Quible

Quible & Associates, P.C.

ENGINEERING • ENVIRONMENTAL SCIENCES • PLANNING • SURVEYING

SINCE 1959

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RECEIVED
JUN 30 2014
SOLID WASTE SECTION

Mr. Ervin Lane
NCDENR Div. of Waste Management, Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

June 25, 2014

RE: Groundwater Monitoring Report
Closed Avoca Landfill, Permit #08-02
Bertie County, North Carolina

Mr. Lane,

Please find enclosed Environmental Monitoring Form and associated data and documentation related to the 5/15/2014 groundwater monitoring event performed for the Closed Avoca Landfill (Permit # 08-02) in Bertie County, North Carolina. The last four rounds of groundwater monitoring have been performed by Quible & Associates, P.C. (Quible). Our last monitoring report was submitted on 6/4/2014. The closed landfill site is located within Scotch Hall Preserve Development, currently owned by Rial Corporation, formerly owned and operated by RJ Reynolds, Avoca Division.

The landfill was reportedly operated by RJ Reynolds from 1979 until sometime in the mid 1990's and was used for disposal of manganese oxide and hydroxide sludge from their wastewater treatment plant. The property has subsequently been purchased by Rial Corporation (2005) who has developed the property as a residential golfing community.

During the 5/15/2014 sampling, each of the monitoring wells were purged and sampled using disposable polyethylene bailers. Samples were collected from each well for laboratory analytical testing of arsenic, barium, cadmium, chromium, manganese, lead, mercury, selenium and silver.

Based on groundwater analytical results reported in the 5/22/2014 laboratory report provided by Environmental Chemists, Inc (Envirochem):

- Concentrations of manganese reported in MW-1 (1440 µg/L), MW-2 (727 µg/L), MW-3 (595 µg/L), MW-4 (529 µg/L), MW-6 (228 µg/L), MW-7 (362 µg/L) and MW-8 (2,450 µg/L) exceed the 2L Groundwater Quality Standard (GQS).

- Concentrations of arsenic reported in MW-2 (99 µg/L), MW-3 (438 µg/L), MW-4 (98 µg/L), MW-5 (38 µg/L), MW-6 (72 µg/L), MW-7 (92 µg/L) and MW-8 (168 µg/L) exceed the 2L Groundwater Quality Standard (GQS).

- Concentrations of Lead in MW-4 (27 µg/L) and MW-5 (26 µg/L) exceed the 2L Groundwater Quality Standard (GQS).

- Concentrations of Chromium MW-1 (29 µg/L), MW-2 (52 µg/L), MW-3 (12 µg/L), MW-5 (49 µg/L), and MW-7 (15 µg/L) exceeds the 2L Groundwater Quality Standard (GQS).

A table summarizing the groundwater analytical data for groundwater samples collected from the last seven sampling events (four and a half years) has been included with this submission along with the original laboratory results. In addition, I will email you an excel file prepared by Envirochem following the Electronic Data Deliverable (EDD) template for the laboratory results.

In general, metals concentrations have gradually decreased or remained relatively consistent over the last four years and there is no indication that contaminant levels will rise in any significant manner. Based on the low levels detected and the distance to receptors, this site does not appear to cause environmental impacts.

Please do not hesitate to contact the undersigned at 252.261.3300 or at brubino@quible.com if you have any questions or require any additional information regarding this matter.

Sincerely,
Quible & Associates, P.C.

Brian D. Rubino, P.G.

