveland Container landfill. The submittal of this Work Plan is in response to a letter from DENR dated April 5, 2011. The facility is maintained by Republic under Permit No. 23-02 issued by the NC Department of Environment and Natural Resources (DENR).

OVERVIEW

During the January 2011 monitoring event, one VOC (vinyl chloride) was detected at a concentration above the Solid Waste Section Limit (SWSL), and three VOCs (acetone, tetrachloroethene, and toluene) were detected at estimated concentrations below the SWSLs in the sample from MW-8. Of these detections, two VOCs (tetrachloroethene and vinyl chloride) exceeded their respective 2L Standards.

Acetone has been detected in samples from MW-8 during six of the last nine sampling events since 2007. Each concentration of acetone has been below the SWSL and the 2L Standard, and one concentration was blank-qualified. The January 2011 monitoring event was the first event during which toluene has been detected in a sample from MW-8. The detection was below the SWSL and 2L Standard. Tetrachloroethene has been detected in samples from MW-8 during nine of the last 15 sampling events since 2003. Each concentration has been estimated below the SWSL, except for the detections during the January 2003 and July 2010 events, which were above the SWSL and 2L Standard. The tetrachloroethene concentrations during the July 2009, January 2010, and January 2011 events were below the SWSL, but above the 2L Standard. Vinyl chloride has been detected in samples from MW-8 during six of the last 15 monitoring events since 2003. Concentrations during the January 2007, July 2009, January 2010, and July 2010 events were estimated below the SWSL, but above the 2L Standard. Vinyl chloride detections during the January 2003 and January 2011 events were at concentrations above the SWSL and 2L Standard. In summary, two VOCs (tetrachloroethene and vinyl chloride) have been detected at concentrations that exceeded both the SWSL and 2L Standard in samples from MW-8 during two sampling events since 2002; but thus far, the concentration of these constituents have not been detected in a consistent manner.

Groundwater contours on the attached drawing indicate that MW-8 is a sidegradient well and the primary groundwater flow across the site is to the south-southeast. Based on data provided by Republic, methane had historically been detected in methane probes MP-3 and MP-4 until the installation of cut-off trenches between the waste unit and the methane monitoring probes in June 2008 and June 2009.

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During recent methane monitoring events, low level methane concentrations have also been measured in probe MP-5, which is located adjacent to groundwater monitoring well MW-8. A site map showing the locations of the facility monitoring wells and methane monitoring probes is attached.

Two sites that are in the DENR Inactive Hazardous Sites Program (Patterson Springs Dump and Camp, Leonard Property) have been identified in relatively close proximity to the JMN/Cleveland Container landfill. Both properties are located less than a mile upgradient to sidegradient of the landfill and could be potential sources of groundwater contamination.

PROPOSED ACTIONS

Based on discussions between Ervin Lane of DENR, Ray Hoffman of Republic, and Dusty Reedy of Golder during the May 11, 2011, meeting, a phased approach to evaluate and identify the source(s) of groundwater contamination will be used. Based on the types and concentrations of constituents reported in groundwater samples, along with the close proximity of the monitoring wells to the waste disposal unit, landfill gas is a potential source for the VOCs detected in groundwater samples from monitoring well MW-8 at the closed landfill. The static groundwater level in MW-8 intersects the screened interval of the well, which could allow landfill gas to enter the monitoring well through the unsaturated portion of the screen. Therefore, Golder proposes that, during the next routine semi-annual groundwater monitoring event, tentatively scheduled for July 2011, headspace gases from MW-8 be collected in a summa canister and analyzed for NC Appendix I VOCs. The headspace sample will be collected by quickly removing the expansion well cap and inserting tubing into the well to a depth just above the water table. The tubing will be connected to the summa canister. The top of the well will remain covered as much as possible to prevent gases from escaping from the well until the gas sample is collected. The laboratory results will be evaluated using Henry's Law to determine if the VOCs detected in groundwater could be derived from landfill gas.

Based on the results of the investigation, future actions will be determined. If it is determined that landfill gas is responsible for the VOC impacts to groundwater, an appropriate corrective action will be investigated to remedy the landfill gas impacts. Also, Golder will try to obtain information about two nearby sites that are in the DENR Inactive Hazardous Sites Program; the Patterson Springs Dump and the Camp, Leonard Property. Republic and Golder requests that DENR share any information acquired from these sites regarding the type and extent of groundwater contamination associated with each property.

SUMMARY

This Work Plan proposes actions to investigate the source of recent groundwater standard exceedances in samples collected from monitoring well MW-8 at the JMN/Cleveland Container landfill maintained by Republic. The initial field work associated with this Work Plan will occur during the next routine semi-annual monitoring event, which is tentatively scheduled for July 2011, with the collection of a headspace gas sample from MW-8. Depending on the results, future actions will be determined. The results of these activities will be submitted to DENR.

If you have any questions, please contact the undersigned at 336-852-4903. We appreciate your assistance with this project.

Sincerely,
GOLDER ASSOCIATES NC, INC.



David "Dusty" Y. Reedy II, P.G.
Senior Project Hydrogeologist



Rachel P. Kirkman, P.G.
Associate and Senior Geologist

Attachment: Drawing 1 – Groundwater Surface Contour Map with Proposed Monitoring Well Locations

Cc: Ray Hoffman, P.E., Area Engineer, Republic Services of NC, LLC, 1220 Commerce Street, Conover, North Carolina 28613. rhoffman@republicservices.com

Tim Allen, General Manager, Republic Services of NC, LLC, 1160 Airport Road, Shelby, North Carolina 28150. tallen@republicservices.com

Terri C. Phillips, P.G., Associate and Senior Consultant, Golder Associates Inc. terri_phillips@golder.com (electronic copy)

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LEGEND

	PROPERTY LINE
	TOPOGRAPHIC CONTOUR
	GROUNDWATER SURFACE CONTOURS
	APPROXIMATE GROUNDWATER FLOW
	PAVED ROAD
	DIRT/GRAVEL ROAD
	TREE LINE
	GP-2
	MW-1B
	SW-3
	AERIAL TARGET
	BENCHMARK

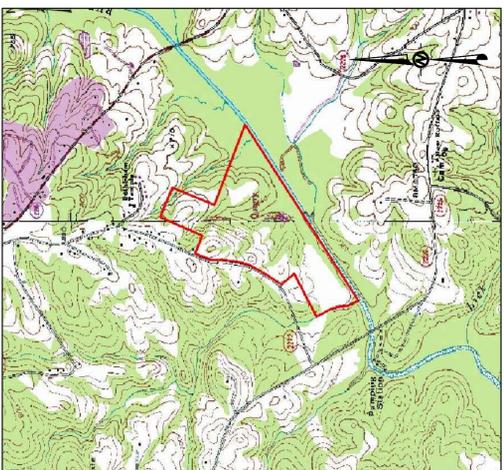
- NOTES**
1. TOPOGRAPHIC CONTOUR INTERVAL = 2 FEET.
 2. GROUNDWATER SURFACE CONTOUR INTERVAL = 10 FEET.
 3. GROUNDWATER ELEVATIONS MEASURED ON JANUARY 20, 2011.
 4. GROUNDWATER CONTOURS ARE BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOWN DATA, TOPOGRAPHIC CONTOURS, AND KNOWN FIELD CONDITIONS. THEREFORE, GROUNDWATER CONTOURS MAY NOT REFLECT ACTUAL GROUNDWATER CONDITIONS.
 5. GROUNDWATER CONTOUR LINES SHOW THE WATER TABLE SHAPE AND ELEVATION. THESE CONTOURS ARE INFERRED LINES FOLLOWING THE GROUNDWATER SURFACE AT A CONSTANT ELEVATION ABOVE SEA LEVEL. THE GROUNDWATER FLOW DIRECTION IS GENERALLY PERPENDICULAR TO THE GROUNDWATER SURFACE CONTOURS, SIMILAR TO THE RELATIONSHIP BETWEEN SURFACE WATER FLOW AND TOPOGRAPHIC CONTOURS.

REFERENCES

1.) THIS TOPOGRAPHIC BASE MAP WAS PRODUCED BY BEI AERIAL MAPPING, PEACHTREE CITY, GEORGIA FOR HODGES, HARBIN, NEWBERRY & TRIBBLE, INC.



NOTE:
AERIAL TARGET NO. 1 (4'X4' CONCRETE PANEL) IS NOT SHOWN ON SHEET. IT IS LOCATED AT THE FOLLOWING COORDINATES:
N 1251444.150
E 533665.540
ELEV=604.310



REV	DATE	DYR	DES	REVISION DESCRIPTION	LKB	DYR	RPK
	4/27/11			UPDATED GW CONTOURS			
					CADD	CHK	RWW
PROJECT: JMN/CLEVELAND CONTAINER INDUSTRIAL LANDFILL							
REPUBLIC SERVICES OF NC, LLC							
CLEVELAND COUNTY, NC PERMIT NO. 23-02							
TITLE: GROUNDWATER SURFACE CONTOUR MAP							
JANUARY 2011							
PROJECT No. 063-6569.011				FILE No. 063669110-011			
DESIGN	DYR	4/27/11	SCALE	AS SHOWN	REV.	-	
CADD	LKB	4/27/11					
CHECK	-	-					
REVIEW	-	-					
						DWG. 1	

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