CC: Dutch Remkes, SHP

Closed Avoca Landfill, Permit #08-02

Summary of Groundwater Analytical Data, Updated May 2014

Sample ID	Date	MW#1	MW#2	MW#3	MW#4	MW#5	MW#6	MW#7	MW#8	NC 2L GQS*
Arsenic	5/15/2014	<10	**99**	**438**	**98**	**38**	**72**	**92**	**168**	10
	5/8/2013	<10	**46**	**58**	**37**	<10	**53**	**21**	<10	10
	5/15/2012	<10	<10	<10	<10	<10	<10	<10	<10	10
	11/3/2011	<10	<10	<10	<10	<10	<10	<10	<10	10
	4/27/2011	0.4	**76.0**	**30.0**	**28.0**	**18.0**	<0.1	**61.0**	<0.1	10
	11/29/2010	0.8	**12.0**	0.4	**28.0**	**12.0**	5.9	1.7	6.4	10
	5/5/2010	0.5	**81.0**	**75.0**	**26.0**	**17.0**	**19.0**	70.0	**15.0**	10
Barium	5/15/2014	86	141	324	234	72	111	155	42	700
	5/8/2013	49.0	71.0	88.0	230.0	42.0	143.0	61.0	32.0	700
	5/15/2012	59.0	90.0	196.0	249.0	30.0	110.0	62.0	84.0	700
	11/3/2011	48.0	67.0	171.0	106.0	78.0	44.0	105.0	24.0	700
	4/27/2011	45.3	69.6	151.0	105.0	<0.02	<0.02	102.0	<0.02	700
	11/29/2010	59.5	71.3	54.3	105.0	61.8	93.3	77.8	58.7	700
	5/5/2010	55.0	141.0	198.0	134.0	73.0	80.9	132.0	88.1	700
Manganese	5/15/2014	**1440**	**727**	**595**	**529**	47	**228**	**362**	**2450**	50
	5/8/2013	**629.0**	**299.0**	**237.0**	**906.0**	39.0	**571.0**	**220.0**	**135.0**	50
	5/15/2012	**858.0**	**484.0**	**538.0**	**539.0**	15.0	**453.0**	**199.0**	**203.0**	50
	11/3/2011	**117.0**	**134.0**	**838.0**	**685.0**	**192.0**	**120.0**	**315.0**	44.0	50
	4/27/2011	**53.0**	**144.0**	**1053.0**	**729.0**	**82.0**	**197.0**	**344.0**	**221.0**	50
	11/29/2010	**173.0**	**222.0**	**75.0**	**502.0**	41.0	**135.0**	**84.0**	19.0	50
	5/5/2010	**181.0**	**397.0**	**624.0**	**590.0**	47.0	45.0	**312.0**	**147.0**	50
Chromium	5/15/2014	**29**	**52**	**12**	**<10**	**49**	<10	**15**	<10	10
	5/8/2013	<10	<10	<10	<10	<10	<10	<10	<10	10
	5/15/2012	<10	**14**	<10	<10	**11**	**12**	<10	<10	10
	11/3/2011	<10	<10	<10	<10	<10	<10	<10	<10	10
	4/27/2011	<10	<10	<10	<10	<10	<10	<10	<10	10
	11/29/2010	<10	<10	<10	<10	<10	<10	<10	<10	10
	5/5/2010	<10	**12**	**13**	<10	<10	<10	<10	<10	10
Selenium	5/15/2014	<10	<10	<10	<10	<10	<10	<10	<10	20
	5/8/2013	<10	<10	<10	<10	<10	**236.0**	<10	<10	20

* NCDENR Division of Water Quality Title 15A NCAC 2L .0202 Groundwater Standard (effective January 1, 2010)

	5/15/2012	<10	<10	<10	<10	<10	<10	<10	<10	20
	11/3/2011	<10	<10	<10	<10	<10	<10	<10	<10	20
	4/27/2011	<10	<10	<10	<10	<10	<10	<10	<10	20
	11/29/2010	<10	<10	<10	<10	<10	<10	<10	<10	20
	5/5/2010	<10	<10	<10	<10	<10	<10	<10	<10	20
Lead	5/15/2014	<10	13	<10	**27**	**26**	<10	<10	<10	15
	5/8/2013	<10	<10	<10	<10	**44.0**	<10	<10	<10	15
	5/15/2012	<10	13	<10	<10	**15.0**	<10	<10	12.0	15
	11/3/2011	<10	<10	<10	<10	<10	<10	<10	<10	15
	4/27/2011	<10	<10	<10	<10	<10	<10	<10	<10	15
	11/29/2010	<10	<10	<10	<10	<10	<10	<10	<10	15
	5/5/2010	<10	<10	<10	<10	<10	<10	<10	<10	15

Notes:
1. All results reported in µg/L
2. Concentrations in bold type meet or exceed 2L GQS

* NCDENR Division of Water Quality Title 15A NCAC 2L .0202 Groundwater Standard (effective January 1, 2010)

envirochem

ANALYTICAL & CONSULTING CHEMISTS

Environmental Chemists, Inc.

6602 Windmill Way • Wilmington, NC 28405
(910) 392-0223 (Lab) • (910) 392-4424 (Fax)

710 Bowsertown Road • Manteo, NC 27954
(252) 473-5702

NCDENR: DWQ CERTIFICATE #94. DLS CERTIFICATE #37729

Quible & Associates
Post Office Box 870
Kitty Hawk NC 27949
Attention: Brian Rubino

Date of Report: May 22, 2014
Customer PO #:
Report #: 2014-05738
Report to: Brian Rubino
Project ID: RJR Avoca Landfill

Lab ID	Sample ID:	Collect Date/Time	Matrix	Sampled by
14-13881	**Site:** MW-1	5/15/2014 1:15 PM	Water	Client

Test	Method	Results	Date Analyzed
Manganese	EPA 200.7	1.44 mg/L	05/21/2014
Selenium	EPA 200.7	<0.010 mg/L	05/21/2014
Arsenic	EPA 200.8	< 0.010 mg/L	5/20/2014
Barium	EPA 200.8	0.086 mg/L	5/20/2014
Cadmium	EPA 200.8	< 0.010 mg/L	5/20/2014
Chromium	EPA 200.8	0.029 mg/L	5/20/2014
Lead	EPA 200.8	< 0.010 mg/L	5/20/2014
Silver	EPA 200.8	< 0.010 mg/L	5/20/2014
Mercury	EPA 245.1	<0.0002 mg/L	05/19/2014

Lab ID	Sample ID:	Collect Date/Time	Matrix	Sampled by
14-13882	**Site:** MW-2	5/15/2014 1:33 PM	Water	Client

Test	Method	Results	Date Analyzed
Manganese	EPA 200.7	0.727 mg/L	05/21/2014
Selenium	EPA 200.7	<0.010 mg/L	05/21/2014
Arsenic	EPA 200.8	0.099 mg/L	5/20/2014
Barium	EPA 200.8	0.141 mg/L	5/20/2014
Cadmium	EPA 200.8	< 0.010 mg/L	5/20/2014
Chromium	EPA 200.8	0.052 mg/L	5/20/2014
Lead	EPA 200.8	0.013 mg/L	5/20/2014
Silver	EPA 200.8	< 0.010 mg/L	5/20/2014
Mercury	EPA 245.1	<0.0002 mg/L	05/19/2014

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Report #: 2014-05738
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Project ID: RJR Avoca Landfill

Lab ID	Sample ID:	Collect Date/Time	Matrix	Sampled by
14-13883	**Site:** MW-3	5/15/2014 1:45 PM	Water	Client

Test	Method	Results	Date Analyzed
Arsenic	EPA 200.7	0.438 mg/L	05/21/2014
Barium	EPA 200.7	0.324 mg/L	05/21/2014
Manganese	EPA 200.7	0.595 mg/L	05/21/2014
Selenium	EPA 200.7	<0.010 mg/L	05/21/2014
Cadmium	EPA 200.8	< 0.010 mg/L	5/20/2014
Chromium	EPA 200.8	0.012 mg/L	5/20/2014
Lead	EPA 200.8	< 0.010 mg/L	5/20/2014
Silver	EPA 200.8	< 0.010 mg/L	5/20/2014
Mercury	EPA 245.1	<0.0002 mg/L	05/19/2014

Lab ID	Sample ID:	Collect Date/Time	Matrix	Sampled by
14-13884	**Site:** MW-4	5/15/2014 1:40 PM	Water	Client

Test	Method	Results	Date Analyzed
Manganese	EPA 200.7	0.529 mg/L	05/21/2014
Selenium	EPA 200.7	<0.010 mg/L	05/21/2014
Arsenic	EPA 200.8	0.098 mg/L	5/20/2014
Barium	EPA 200.8	0.234 mg/L	5/20/2014
Cadmium	EPA 200.8	< 0.010 mg/L	5/20/2014
Chromium	EPA 200.8	< 0.010 mg/L	5/20/2014
Lead	EPA 200.8	0.027 mg/L	5/20/2014
Silver	EPA 200.8	< 0.010 mg/L	5/20/2014
Mercury	EPA 245.1	<0.0002 mg/L	05/19/2014

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Post Office Box 870
Kitty Hawk NC 27949
Attention: Brian Rubino

Date of Report: May 22, 2014
Customer PO #:
Report #: 2014-05738
Report to: Brian Rubino
Project ID: RJR Avoca Landfill

Lab ID	Sample ID:	Collect Date/Time	Matrix	Sampled by
14-13885	**Site:** MW-5	5/15/2014 2:00 PM	Water	Client

Test	Method	Results	Date Analyzed
Manganese	EPA 200.7	0.047 mg/L	05/21/2014
Selenium	EPA 200.7	<0.010 mg/L	05/21/2014
Arsenic	EPA 200.8	0.038 mg/L	5/20/2014
Barium	EPA 200.8	0.072 mg/L	5/20/2014
Cadmium	EPA 200.8	< 0.010 mg/L	5/20/2014
Chromium	EPA 200.8	0.049 mg/L	5/20/2014
Lead	EPA 200.8	0.026 mg/L	5/20/2014
Silver	EPA 200.8	< 0.010 mg/L	5/20/2014
Mercury	EPA 245.1	<0.0002 mg/L	05/19/2014

Lab ID	Sample ID:	Collect Date/Time	Matrix	Sampled by
14-13886	**Site:** MW-6	5/15/2014 2:15 PM	Water	Client

Test	Method	Results	Date Analyzed
Selenium	EPA 200.7	<0.010 mg/L	05/21/2014
Arsenic	EPA 200.8	0.072 mg/L	5/20/2014
Barium	EPA 200.8	0.111 mg/L	5/20/2014
Cadmium	EPA 200.8	< 0.010 mg/L	5/20/2014
Chromium	EPA 200.8	< 0.010 mg/L	5/20/2014
Lead	EPA 200.8	< 0.010 mg/L	5/20/2014
Manganese	EPA 200.8	0.228 mg/L	05/20/2014
Silver	EPA 200.8	< 0.010 mg/L	5/20/2014
Mercury	EPA 245.1	<0.0002 mg/L	05/19/2014

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Analytical & Consulting Chemists

ENVIRONMENTAL CHEMISTS, INC

NCDENR: DWQ CERTIFICATION # 94 NCDHHS: DLS CERTIFICATION # 37729

6602 Windmill Way Wilmington, NC 28405
OFFICE: 910-392-0223 FAX 910-392-4424
info@environmentalchemists.com

COLLECTION AND CHAIN OF CUSTODY

CLIENT: Quible & Assoc., P.C.	PROJECT NAME: RJR AVOCA LANDFILL	REPORT NO: 14-05738
ADDRESS: 8 JUNIPER TR	CONTACT NAME:	PO NO:
P.O. Drawer 870	REPORT TO: BRIAN RUBINO	PHONE/FAX: 252.261.3300
Kitty Hawk NC 27949	COPY TO:	email: brubino@quible.com

Sampled By:

SAMPLE TYPE: I = Influent, E = Effluent, W = Well, ST = Stream, SO = Soil, SL = Sludge, Other:

Sample Identification	Collection Date	Collection Time	Collection Temp	Sample Type	Composite or Grab	Container (P or G)	Chlorine mg/L	LAB ID NUMBER	PRESERVATION NONE	HCL	H2SO4	HNO3	NAOH	THIO	OTHER	ANALYSIS REQUESTED
MW1	5/15/14	1:15p		W	C	P		13881				↑				8 RCRA + Mn
					G	G										3030C EXT
MW2	5/15/14	1:33p		W	C	P		13882								8 RCRA + Mn
					G	G										3030C EXT
MW3	5/15/14	1:45p		W	C	P		13883								8 RCRA + Mn
					G	G										3030C EXT
MW4	5/15/14	1:40p		W	C	P		13884								8 RCRA + Mn
					G	G										3030C EXT
MW5	5/15/14	2:00p		W	C	P		13885								8 RCRA + Mn
					G	G										3030C EX
MW6	5/15/14	2:15p		W	C	P		13886								8 RCRA + Mn
					G	G										3030C EXT
MW7	5/15/14	2:30p		W	C	P		13887								8 RCRA + Mn
					G	G										3030C EXT
MW8	5/15/14	2:45p		W	C	P		13888				↓				8 RCRA + Mn
					G	G										3030C EXT
					C	P										
					G	G										
					C	P										
					G	G										

Transfer	Relinquished By:	Date/Time	Received By:	Date/Time
1.				
2.				

Temperature when Received: Accepted: Rejected: Resample Requested:

Delivered By: Received By: Date: 5/16/14 Time: 1:31p

Comments: TURNAROUND: