South Park Landfill

April 2013 Interim Site-Wide Groundwater Monitoring Results

Prepared for

City of Seattle
South Park Property Development, LLC

September 2013

FLOYD | SNIDER
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South Park Property Development, LLC

Prepared by

Floyd|Snider-Aspect Team

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CERTIFICATION

This document has been prepared for the City of Seattle under the direction of:

John Jacob Strunk

Name: John Strunk, LHG

Date: September 18, 2013

AUTHOR RECOGNITION

The following individuals have contributed to the preparation of this April 2013 Interim Site-Wide Groundwater Monitoring Results:

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List of Abbreviations/Acronyms

Acronym/ Abbreviation	Definition
AO	Agreed Order No. 6706
ARI	Analytical Resources, Inc.
CAP	Cleanup Action Plan
CKD	Cement kiln dust
DCE	Dichloroethene
DNAPL	Dense non-aqueous phase liquid
DO	Dissolved oxygen
Ecology	Washington State Department of Ecology
KIP	Kenyon Industrial Park
Landfill	South Park Landfill
LDPE	Low density polyethylene
LFG	Landfill gas
MTCA	Model Toxics Control Act
NAPL	Non-aqueous phase liquid
ORP	Oxidation reduction potential
PVC	Polyvinyl chloride
Redox	Reduction-oxidation
RI/FS	Remedial Investigation/Feasibility Study
SPPD	South Park Property Development, LLC
SRDS	South Recycling and Disposal Station
TCE	Trichloroethylene
USEPA	U.S. Environmental Protection Agency

1.0 Introduction

This report provides the results of the April 2013 groundwater monitoring activities for the Interim Site-wide Groundwater Monitoring Program at the South Park Landfill (Landfill). The groundwater monitoring was conducted in accordance with the Interim Site-wide Groundwater Monitoring Plan (Floyd|Snider 2012a), which provides groundwater monitoring prior to the completion and submittal of the Cleanup Action Plan (CAP) and development of a Long-term Site-wide Groundwater Monitoring Plan. The Interim Site-wide Groundwater Monitoring Program supplements the Draft South Park Landfill Remedial Investigation/Feasibility Study (RI/FS; Floyd|Snider 2012b), which is currently being reviewed by the Washington State Department of Ecology (Ecology).

This report includes a brief description of the Landfill; a summary of the sampling methods and procedures; and an update of groundwater flow directions; and presents the analytical results. The April 2013 sampling event discussed in this report is the first groundwater quality monitoring event conducted as described in the Interim Site-wide Groundwater Monitoring Plan (Floyd|Snider 2012a).

1.1 SITE DESCRIPTION

The Landfill is a former municipal solid waste landfill located in the South Park neighborhood of Seattle, Washington. The Landfill is located in the Duwamish Valley, between State Routes 509 and 99, and received solid wastes from the 1930s until it was closed in 1966 under King County's Title 10 provisions for solid waste regulation. Soil, groundwater, surface water, and landfill gas (LFG) monitoring began at the Landfill in the late 1980s and has continued through the present day. The Landfill is composed of several parcels, including the approximately 20-acre South Park Property Development, LLC (SPPD), the South Recycling and Disposal Station (SRDS), the Kenyon Industrial Park (KIP), and several other smaller parcels. The SPPD parcel will be developed in 2013 as part of an interim action (Farallon 2013).

In February 2007, the Landfill was added to Washington State's Hazardous Sites List and a RI/FS was conducted under Model Toxics Control Act (MTCA) Agreed Order No. 6706 (Agreed Order) with Ecology. The RI/FS determined the nature and extent of contamination associated with the Landfill and evaluated potential remedial alternatives.

1.1.1 Monitoring Well Network

The monitoring wells included in the Interim Site-wide Groundwater Monitoring Program are illustrated on Figure 1.2. In addition to the proposed point of compliance (POC) wells (MW-08, MW-10, MW-18, MW-24, MW-25, MW-26, MW-27, MW-32, and MW-33), the monitoring well network also includes monitoring wells used to assess upgradient groundwater conditions (KMW-05, KMW-08, MW-12, MW-14, and MW-29); a monitoring well used to assess groundwater conditions along the northern edge of KIP (KMW-03A); and downgradient monitoring wells used to assess groundwater conditions adjacent to the former Glitsa American, Inc. (Glitsa) property (MW-30 and MW-31). KMW-08 was sampled as a supplement to KMW-05 in assessing upgradient groundwater conditions because the groundwater in KMW-05 was dark brown in color, which may be indicative of the aqueous interaction of highly alkaline cement kiln dust (CKD) and organic rich soil. Several additional wells (MW-06, KMW-01A, KMW-02B, KMW-04, KMW-06, and KMW-07) and surface water monitoring locations (SG-1S and SG-2N)

were included in the monitoring network to measure groundwater and surface water levels for determining representative groundwater flow directions and gradients at the Landfill.

As discussed in the draft RI/FS (refer to Section 5.5 of that document), the monitoring wells are primarily completed in one of three groundwater zones of interest (Perched Zone, A-Zone, or B-Zone), all of which are part of the Shallow Aquifer. The Perched Zone is a thin discontinuous layer of groundwater that exists above the Silt Overbank Deposit, which can often be in contact with solid waste and is thus conceptually equivalent to leachate in those locations. The A-Zone is immediately below the Silt Overbank Deposit and is the critical zone where leachate (and perched water) can enter the groundwater system and move off-site. The B-Zone represents the base of the Shallow Aquifer, overlying finer-grained estuarine deposits, and is where dense non-aqueous phase liquids (DNAPLs) would accumulate, if present. The completion zone for each well included in the monitoring well network is shown on Figure 1.1. Well construction logs are presented in Appendix A of the Interim Site-wide Groundwater Monitoring Plan.

2.0 Groundwater Level Monitoring

Water levels were measured in the monitoring wells and surface water monitoring locations at the Landfill in order to provide an indication of groundwater elevations, gradients, and flow directions for the April 2013 sampling event. Figure 1.1 provides the monitoring well and surface water monitoring locations.

2.1 MEASUREMENT PROCEDURE

Groundwater level measurements were conducted between April 1 and April 4, 2013, concurrent with groundwater sampling. Water level measurements were collected prior to the purging of the well for the collection of the groundwater samples. Groundwater levels were measured to a precision of 0.01 foot using an electric water level indicator. All groundwater level measurements were made relative to the surveyed top of the polyvinyl chloride (PVC) casing. Readings were recorded on a field form along with the measurement date and time (refer to Appendix A).

Due to the discoloration of the groundwater in KMW-05, an interface probe was used to confirm that no non-aqueous phase liquid (NAPL) was present within the well. There was no presence of NAPL detected in the well and there was no noticeable odor. There were no indications of potential NAPL in any of the other monitoring wells.

Surface water levels were measured at two locations (SG-1S and SG-2N) in the West Ditch (refer to Figure 1.1). SG-1S is a permanent staff gage installed at the southern end of the West Ditch, while SG-2N is a surveyed measuring point from the top of a 2-inch diameter PVC pipe set in concrete associated with a culvert at the northern end of the West Ditch. Due to the absence of the Silt Overbank Deposit in the northern portion of the West Ditch (refer to Section 5.5.4 of the RI/FS), surface water in the vicinity of SG-2N is expected to be in hydraulic continuity with groundwater in the A-Zone of the Shallow Aquifer. Therefore, the surface water elevation at SG-2N is considered an expression of the groundwater elevation. However, the Silt Overbank Deposit is present in the vicinity of SG-1S, likely acting as an aquitard between the West Ditch and the underlying A-Zone of the Shallow Aquifer.

2.2 GROUNDWATER LEVELS AND FLOW DIRECTIONS

A shallow groundwater elevation and flow direction map for April 2013 is presented on Figure 2.1. Groundwater elevations at the two surface water locations and 23 monitoring wells with screens completed primarily in the A-Zone of the Shallow Aquifer were used for the contouring. The groundwater elevations were interpolated using triangulation with linear interpolation to produce the contours.

The interpolated groundwater elevations were then used in a “raindrop” analysis, where virtual particles are placed on the map and their flow path is predicted based on the interpolated water table surface, to produce the inferred groundwater flow path lines depicted on Figure 2.1. As shown on Figure 2.1, the groundwater flow direction in the vicinity of the Landfill is generally inferred to be to the northeast toward the Duwamish River.

3.0 Groundwater Quality Monitoring

Groundwater samples were collected between April 1 and April 4, 2013, from the 17 monitoring wells (including KMW-08) according to low-flow sampling procedures as described in the Interim Site-wide Groundwater Monitoring Plan (Floyd|Snider 2012a).

3.1 PROCEDURE

The wells were purged and sampled using either a dedicated bladder pump or a peristaltic pump with dedicated low density polyethylene (LDPE) and silicon tubing.

The wells were purged at a flow rate of less than 500 milliliters per minute until the field parameters stabilized or more than three casing volumes was purged from the well. The monitored field parameters included temperature, pH, conductivity, dissolved oxygen (DO), and oxidation reduction potential (ORP), which were recorded at 5-minute intervals using a calibrated multi-parameter probe and flow-through cell. Stabilization was defined as three successive readings where DO varied by less than 10 percent and ORP varied by less than 10 millivolts (mV). Additional stability criteria included 0.5 degrees Celsius (°C) for temperature, 10 percent for conductivity, and 0.1 units for pH. Flow rate and depth to water were also measured during well purging. In addition, prior to sampling, a turbidity measurement was collected to evaluate the quality of dissolved/total metal analytical results. All field measurements were documented on the respective Groundwater Sampling Records for each well, which are provided in Appendix A. Purge water was placed in 55-gallon drums on-site, which were removed for off-site disposal on April 22, 2013.

Groundwater samples were collected from the discharge tubing in advance of the flow-through cell. All dissolved metal samples (iron and manganese) were field filtered using disposable 0.45 micrometer filters. Samples were placed in containers provided by the laboratory, stored in coolers with ice, and delivered to Analytical Resources, Inc. (ARI) laboratory under industry-standard chain-of-custody procedures at the end of each sampling day. Groundwater samples were analyzed for the following parameters based on the Interim Site-wide Groundwater Monitoring Plan:

- cis-1,2–Dichloroethene (DCE), trichloroethylene (TCE), and benzene by U.S. Environmental Protection Agency (USEPA) Method 8260C
- Vinyl chloride by USEPA Method 8260C SIM
- Dissolved iron and manganese by USEPA Method 6010B
- Total iron and manganese by USEPA Method 6010B

Benzene was only analyzed in MW-25 and the upgradient monitoring wells (KMW-05 and KMW-08) based on historical detections of benzene in MW-25 and KMW-05.

In addition, the groundwater samples were also analyzed for several parameters not included in the Interim Site-wide Groundwater Monitoring Plan, including geochemical indicator parameters, the sulfide-sulfate reduction-oxidation (redox) couple, and nitrogen redox couples:

- Major cations, including sodium, potassium, calcium, and magnesium, by USEPA Method 6010B
- Major anions, including alkalinity, carbonate, and bicarbonate, by SM 2320B

- Major anions, including chloride, sulfate, nitrate, and nitrite by USEPA Method 300.0
- Ammonia by USEPA 350.1M and sulfide by USEPA Method 376.2

Quality control/quality assurance measures included two field duplicates, one rinse blank, and six trip blanks (one submitted with each cooler) submitted with the groundwater samples. The field duplicates were collected from MW-25 (identified as MW-60 in the laboratory report) and from KMW-08 (identified as MW-61 in the laboratory report), with the highest concentrations reported for MW-25 and KMW-08 on Figures 3.1, 3.2, and 3.3. The rinse blank is identified as MW-80 in the laboratory report. The chain-of-custodies and laboratory reports for the April 2013 sampling event are provided in Appendix B.

3.2 ANALYTICAL RESULTS

The results of the April 2013 sampling event were received from ARI on April 18, 2013 (Appendix B). Table 3.1 provides a summary of the analytical results and field parameters. Cleanup levels have not yet been established for this site, but are expected to be based on either drinking water use (MCTA Method B) or on protection of surface water quality. Table 1 lists both potential cleanup levels for the convenience of the reader.

A Level I data validation of the analytical results was performed by Floyd|Snider and the data validation report is included as Appendix C. Results of the data validation indicated that all analytical results were acceptable as reported by the laboratory.

The analytical results are spatially illustrated on Figures 3.1, 3.2, and 3.3. An analysis of major cations (sodium, potassium, calcium, and magnesium) and anions (chloride, sulfate, carbonate, and bicarbonate) is also shown on the trilinear plots in Figures 3.4 and 3.5.

4.0 References

Farallon Consulting, LLC (Farallon). 2013. *Interim Action Work Plan – South Park Landfill Site, Seattle, Washington*. Prepared for the South Park Property Development, LLC. 22 February.

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Table

Table 3.1
April 2013 Groundwater Sample Analytical Results

	Location	KMW-03A	KMW-05	KMW-08		MW-08	MW-10	MW-12	MW-14	MW-18	MW-24
	X-coord[1]	1270170.48	1269861.86	1269692.89	1269692.89	1271368.12	1270569.12	1269783.23	1269963.2	1271077.67	1271162.48
	Y-coord[1]	197585.09	197427.44	197356.14	197356.14	196837.87	197647.09	196963.92	196398.73	196350.26	197102.37
	Sample ID	SPL-GW-KMW03A-040313	SPL-GW-KMW05-040313	SPL-GW-KMW08-040413	SPL-GW-MW61-040413	SPL-GW-MW08-040213	SPL-GW-MW10-040213	SPL-GW-MW12-040313	SPL-GW-MW14-040313	SPL-GW-MW18-040313	SPL-GW-MW24-040213
	Sample Date	04/03/2013	04/03/2013	04/04/2013	04/04/2013	04/02/2013	04/02/2013	04/03/2013	04/03/2013	04/03/2013	04/02/2013
Analyte	**Units**										
Conventionals by USEPA 300.0, 350.1M, 376.2, and SM 2320											
Chloride	mg/L	12.9	158	9.5	9.4	189	15.8	17.4	13.1	16.3	33.2
Sulfate	mg/L	0.4	1,150	27.9	27.6	3.8	56.3	17.8	2.3	76.5	0.3
Sulfide	mg/L	0.05 U	30.6	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
N-ammonia	mg-N/L	3.04	74.3	0.22	0.235	2.96	3.74	0.692	0.236	2.27	3.52
N-nitrate	mg-N/L	0.1 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-nitrite	mg-N/L	0.1 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Alkalinity	mg/L $CaCO_3$	368	7,510	154	158	375	276	153	261	430	420
Bicarbonate	mg/L $CaCO_3$	368	1 U	154	158	375	276	153	261	430	420
Carbonate	mg/L $CaCO_3$	1 U	2,640	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Hydroxide	mg/L $CaCO_3$	1 U	4,860	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Metals by SW6010C											
Calcium, dissolved	mg/L	84.3	9.8	40.3	40.3	46	44.3	30.8	50.6	70.8	73.4
Iron, dissolved	mg/L	10.4	5	0.07	0.07	19.1	19.2	7.97	4.29	59.5	26
Iron, total	mg/L	10.2	5.7	0.15	0.15	19	18.4	11.3	4.8	59.6	29.5
Magnesium, dissolved	mg/L	27.1	0.5 U	8.89	8.89	47.8	28.2	16.4	30.5	62.2	33
Manganese, dissolved	mg/L	0.048	0.01 U	0.24	0.242	1.19	1.1	0.742	0.576	1.57	1.64
Manganese, total	mg/L	0.05	0.01 U	0.241	0.241	1.17	1.05	0.769	0.587	1.57	1.79
Potassium, dissolved	mg/L	15.5	4,160	22.9	22.8	16.9	9.2	4	4.9	16.6	12.3
Sodium, dissolved	mg/L	24.5	1,520	22.7	22.3	157	59.4	20.8	16.3	33.8	58.7
VOCs by SW8260C											
Benzene	µg/L		8.2	0.2 U	0.2 U	--	--	--	--	--	--
cis-1,2-Dichloroethene	µg/L	0.2 U	4 U	0.2 U	0.2 U	0.2 U	1.8	3.1	0.2 U	0.2 U	0.2 U
Trichloroethene	µg/L	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.37	0.2 U	0.2 U	0.2 U
VOCs by SW8260C-SIM											
Vinyl chloride	µg/L	0.3	0.4 U	0.02 U	0.02 U	0.063	1.2	0.1	0.02 U	0.072	0.032
Field Parameters											
Dissolved oxygen	mg/L	0.72	0.60	0.95	--	2.23	1.70	2.05	2.39	2.95	2.70
ORP	mV	-227.6	-560.4	110.4	--	-98.5	-109.3	-14.0	-50.2	-103.5	-86.6
pH	pH	7.68	13.11	6.66	--	6.82	6.80	6.68	6.70	6.60	6.68
Specific conductance	µS/cm	823.0	31,561.0	398.0	--	1,331.0	715.0	435.6	597.7	1,172.0	913.0

		Proposed CUL (Potential Scenarios)		
Monitored Analytes	**Units**	**Drinking Water**	**Protection of Surface Water**	**Upgradient or Background**
Benzene	µg/L	5	51	--
cis-1,2-Dichloroethene	µg/L	16	900	--
Trichloroethene	µg/L	4.9	30	--
Vinyl chloride	µg/L	0.29	2.40	--
Iron	mg/L	--	--	18
Manganese	mg/L	--	--	2.0

Notes:

-- Not analyzed for.
1 Coordinates are in Washington State Plane North NAD 83 feet.

Abbreviations:

$CaCO_3$ Calcium carbonate
CUL Cleanup level
µg/L Micrograms per liter
µS/cm Microsiemens per centimeter
mg/L Milligrams per liter
mg-N/L Milligrams per liter as nitrogen
mV Millivolt
NAD 83 North American Datum of 1983
ORP Oxidation reduction potential
VOC Volatile organic compound

Qualifier:

U Analyte was not detected at given reporting limit.

Table 3.1
April 2013 Groundwater Sample Analytical Results

	Location	MW-25		MW-26	MW-27	MW-29	MW-30	MW-31	MW-32	MW-33
	X-coord[1]	1270572.18	1270572.18	1271163.2	1271347.6	1270272.103	1270826.64	1270825.71	1270622.16	1270751.02
	Y-coord[1]	197667.54	197667.54	197122.51	196835.03	196033.286	197655.77	197660.37	197416.52	197257.91
	Sample ID	SPL-GW-MW25-040113	SPL-GW-MW60-040113	SPL-GW-MW26-040213	SPL-GW-MW27-040213	SPL-GW-MW29-040313	SPL-GW-MW30-040213	SPL-GW-MW31-040213	SPL-GW-MW32-040113	SPL-GW-MW33-040113
	Sample Date	04/01/2013	04/01/2013	04/02/2013	04/02/2013	04/03/2013	04/02/2013	04/02/2013	04/01/2013	04/01/2013
Analyte	**Units**									
Conventionals by USEPA 300.0, 350.1M, 376.2, and SM 2320										
Chloride	mg/L	6.1	6.2	11.1	11.8	17.8	37.3	12.5	33.8	88.6
Sulfate	mg/L	4	4.5	12.1	6.2	282	19.4	0.1	12.8	1.4
Sulfide	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
N-ammonia	mg-N/L	2.11	2.1	0.18	1.59	0.754	0.299	2.19	9.35	14.7
N-nitrate	mg-N/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-nitrite	mg-N/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Alkalinity	mg/L $CaCO_3$	134	136	33.7	104	259	171	171	672	661
Bicarbonate	mg/L $CaCO_3$	134	136	33.7	104	259	171	171	672	661
Carbonate	mg/L $CaCO_3$	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Hydroxide	mg/L $CaCO_3$	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Metals by SW6010C										
Calcium, dissolved	mg/L	19.5	19.7	8.92	16.2	147	65.1	24.5	68.3	37.1
Iron, dissolved	mg/L	6.7	6.68	5.58	12.5	15.8	2.21	11.9	23.8	18.4
Iron, total	mg/L	7.25	7.28	8.26	21.6	16.6	2.3	18.3	22.9	18.4
Magnesium, dissolved	mg/L	5.2	5.23	3.27	4.36	35.5	12.3	7.06	44.1	22.1
Manganese, dissolved	mg/L	0.525	0.528	0.129	0.395	1.31	0.079	0.442	2.31	1.84
Manganese, total	mg/L	0.536	0.53	0.136	0.417	1.36	0.08	0.505	2.2	1.83
Potassium, dissolved	mg/L	2.8	2.8	2.9	3.3	10.8	3.9	4.2	14.9	9.6
Sodium, dissolved	mg/L	33.8	33.7	9.5	30.3	21.4	14.3	40.3	162	265
VOCs by SW8260C										
Benzene	µg/L	0.43	0.4	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	µg/L	0.72	0.8	0.33	0.4	0.2 U	0.64	5.2	1.5	0.2 U
Trichloroethene	µg/L	0.2 U	0.2 U	0.31	0.2 U	0.2 U	0.6	0.2 U	0.2 U	0.2 U
VOCs by SW8260C-SIM										
Vinyl chloride	µg/L	1.4	1.4	0.02 U	0.25	0.02 U	0.12	4.7	0.28	1.1
Field Parameters										
Dissolved oxygen	mg/L	1.20	--	1.72	1.98	2.33	1.28	2.06	1.11	2.53
ORP	mV	-58.2	--	-13.3	-86.9	-28.7	6.0	-50.2	-97.7	-101.4
pH	pH	6.78	--	6.32	6.75	6.53	6.53	6.56	6.76	6.75
Specific conductance	µS/cm	288.8	--	148.7	280.7	1156.0	488.5	386.7	1339.0	1526.0

		Proposed CUL (Potential Scenarios)		
Monitored Analytes	**Units**	**Drinking Water**	**Protection of Surface Water**	**Upgradient or Background**
Benzene	µg/L	5	51	--
cis-1,2-Dichloroethene	µg/L	16	900	--
Trichloroethene	µg/L	4.9	30	--
Vinyl chloride	µg/L	0.29	2.40	--
Iron	mg/L	--	--	18
Manganese	mg/L	--	--	2.0

Notes:

-- Not analyzed for.
1 Coordinates are in Washington State Plane North NAD 83 feet.

Abbreviations:

$CaCO_3$ Calcium carbonate
CUL Cleanup level
µg/L Micrograms per liter
µS/cm Microsiemens per centimeter
mg/L Milligrams per liter
mg-N/L Milligrams per liter as nitrogen
mV Millivolt
NAD 83 North American Datum of 1983
ORP Oxidation reduction potential
VOC Volatile organic compound

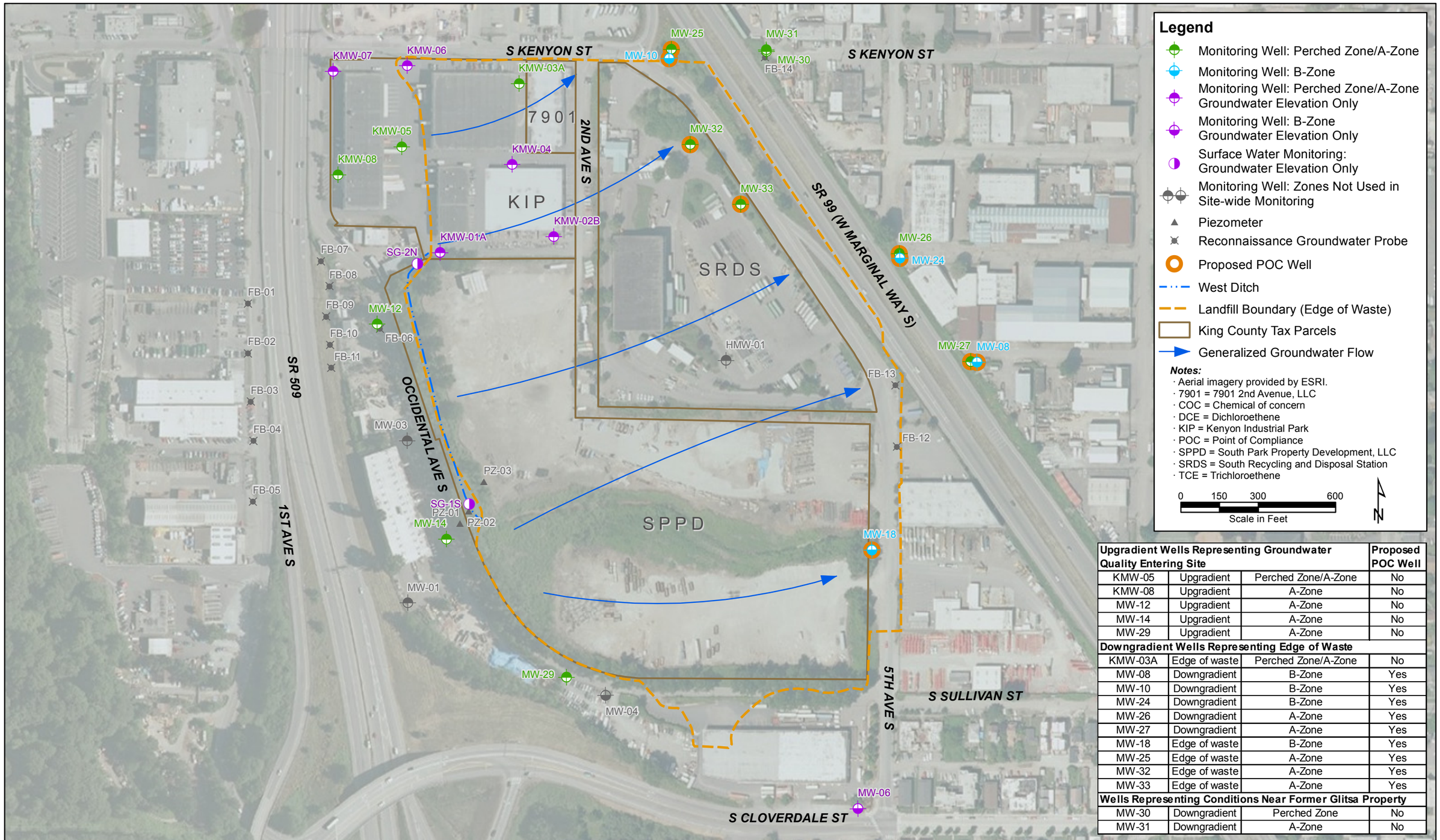
Qualifier:

U Analyte was not detected at given reporting limit.

South Park Landfill

April 2013 Interim Site-wide Groundwater Monitoring Results

Figures



Legend

- Monitoring Well: Perched Zone/A-Zone
- Monitoring Well: B-Zone
- Monitoring Well: Perched Zone/A-Zone Groundwater Elevation Only
- Monitoring Well: B-Zone Groundwater Elevation Only
- Surface Water Monitoring: Groundwater Elevation Only
- Monitoring Well: Zones Not Used in Site-wide Monitoring
- Piezometer
- Reconnaissance Groundwater Probe
- Proposed POC Well
- West Ditch
- Landfill Boundary (Edge of Waste)
- King County Tax Parcels
- Generalized Groundwater Flow

Notes:

· Aerial imagery provided by ESRI.
· 7901 = 7901 2nd Avenue, LLC
· COC = Chemical of concern
· DCE = Dichloroethene
· KIP = Kenyon Industrial Park
· POC = Point of Compliance
· SPPD = South Park Property Development, LLC
· SRDS = South Recycling and Disposal Station
· TCE = Trichloroethene

0 150 300 600
Scale in Feet

N

Upgradient Wells Representing Groundwater Quality Entering Site			Proposed POC Well
KMW-05	Upgradient	Perched Zone/A-Zone	No
KMW-08	Upgradient	A-Zone	No
MW-12	Upgradient	A-Zone	No
MW-14	Upgradient	A-Zone	No
MW-29	Upgradient	A-Zone	No
Downgradient Wells Representing Edge of Waste			
KMW-03A	Edge of waste	Perched Zone/A-Zone	No
MW-08	Downgradient	B-Zone	Yes
MW-10	Downgradient	B-Zone	Yes
MW-24	Downgradient	B-Zone	Yes
MW-26	Downgradient	A-Zone	Yes
MW-27	Downgradient	A-Zone	Yes
MW-18	Edge of waste	B-Zone	Yes
MW-25	Edge of waste	A-Zone	Yes
MW-32	Edge of waste	A-Zone	Yes
MW-33	Edge of waste	A-Zone	Yes
Wells Representing Conditions Near Former Glitsa Property			
MW-30	Downgradient	Perched Zone	No
MW-31	Downgradient	A-Zone	No

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Interim Site-wide Groundwater Monitoring Plan
South Park Landfill
Seattle, Washington

Figure 1.1
April 2013 Groundwater Monitoring Locations

I:\GIS\Projects\COS-SPARK\MXD\Figure 1 (Groundwater Monitoring Locations)Version2.mxd
9/19/2013

Legend

- Flow Paths (Orange Denotes Start Point)
- 1ft Groundwater Elevation Contours
- Revised Landfill Boundary (Based on RI/FS)
- Tax Parcels

Monitoring Well Locations

- Not Included in Analysis
- Used for Contouring and Flow Path Analysis

Notes:

· Tax parcels provided by King County Geographic Information Systems Center.
· Aerial imagery provided by Esri
· Water Levels at KMW-02B, MW-01, MW-04, MW-08, MW-10, MW-24, and MW-30 were not used in the creation of the groundwater elevation contour map.

KMW-07 13.93
KMW-06 9.10
KMW-03A 8.98
MW-25 6.69
MW-31 6.45
MW-30
FB-14
MW-32 6.77
KMW-05 10.30
KMW-08 13.86
KMW-04 8.97
MW-33 6.82
KMW-01A 9.02
SG-2N 9.35
KMW-02B
MW-26 6.69
MW-24
FB-07
FB-08
FB-09
FB-10
FB-11
MW-12 12.67
MW-27 6.80
MW-08
MW-23
MW-12
SG-1S 10.41
MW-14 16.36
MW-18 7.08
MW-01
MW-29 12.23
MW-04
MW-06 8.52
S KENYON ST
OCCIDENTAL AVE S
5TH AVE S
S SULLIVAN ST
S CLOVERDALE ST
13.5
10.5
7.5
8.5
9.5
14.5
12.5

N

0 100 200 400
Scale in Feet

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Interim Site-wide Groundwater Monitoring
South Park Landfill
Seattle, Washington

Figure 2.1
Groundwater Elevation Contour Map
April 2013

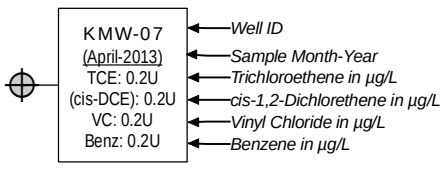
T:\projects_8\SouthPark_Landfill\Delivered\April2013Monitoring\RevSept20-2013\Fig 2-1 GW Elevation Contour Map.mxd
9/20/2013

Legend

Well Locations:

- B-zone Monitoring Well
- Perched Zone/A-zone Monitoring Well
- Perched Zone Monitoring Well
- Kenyon Street Bus Yard Monitoring Well

Well Labels:



· Qualifier "U" = The analyte was not detected at the reported concentration.
· Qualifier "J" = The reported concentration is an estimate.
· -- indicates paramter not analyzed.

Monitored Chemicals	Units	Proposed CUL (Potential Scenarios)		
		Drinking Water	Protection of Surface Water	Upgradient or Background
Benzene	µg/L	5	51	
cis-1,2-Dichloroethene	µg/L	16	900	
Trichloroethene	µg/L	4.9	30	
Vinyl chloride	µg/L	0.29	2.4	

Revised Landfill Boundary (based on RI/FS)

Tax Parcel

1,000-foot Perimeter from Landfill Boundary

Notes:
· Tax parcels provided by King County Geographic Information Systems Center.
· Aerial imagery provided by Esri
· µg/L - Micrograms per liter
· RI/FS - Remedial Investigation/Feasibility Study

DUWAMISH WATERWAY

S HOLDEN ST
SR 509
S KENYON ST
5TH AVE S
OCCIDENTAL AVE S
8TH AVE S
SR 99 (W MARGINAL WAY S)
S SULLIVAN ST
S CLOVERDALE ST

KMW-05 (April-2013): TCE: 4.0U; cis-DCE: 4.0U; VC: 0.4U; Benz: 8.2
KMW-03A (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 0.3; Benz: --
BYMW-11 (July-2008): VC: 0.2U
BYMW-5 (Feb-2008): VC: 0.2U
MW-25 (April-2013): TCE: 0.2U; cis-DCE: 0.8; VC: 1.4; Benz: 0.43
MW-30 (April-2013): TCE: 0.6; cis-DCE: 0.64; VC: 0.12; Benz: --
KMW-08 (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 0.02U; Benz: 0.2U
MW-10 (April-2013): TCE: 0.2U; cis-DCE: 1.8; VC: 1.2; Benz: --
MW-31 (April-2013): TCE: 0.2U; cis-DCE: 5.2; VC: 4.7; Benz: --
MW-26 (April-2013): TCE: 0.31; cis-DCE: 0.33; VC: 0.02U; Benz: --
MW-32 (April-2013): TCE: 0.2U; cis-DCE: 1.5; VC: 0.28; Benz: --
MW-24 (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 0.032; Benz: --
MW-12 (April-2013): TCE: 0.37; cis-DCE: 3.1; VC: 0.1; Benz: --
MW-33 (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 1.1; Benz: --
MW-08 (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 0.063; Benz: --
MW-27 (April-2013): TCE: 0.2U; cis-DCE: 0.4; VC: 0.25; Benz: --
MW-14 (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 0.02U; Benz: --
MW-18 (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 0.072; Benz: --
MW-29 (April-2013): TCE: 0.2U; cis-DCE: 0.2U; VC: 0.02U; Benz: --

N
0 200 400 800
Scale in Feet

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Interim Site-wide Groundwater Monitoring
South Park Landfill
Seattle, Washington

Figure 3.1
Groundwater Sample Analytical Results
Benzene and Chlorinated Ethenes

T:\projects_8\SouthPark_Landfill\Delivered\April2013Monitoring\RevSept20-2013\Fig 3-1 GW TPHs and Benzene.mxd
9/20/2013

Legend

Exploration Locations:

- B-zone Monitoring Well
- Perched Zone/A-zone Monitoring Well
- Perched Zone Monitoring Well

Location Labels:

KMW-07	
(April-2013)	*Well ID*
Fe (T/D): --/--	*Sample Month/Year*
Mn (T/D): 252/202	*Total/Dissolved Iron Concentration in µg/L*
DO: 0.33	*Total/Dissolved Manganese Concentration in µg/L*
pH: 6.72	*Dissolved Oxygen in mg/L*
ORP: 49.8	*pH*
Cond: 621	*Oxidation Reduction Potential in mV*
	Specific Conductance in µS/cm

· Qualifier "U" = The analyte was not detected at the reported concentration.
· -- indicates paramter not analyzed.

Monitored Chemicals	Units	Proposed CUL (Potential Scenarios)		
		Drinking Water	Protection of Surface Water	Upgradient or Background
Iron	mg/L			18
Manganese	mg/L			2

- Revised Landfill Boundary (based on RI/FS)
- Tax Parcel
- 1,000-foot Perimter from Landfill Boundary

Notes:
· Tax parcels provided by King County Geographic Information Systems Center.
· Aerial imagery provided by Esri
· µg/L - Micrograms per liter
· µS/cm - Microsiemens per centimeter
· mV - millivolts
· RI/FS - Remedial Investigation/Feasibility Study

DUWAMISH WATERWAY

S HOLDEN ST

KMW-03A
(April-2013)
Fe(T/D): 10200/10400
Mn(T/D): 50/48
DO:0.72
pH: 7.68
ORP: -227.6
Cond.: 823

MW-25
(April-2013)
Fe(T/D): 7280/6700
Mn(T/D): 536/528
DO: 1.2
pH: 6.78
ORP: -58.2
Cond.: 288.8

MW-32
(April-2013)
Fe(T/D): 22900/23800
Mn(T/D): 2200/2310
DO: 1.11
pH: 6.76
ORP: -97.7
Cond.: 1329

MW-30
(April-2013)
Fe(T/D): 2300/2210
Mn(T/D): 80/79
DO: 1.28
pH: 6.53
ORP: 6
Cond.: 488.5

KMW-05
(April-2013)
Fe(T/D): 5700/5000
Mn(T/D): 10U/10U
DO: 0.6
pH: 13.11
ORP: -560.4
Cond.: 31561

S KENYON ST

SR 509

KMW-08
(April-2013)
Fe(T/D): 150/70
Mn(T/D): 241/242
DO: 0.95
pH: 6.66
ORP: 110.4
Cond.: 398

MW-10
(April-2013)
Fe(T/D): 18400/19200
Mn(T/D): 1050/1100
DO: 1.7
pH: 6.8
ORP: -109.3
Cond.: 715

5TH AVE S

MW-31
(April-2013)
Fe(T/D): 18300/11900
Mn(T/D): 505/442
DO: 2.06
pH: 6.56
ORP: -50.2
Cond.: 386.7

MW-26
(April-2013)
Fe(T/D): 8260/5580
Mn(T/D): 136/129
DO: 1.72
pH: 6.32
ORP: -13.3
Cond.: 148.7

MW-08
(April-2013)
Fe(T/D): 19000/19100
Mn(T/D): 1170/1190
DO: 2.23
pH: 6.82
ORP: -98.5
Cond.: 1331

8TH AVE S

1ST AVE S

MW-33
(April-2013)
Fe(T/D): 18400/18400
Mn(T/D): 1830/1840
DO: 2.53
pH: 6.75
ORP: -101.4
Cond.: 1526

MW-24
(April-2013)
Fe(T/D):29500/26000
Mn(T/D): 1790/1640
DO: 2.7
pH: 6.68
ORP: -86.6
Cond.: 913

MW-27
(April-2013)
Fe(T/D):21600/12500
Mn(T/D): 417/395
DO: 1.98
pH: 6.75
ORP: -86.9
Cond.: 280.7

MW-12
(April-2013)
Fe(T/D): 11300/7970
Mn(T/D): 769/742
DO: 2.05
pH: 6.68
ORP: -14
Cond.: 435.6

MW-14
(April-2013)
Fe(T/D): 4800/4290
Mn(T/D): 587/576
DO: 2.39
pH: 6.7
ORP: -50.2
Cond.: 597.7

MW-18
(April-2013)
Fe(T/D): 59600/59500
Mn(T/D): 1570/1570
DO: 2.95
pH: 6.6
ORP: -103.5
Cond.: 1172

SR 99 (W MARGINAL WAY S)

MW-29
(April-2013)
Fe(T/D): 16600/15800
Mn(T/D): 1360/1310
DO: 2.33
pH: 6.53
ORP: -28.7
Cond.: 1156

5TH AVE S

S SULLIVAN ST

S CLOVERDALE ST

N

0 200 400 800
Scale in Feet

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Interim Site-wide Groundwater Monitoring
South Park Landfill
Seattle, Washington

Figure 3.2
Groundwater Sample Analytical Results
Iron and Manganese

T:\projects_8\SouthPark_Landfill\Delivered\April2013Monitoring\RevSept20-2013\Fig 3-2 GW Iron and Manganese.mxd
9/20/2013

Legend

Well Locations:

- B-zone Monitoring Well
- Perched Zone/A-zone Monitoring Well
- Perched Zone Monitoring Well

Well Labels:

MW-10	*Well ID*
(April-2013)	*Sample Month/Year*
Ammonia:3.04	*Ammonia in mg-N/L*
Nitrite:5U	*Nitrate as Nitrogen in mg/L*
Nitrate: *0.01U*	*Nitrate as Nitrogen in mg/L*
Sulfate: *17.8*	*Sulfate in mg/L*
Sulfide: *30.6*	*Sulfide in mg/L*
DO:1.2	*Dissolved Oxygen in mg/L*
ORP: *-55.2*	*Oxidation Reduction Potential in mV*

· Qualifier "U" = The analyte was not detected at the reported concentration.
· Qualifier "J" = The reported concentration is an estimate.
· *BLUE ITALICS* indicate favorable conditions for natural attenuation of hydrocarbon fuels or chlorinated solvents (values from USEPA/600/R-98/128 1998):
- Dissolved Oxygen: less than 0.5 mg/L
- Oxidation Reduction Potential: less than 50 mV
- Nitrate as Nitrogen: less than 1 mg/L
- Sulfate: less than 20 mg/L
- Sulfide: greater than 1 mg/L

- Revised Landfill Boundary (based on RI/FS)
- 1,000-foot Perimeter from Landfill Boundary
- Tax Parcel

Notes:
· Tax parcels provided by King County Geographic Information Systems Center.
· Aerial imagery provided by Esri
· Only well locations sampled for natural attenuation parameters are illustrated.
· µg/L - Micrograms per liter
· mg/L - Milligrams per liter
· mV - millivolts
· USEPA - United States Environmental Protection Agency
· RI/FS - Remedial Investigation/Feasibility Study

DUWAMISH WATERWAY

S HOLDEN ST

KMW-03A (April-2013): Ammonia: 3.04; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *0.4*; Sulfide: 0.05U; DO: 0.72; ORP: *-227.6*

MW-25 (April-2013): Ammonia: 2.11; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *4.5*; Sulfide: 0.05U; DO: 1.2; ORP: *-58.2*

MW-32 (April-2013): Ammonia: 9.35; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *12.8*; Sulfide: 0.05U; DO: 1.11; ORP: *-97.7*

MW-30 (April-2013): Ammonia: 0.299; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *19.4*; Sulfide: 0.05U; DO: 1.28; ORP: *6.0*

KMW-08 (April-2013): Ammonia: 0.235; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: 27.9; Sulfide: 0.05U; DO: 0.95; ORP: 110.4

S KENYON ST

S KENYON ST

MW-10 (April-2013): Ammonia: 3.74; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: 56.3; Sulfide: 0.05U; DO: 1.7; ORP: *-109.3*

5TH AVE S

MW-31 (April-2013): Ammonia: 2.19; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *0.1*; Sulfide: 0.05U; DO: 2.06; ORP: *-50.2*

MW-26 (April-2013): Ammonia: 0.18; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *12.1*; Sulfide: 0.05U; DO: 1.72; ORP: *-13.3*

MW-27 (April-2013): Ammonia: 1.59; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *6.2*; Sulfide: 0.05U; DO: 1.98; ORP: *-86.9*

KMW-05 (April-2013): Ammonia: 74.3; Nitrite: 5U; Nitrate: 5U; Sulfate: 1150; Sulfide: *30.6*; DO: 0.6; ORP: *-560.4*

SR 509

1ST AVE S

2ND AVE S

MW-33 (April-2013): Ammonia: 14.7; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *1.4*; Sulfide: 0.05U; DO: 2.53; ORP: *-101.4*

MW-24 (April-2013): Ammonia: 3.52; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *0.3*; Sulfide: 0.05U; DO: 2.7; ORP: *-86.6*

MW-08 (April-2013): Ammonia: 2.96; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *3.8*; Sulfide: 0.05U; DO: 2.23; ORP: *-98.5*

MW-12 (April-2013): Ammonia: 0.692; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *17.8*; Sulfide: 0.05U; DO: 2.05; ORP: *-14*

OCCIDENTAL AVE S

MW-18 (April-2013): Ammonia: 2.27; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: 76.5; Sulfide: 0.05U; DO: 2.95; ORP: *-103.5*

SR 99 (W MARGINAL WAY S)

MW-14 (April-2013): Ammonia: 0.236; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: *2.3*; Sulfide: 0.05U; DO: 2.39; ORP: *-50.2*

5TH AVE S

S SULLIVAN ST

MW-29 (April-2013): Ammonia: 0.754; Nitrite: 0.1U; Nitrate: *0.1U*; Sulfate: 282; Sulfide: 0.05U; DO: 2.33; ORP: *-28.7*

S CLOVERDALE ST

N

0 200 400 800

Scale in Feet

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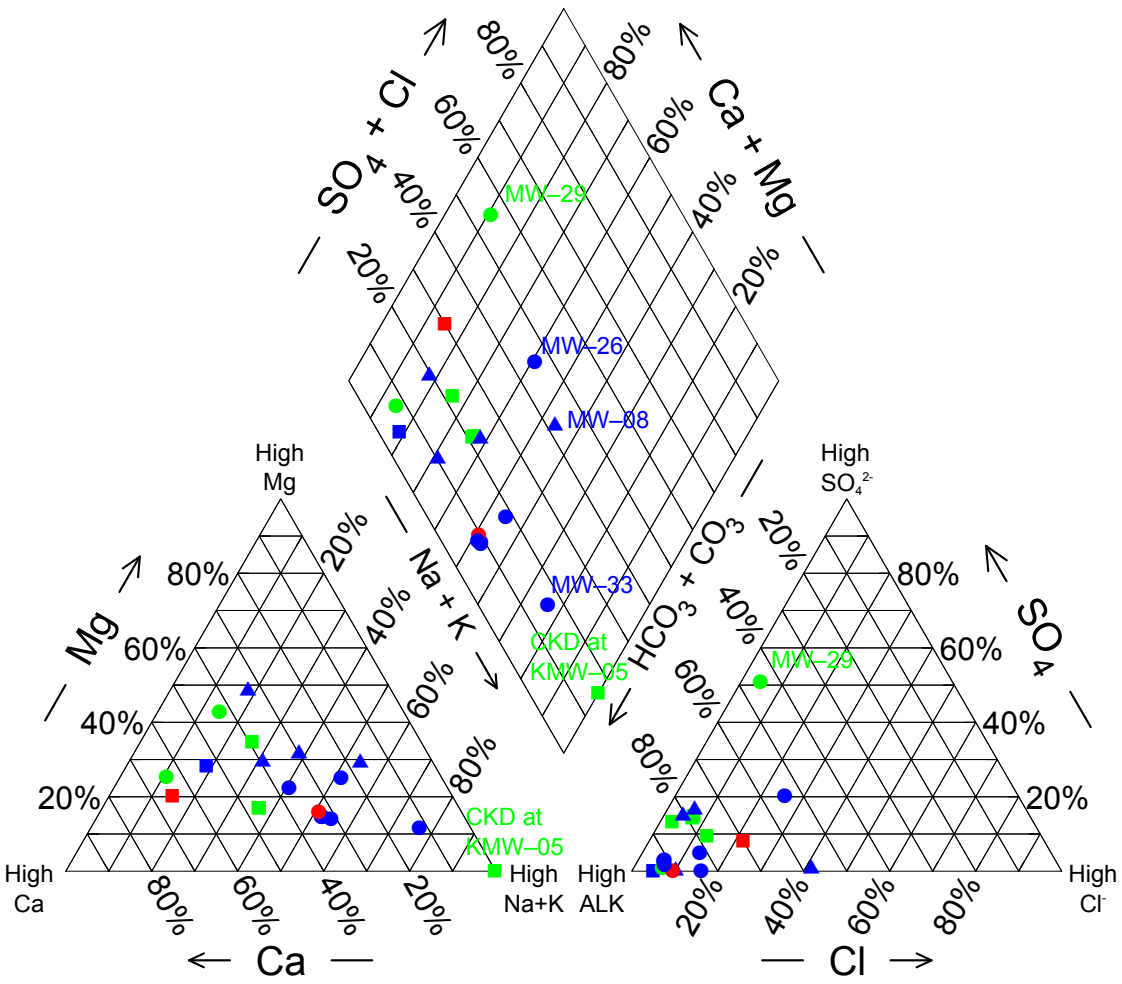
Interim Site-wide Groundwater Monitoring
South Park Landfill
Seattle, Washington

Figure 3.3
Groundwater Sample Analytical Results
Long-term Groundwater Monitoring Parameters

T:\projects_8\SouthPark_Landfill\Delivered\April2013Monitoring\RevSept20-2013\Fig 3-3 GW Natural Attenuation Params.mxd
9/20/2013



Legend

- Upgradient Perched and Perched/Shallow
  - KMW–05
  - KMW–08
  - KMW–08Dup
  - MW–12
- Downgradient Perched and Perched/Shallow
  - KMW–03A
- Off-site Perched and Perched/Shallow
  - MW–30
- Upgradient Shallow
  - MW–14
  - MW–29
- Downgradient Shallow
  - MW–25
  - MW–25Dup
  - MW–26
  - MW–27
  - MW–32
  - MW–33
- Off-site Shallow
  - MW–31
- Downgradient Deep
  - MW–08
  - MW–10
  - MW–18
  - MW–24

Note:
Companion information is provided on Figure 3.5.

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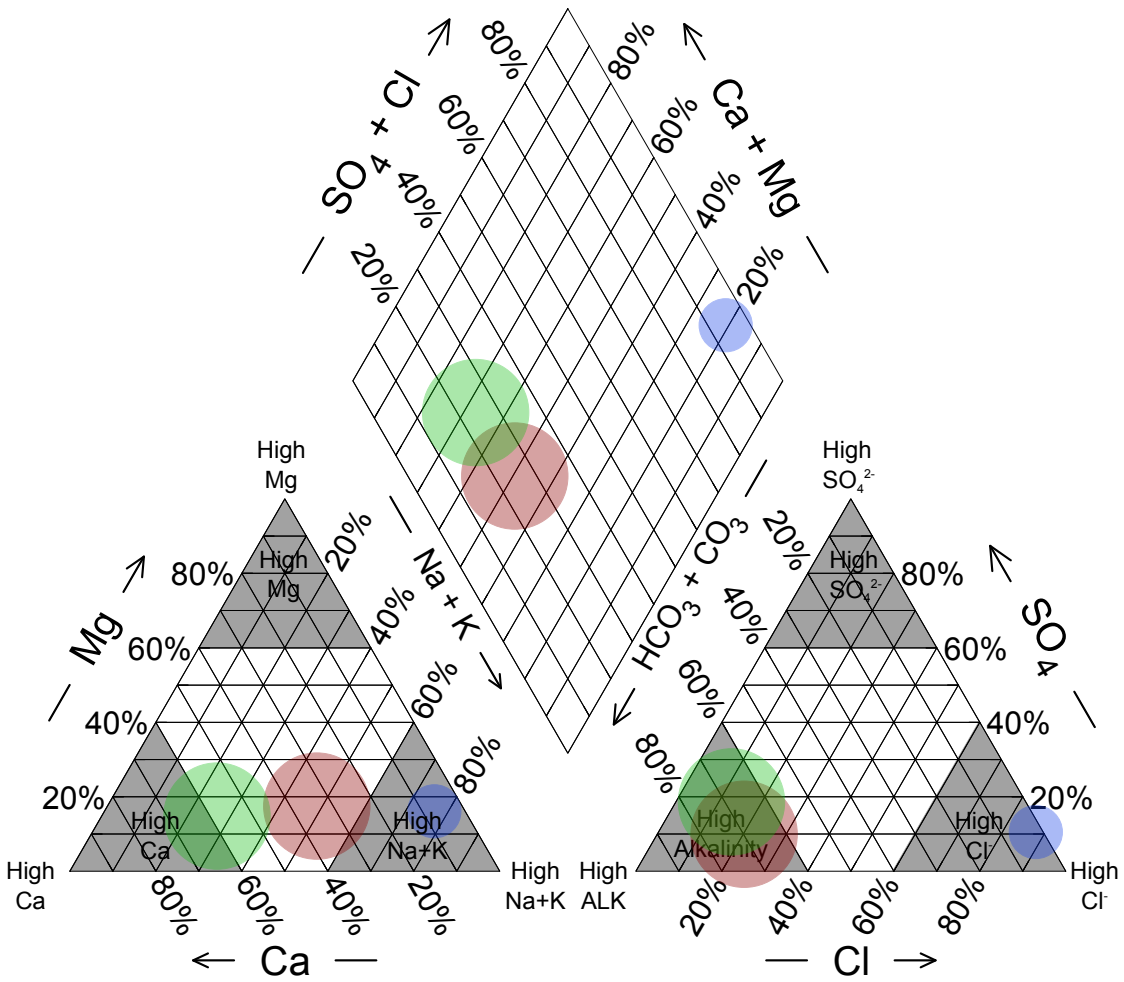
Interim Site-wide Groundwater Monitoring
South Park Landfill
Seattle, Washington

Figure 3.4
April 2013 Groundwater Monitoring
Trilinear Plot of Major Cations and Anions



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Interim Site-wide Groundwater Monitoring
South Park Landfill
Seattle, Washington

Figure 3.5
Trilinear Plot of Major Cations and Anions for Typical Waters

South Park Landfill

April 2013 Interim Site-wide Groundwater Monitoring Results

Appendix A
Groundwater Sampling Field Forms

Aspect CONSULTING

Sample number: SPL-GW-KMW08-040413

GROUNDWATER SAMPLING RECORD

WELL NUMBER: KMW-08 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date: 4/4/13
Starting Water Level (ft TOC): 5.90
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1022		0.35								Start
1027			5.92	13.6	388.2	0.94	6.66	122.4	clear	
1032			5.92	13.6	383.0	0.90	6.66	117.8		
1037			5.92	13.6	388.6	0.88	6.66	115.2		
1042			<5.92	13.6	393.3	0.88	6.66	111.4		
1047				13.5	398.0	0.95	6.66	110.4	0.41	Sample

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
								Field DUP. Time: (1130)
								SPL-GW-MW61-040413
1050	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VC)
	500mL	HDPE	1	(YES)	HNO3			Dissolved Metals Na, K, Ca, Mg, FE Mn
	500 mL	HDPE	1	NO	HNO3			total Metals FE, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
	1L	OS	1	NO	NO			Alk
	~~500mL~~ 250mL	~~HDPE~~ Amber	1	NO	H_2SO_4			NH3 (Ammonia)
	500mL	HDPE	1	NO	Zn acetate			NO Headspace

METHODS

Parameters measured with (instrument model & serial number): YSI (yellow) Cal @ 4/4/13 930
Purging Equipment: Peristaltic + dedicated tubing Decon Equipment: Alconox + DI H2O
Disposal of Discharged Water: Drum onsite
Observations/Comments: Took Field DUP

Aspect CONSULTING

Sample number: SPL-GW-KMW05-040313

GROUNDWATER SAMPLING RECORD

WELL NUMBER: KMW-05 Page: 1 of 1

Project Name: South Park
Date: 4/3
Sampled by: SM/CM
Measuring Point of Well:
Screened Interval (ft. TOC):
Filter Pack Interval (ft. TOC):

Project Number: 100116
Starting Water Level (ft TOC): 5.49
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

~2' of DEnse product @ bottom of well
More notes on back

Casing Volume ________ (ft Water) x ________ (Lpfv)(gpf) = ________ (L)(gal)
Casing volumes: 3/4" = 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4" = 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): ________

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1447		0.3								Start
1452			5.55	15.4	31023	0.58	13.01	-344.2	Cola	
1457										pulled tubing up 2'
1500										Stop Pump
1503		0.2								Restart
1508			5.54	15.8	32843	0.58	13.10	-479		
1513			5.54	15.9	32624	0.57	13.10	-490.9		
1518			5.54	15.8	32320	0.58	13.10	-502.3		
1523			5.54	15.8	32270	0.59	13.11	-511.9		
1528				16.0	31987	0.58	13.10	-523.3		
1533				16.0	31806	0.56	13.10	-539.7		
1538				15.9	31659	0.59	13.11	-549.3		
1543				15.9	31561	0.60	13.11	-560.4		

Total Gallons Purged: ________ Total Casing Volumes Removed: ________

Ending Water Level (ft TOC): ________ Ending Total Depth (ft TOC): ________

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
								~~Field Dup SPL-GW-MW61-040313~~ time
1550	40mL	VOA	3	No	1HCl, 2 no			VOC 8260C + Benzene ✓
	40mL	VOA	3	No	1HCl, 2 no			VOC 8260C-SIM (VC) ✓
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, Fe, Mn ✓
	500mL	HDPE	1	NO	HNO3			total Metals Fe, Mn ✓
	Small	OJ	1	No	No			Anions Cl, NO3, NO2, SO4 ✓
	1L	OJ	1	No	No			Alk ✓
	500mL	HDPE	1	No	H2SO4			NH3 (Ammonia) ✓
	500mL	HDPE	1	No	Zn acetate			Sulfide NO Headspace ✓

METHODS

Parameters measured with (instrument model & serial number): YSI pro+ (yellow) cal @ 4/2/13

Took Product Sample

Purging Equipment: ________ Decon Equipment: ________

Disposal of Discharged Water:

Observations/Comments: ~~Collected Field Dup (all most 12 bottles) ID SPL-GW-~~ [illegible] ~~MW61-040313~~ ~~time?~~
Water levels on Back of Form/

No Field Dup

FID

Z:\Equipment\Field Forms\Groundwater Sampling Form.xlsx

Tried to measure DT product. No product in well, no odor on indicator

Aspect CONSULTING

Sample number SPL-GW-KMW03A-040313

GROUNDWATER SAMPLING RECORD

WELL NUMBER: KMW-03A Page: 1 of 1

Project Name: South Park
Date: 4/3/13
Sampled by: SM/CM
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Project Number: 100116
Starting Water Level (ft TOC): 9.64
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1324		0.3								Start
1324										
1329			9.64	14.1	820	0.88	7.52	-67.1	clear	
1334			9.65	14.1	820	0.83	7.60	-186.1		
1339			9.65	14.2	820	0.76	7.65	-215.1		
1344			9.65	14.2	821	0.75	7.67	-222.8		
1349		↓		14.1	823	0.72	7.68	-227.10	1.65	Sample

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1400	40mL	VOA	3	No	HCl, 2 no			VOC 8260C
	40mL	VOA	3	No	HCl, 2 no			VOC 8260C-SIM (VE)
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, Fe, Mn
	500 mL	HDPE	1	NO	HNO3			total metals Fe, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
↓	1L	OS	1	NO	NO			Alk
	500mL	HDPE	1	No	H2SO4			NH3 (Ammonia)
METHODS	500mL	HDPE	1	No	Zn acetate			Sulfide NO Headspace

Parameters measured with (instrument model & serial number): YSI + Pro (yellow) calibrated 4/3/13 AM
Purging Equipment: Peristaltic + dedicated tubing Decon Equipment:
Disposal of Discharged Water: Drum on site
Observations/Comments:

Aspect CONSULTING

Sample number SPL-GW-MW12-040313

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-12 Page: 1 of 1

Project Name: South Park
Project Number: 10016
Date: 4/3/13
Starting Water Level (ft TOC): 7.96
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
11:53										START
11:58		.3	7.99	12.6	423.2	3.43	6.68	-14.0	Orange	
12:03			7.99	12.6	427.7	2.12	6.64	-6.6	Start clearing	
12:08			7.99	12.6	431.0	1.99	6.65	-6.5		
12:13				12.6	436.5	2.08	6.67	-9.7		
12:18				12.6	435.6	2.05	6.68	-14.0	62.8	Sample

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
12:30	40mL	VOA	3	NO	1 HCl, 2 no	orange	62.8	VOC 8260C
	40mL	VOA	3	NO	1 HCl, 2 no			VOC 8260C-SIM (VC)
	500mL	HDPE	1	(YES)	HNO3			Dissolved Metals Na, K, Ca, Mg, Fe, Mn
	500mL	HDPE	1	NO	HNO3			total Metals Fe, Mn
	Small	OJ	1	NO	NO			Anions Cl, NO3, NO2, SO4
	1L	OJ	1	NO	NO			Alk
	500mL	HDPE	1	NO	H_2SO_4			NH3 (Ammonia)
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide NO Headspace

Parameters measured with (instrument model & serial number): YSI pro+ (yellow) Calibrated @ 4/3/13 Am
Purging Equipment: Dedicated bladder pump + tubing Decon Equipment: Alconox + DI water
Disposal of Discharged Water: Drum onsite
Observations/Comments: Drum Buried near well

Aspect CONSULTING

Sample number SPL-GW-MW14-040313

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-14 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date: 4/3/13
Starting Water Level (ft TOC): 5.49
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1055		0.35								Start pump
1100			3.90	12.7	657	4.05	6.74	-58.1	clear	
1105			3.90	12.6	604.1	3.24	6.64	~~-73~~ -56.2		
1110			3.95	12.5	599.2	2.81	6.68	-53.7		
~~1115~~			~~3.95~~	~~12.5~~	~~598.7~~	~~2.71~~	~~6.66~~	~~-52.2~~		
1115			3.95	12.5	598.0	2.54	6.69	-52.1		
1120			3.95	12.5	598.2	2.40	6.70	-50.9		
1125		↓		12.5	597.7	2.39	6.70	-50.2	9.57	Sample

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1130	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C ✓
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VC) ✓
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, Mn, FE ✓
	500 mL	HDPE	1	NO	HNO3			total metals FE, Mn ✓
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4 ✓
	1L	OS	1	NO	NO			Alk ✓
	500mL	HDPE	1	NO	H2SO4			NH3 (Ammonia) ✓
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide NC Headspace ✓

Parameters measured with (instrument model & serial number): yellow YSI cal @ 4/3/13 AM
Purging Equipment: dedicated bladder pump + tubing
Decon Equipment: Alconox + DI water
Disposal of Discharged Water: DRUM on site
Observations/Comments: Drum burned near well

Aspect CONSULTING

Sample number: SPL-GW-MW29-040313

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-29 Page: 1 of 1

Project Name: South Park
Project Number: 10016
Date: 4/3/13
Sampled by: SM/CM
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)
Starting Water Level (ft TOC): 6.93
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1000		0.35								Start
1005		0.2	8.44	13.8	1154	1.06	6.49	37.0	CLEAR	Reduced flow rate
1010			8.27	13.9	1149	1.26	6.50	9.1		
1015			8.02	13.9	1153	1.70	6.52	-7.2		
1020			8.20	14.0	1154	2.02	6.53	-14.8		
1025			8.20	13.9	1158	2.19	6.52	-22.3		
1030			8.14	14.0	1156	2.33	6.53	-28.7	17.4	Sample

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1035	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VE)
	500mL	HDPE	1	(YES)	HNO3			(Dissolved) Metals Na, K, Ca, Mg, FE, Mn
	500 mL	HDPE	1	NO	HNO3			total metals FE, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
	1L	OS	1	NO	NO			Alk
	500 mL	HDPE	1	NO	H2SO4			NH3 (Ammonia)
	500mL	HDPE	1	NO	Zn acetate			Sulfide

METHODS

Parameters measured with (instrument model & serial number): YSI (yellow) cal @ 4/3/13 AM
Purging Equipment: Parastaltic + dedicated tubing
Decon Equipment: Alconox + DI
Disposal of Discharged Water: Drum on site

Observations/Comments:

Aspect CONSULTING

Sample number SPL - ~~MW~~ GW - MW18 - 040312

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-18 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date: 4/3/13
Starting Water Level (ft TOC): 14.95
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
0845										START
0850		0.3	14.95	12.8	1071	1.55	6.51	5.2	999	
0855			14.95	12.19	1124	1.35	6.54	-55.4		
0900			14.99	12.9	1148	1.48	6.56	-78.1		
0905				12.9	1159	1.99	6.57	-89.9		
0910				13.0	1165	2.27	6.58	-94.3		
0915				13.0	1160	2.03	6.59	-98.9		
0920				13.1	1168	2.81	6.60	-101.3		
0925				13.1	1172	2.95	6.60	-103.5	2.32	

Total Gallons Purged: Total Casing Volumes Removed:

Ending Water Level (ft TOC): Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
0930	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VE)
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, FE Mn
	500mL	HDPE	1	NO	HNO3			Total Metals FE, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
	L	OS	1	NO	NO			ALK
	500mL	HDPE	1	NO	H2SO4			NH3 (Ammonia)
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide NO Headspace

Parameters meesured with (instrument model & serial number): YSI pro (yellow) calibrated @ 4/3/13 AM

Purging Equipment: bladder pump & dedicated tubing Decon Equipment: Alconox + DI

Disposal of Discharged Water: Drum onsite

Observations/Comments: there's a Drum 3/4 burried next to well w/ locked lid

TB-1 is in the first cooler filled @ beginning of Day (green)

Aspect CONSULTING

Sample number: SPL-GW-MW10-040213

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-10 Page: 1 of 1

Project Name: South Park
Project Number: 10016
Date: 4/2/13
Starting Water Level (ft TOC): 12.78
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1612		0.35								Start
1617			12.80	14.3	377.9	2.68	7.01	-51.1	clear	
1622			12.80	14.3	652.	1.67	6.78	-91.0		
1627			12.78	14.3	700	1.51	6.81	-101.5		
1632			12.78	14.3	692	1.59	6.81	-106.5		
1637		4	12.80	14.3	715	1.70	6.80	-109.3	2.62	Sample

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1640	40mL	VOA	3	NO	HCl, 2 no	clear	2.62	VOC 8260C ✓
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VC) ✓
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, Fe Mn ✓
	500mL	HDPE	1	NO	HNO3			total metals FE, Mn ✓
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4 ✓
	L	OS	1	NO	NO			Alk ✓
	500mL	HDPE	1	NO	H2SO4			NH3 (Ammonia) ✓
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide ND Headspace ✓

Parameters measured with (instrument model & serial number): YSI (yellow) Cal'd 4/2/13 AM
Purging Equipment: peristaltic + dedicated tubing
Decon Equipment: Alconox + DI
Disposal of Discharged Water: Drums on site
Observations/Comments: 55 gallon Drum B/4 buried next to wells MW-10, MW-3, MW-8, & MW-24

Aspect CONSULTING

Sample number SPL-GW-MW27-040213

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-27 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date: 4/2/13
Sampled by: SM/CM
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Starting Water Level (ft TOC): 7.96
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1510		~0.29								Start pump
1515			7.97	13.3	1329	2.31	6.80	-91.2		
1520		7.97	7.96	13.5	1325	2.34	6.82	-89.0		
1525		7.96	7.96	13.7	1326	2.26	6.82	-88.4		
1530			7.95	10.8	204.3	2.34	6.77	-80.1		
1533										
1538			7.95	10.8	279.5	2.16	6.68	-76.0		
1543				10.8	279.9	2.07	6.72	-83.7	clear	
1548				10.9	280.1	1.98	6.75	-87.0	904	

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1550	40mL	VOA	3	NO	HCl, 2 no	yellow	90.4	VOC 8260C
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VC)
	500mL	HDPE	1	(YES)	HNO_3			Dissolved Metals Na, K, Ca, Mg, Fe, Mn
	500 ML	HDPE	1	NO	HNO_3			total metals Fe, Mn
	Small	OS	1	NO	NO			Anions Cl, NO_3, NO_2, SO_4
	1L	OS	1	NO	NO			Alk
	500mL	HDPE	1	NO	H_2SO_4			NH_3 (Ammonia)
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide NC Headspace

Parameters measured with (instrument model & serial number): YSI Pro20 (yellow)
Purging Equipment: dedicated bladder pump + tubing Decon Equipment: Alconox + DI
Disposal of Discharged Water: Drum onsite
Observations/Comments:

Aspect CONSULTING

Sample number SPL-GW-MW08-040213

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-8 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date: 4/2/13
Starting Water Level (ft TOC): 7.08
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1415 ~~1418~~		0.35								Start
1420		0.2	7.98	11.7	1678	1.61	6.79	-535	CLEAR	
1425			7.95	11.7	1445	1.95	6.81	-999		
1430			8.00	11.7	1373	2.10	6.82	-939		
1435			8.00	11.7	1340	2.23	6.83	-965		
1440			8.01	11.7	1331	2.23	6.82	-995	3.47	Sample

Total Gallons Purged: Total Casing Volumes Removed:

Ending Water Level (ft TOC): Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1445	40mL	VOA	3	No	HCl, 2 no			VOC 8260C
	40mL	VOA	3	No	HCl, 2 no			VOC 8260C-SIM (VC)
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, FE Mn
	500 mL	HDPE	1	NO	HNO3			total metals FE, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
	1L	OS	1	NO	NO			ALK
	500mL	HDPE	1	NO	H2SO4			NH3 (Ammonia)
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide NC Headspace

Parameters measured with (instrument model & serial number): YSI (yellow) cal @ 4/2/13 Am
Purging Equipment: disposable bladder pump + tubing Decon Equipment: Alconox + DI water
Disposal of Discharged Water: Pour on site
Observations/Comments:

Aspect CONSULTING

Sample number SPL-~~#~~GW-MW26-040213

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-26 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date: 4/2/13
Starting Water Level (ft TOC): 9.25
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC): _____

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1255		0.3								Start pump
1300			9.25	11.9	177.5	2.88	6.42	-52.5	OVERRANGE	
1305			9.25	11.9	156.5	2.26	6.35	-31.6		
1310			9.25	11.9	153.5	2.04	6.33	-24.3		
1315				11.9	151.6	1.93	6.33	-19.8		
1320				11.9	150.0	1.84	6.32	-19.8		
1325				11.9	149.5	1.78	6.32	-19.3		
1330				[illegible]	148.7	1.72	6.32	-18.3	59.7	

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1350	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VC)
	500mL	HDPE	1	(YES)	HNO3			(Dissolved Metals) Na, K, Ca, Mg, FE Mn
	500 ML	HDPE	1	NO	HNO3			Total Metals FE, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
	1L	OS	1	NO	NO			Alk
	500 mL	HDPE	1	NO	H2SO4			NH3 (Ammonia)
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide NO Headspace

Parameters measured with (instrument model & serial number): YSI (yellow) Cal @ 4/2/13 AM
Purging Equipment: Redi-Flo bladder pump + tubing Decon Equipment: Alconox + DI water
Disposal of Discharged Water: Drum on site
Observations/Comments:

Aspect CONSULTING

Sample number SPL-GW-MW24-040213

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-24 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date:
Sampled by: SM/CM
Starting Water Level (ft TOC): 8.47
Measuring Point of Well:
Casing Stickup (ft):
Screened Interval (ft. TOC)
Total Depth (ft TOC):
Filter Pack Interval (ft. TOC)
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1205			8.47							START
1210		0.3	8.49	11.8	950	2.05	6.04	-47.2	CLEAR	
1215		↓	8.49	11.9	940	2.17	6.06	-63.9		
1220		↓	8.49	11.9	919	2.44	6.03	-76.4		
1225		↓		11.9	911	2.60	6.05	-82.2		
1230		↓		11.9	913	2.70	6.05	-86.6	39.1	STOP

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1235	40mL	VOA	3	NO	1:1 HCl, 2 no	clear	39.1	VOC 8260C 1
	40mL	VOA	3	NO	1:1 HCl, 2 no	↓	↓	VOC 8260C-SIM (VOC) 1
	500mL	HDPE	1	(YES)	HNO_3			(Dissolved Metals Na, K, Ca, Mg, FE, Mn) 1
	500 mL	HDPE	1	NO	HNO_3			total Metals FE, Mn 1
	Small	OS	1	NO	NO			Anions Cl, NO_3, NO_2, SO_4 1
	1L	OS	1	NO	NO			ALK 1
	500mL	HDPE	1	NO	H_2SO_4			NH_3 (Ammonia) 1
METHODS	500mL	HDPE	1	NO	Zn acetate			SULFIDE NO Headspace 1

Parameters measured with (instrument model & serial number): YSI (yellow) cal @ 4/2/13 AM
Purging Equipment: dedicated bladder pump tubing Decon Equipment: Alconox + DI water
Disposal of Discharged Water: Drum onsite
Observations/Comments:

Aspect CONSULTING

Sample number SPL-GW-MW31-040213

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-31 Page: 1 of 1

Project Name: South Park
Project Number: 100116
Date: 4/2/13
Starting Water Level (ft TOC): 10.67
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC):
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC): _____

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1028		0.3								Start
1033			10.68	12.9	437	2.49	6.64	-0.2	orange	
1038			10.68	12.9	397	1.85	6.59	-12.1		
1043			10.68	12.9	387.1	1.89	6.57	-27.8		
1048				13.0	385.5	1.96	6.56	-36.0		
1053				12.9	385.10	2.01	6.56	-42.3		
1058				13.0	385.4	2.04	6.56	-46.5		
1103				12.9	386.7	2.06	6.56	-50.2	82.3	Sept

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1110	40mL	VOA	3	No	HCl, 2 no			VOC 8260C /
	40mL	VOA	3	No	HCl, 2 no			VOC 8260C-SIM (VC) /
	500mL	HDPE	1	(YES)	HNO3			Dissolved Metals Na, K, Ca, Mg, Fe /
	500 mL	HDPE	1	NO	HNO3			Total Metals Fe, Mn /
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4 /
	1L	OS	1	NO	NO			Alk /
	500mL	HDPE	1	No	H2SO4			NH3 (Ammonia) /
METHODS	500mL	HDPE	1	NO	Zn acetate			SULFIDE WD Headspace

Parameters measured with (instrument model & serial number): YSI yellow Cal @ 4/2/13 AM
Purging Equipment: dedicated bladder pump Decon Equipment: Alconox + DI
Disposal of Discharged Water: Drum onsite
Observations/Comments:

Aspect CONSULTING

Sample number: SPL-GW-MW30-040203

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-30 Page: 1 of 1

Project Name: South Park
Project Number: 10016
Date: 4/2/13
Sampled by: SM/CM
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)
Starting Water Level (ft TOC): 9.80
Casing Stickup (ft):
Total Depth (ft TOC): 12.5'
Casing Diameter (inches):

3 Casing Volumes: 2.5 (ft Water) x 0.62 (Lpfv) x3 (gpf) = 4.65 (L)(gal)

Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na	± 3%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
9:40										Start purge
9:45		.3	9.96	11.1	485.0	1.05	6.47	47.0	CLEAR	
9:50			9.93	11.1	486.5	0.97	6.40	36.5		
9:55			9.93	11.1	487.0	0.95	6.51	17.4		
10:00			9.96	11.1	488.3	1.02	6.51	12.3		
10:05			9.98	11.1	490.7	1.14	6.53	9.9		
10:10			9.98	11.1	488.5	1.28	6.53	6.0	21.2	Sample

Total Gallons Purged: 9L
Total Casing Volumes Removed: 7.3
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
10:15	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C
	40mL	VOA	3	NO	HCl, 2 no			VOC 8260C-SIM (VC)
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, Fe, Mn
	500 mL	HDPE	1	NO	HNO3			total metals Fe, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
	1L	OS	1	NO	NO			Alk
	500 mL	HDPE	1	NO	H2SO4			NH3 (Ammonia)
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide NC Headspace

Parameters measured with (instrument model & serial number): YSI yellow calibrated 4/2/13 AM
Purging Equipment: peristaltic Dedicated Lab's Decon Equipment:
Disposal of Discharged Water: Drum on site
Observations/Comments: purged ≥ 3 casing volumes

2.5' x 0.62 x3 = 4.65 L = 3 casing vols
3 min x 0.34 L/min = 9L

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SPL-GW-MW80-040213

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-80 Page: 1 of 1

Project Name: South Park

Project Number: 100116

Date: 4/2/13

Developed by: JM

Measuring Point of Well:

Screened Interval (ft. TOC)

Filter Pack Interval (ft. TOC)

Starting Water Level (ft TOC): NA

Casing Stickup (ft):

Total Depth (ft TOC):

Casing Diameter (inches):

Casing Volume ______ (ft Water) x ______ (Lpfv)(gpf) = ______ (L)(gal)

Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Time	Cumul. Vol. (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (C or F)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	Eh ORP (mv)	Turbidity (NTU)	Comments
		Rinse			Blank					
				No	parameters					

Total Gallons Purged:

Total Casing Volumes Removed:

Ending Water Level (ft TOC):

Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type		Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1130	40ml	VOA		3	No	HCL			8260C
1130	40ml	VOA		3	No	HCL			8260C-Sim

METHODS

Sampling Equipment and IDs:

Purging Equipment: parastaltic & new tubing

Decon Equipment:

Disposal of Discharged Water:

Observations/Comments: Rinse Blank w/ lab supplied DI water

3' poly c 5' silicon tubing

Aspect CONSULTING

Sample number: SPL-GW-MW-32-040113

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-32 Page: 1 of 1

Project Name: South Park
Date: 4/1/13
Sampled by: SM/CM
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Project Number: 100116
Starting Water Level (ft TOC): 10.30
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume ________ (ft Water) x ________ (Lpfv)(gpf) = ________ (L)(gal)

Casing volumes: 3/4" = 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4" = 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	0.5 (~~na~~)	~~± 3%~~ 10%	~~± 10%~~ 10%	± 0.1	± 10 mV	± 10%	
Time	**Cumul. Volume (gal or L)**	**Purge Rate (gpm or Lpm)**	**Water Level (ft)**	**Temp. (°C)**	**Specific Conductance (µS/cm)**	**Dissolved Oxygen (mg/L)**	**pH**	**ORP (mv)**	**Turbidity (NTU)**	**Comments**
11:40										Start
11:45		0.25	10.34	12.8	1253	1.54	6.77	-31.4	clear	
11:50			10.34	13.0	1216	1.20	6.77	-71.5		
11:55			10.42	12.9	1262	1.23	6.76	-82.1		
1200			10.43	12.9	1290	1.61	6.76	-87.2		
1205			10.42	13.0	1308	2.07	6.76	-91.2		
1210			10.42	13.0	1319	2.45	6.76	-93.8		
1215			10.42	13.0	1323	2.72	6.76	-95.4		
1220			10.42	13.0	1327	2.81	6.76	-96.7		
1225			10.42	13.0	1329	3.01	6.76	-97.7	20.0	
13:07						1.11				

Total Gallons Purged: @ 2.5 g
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1230	40mL	VOA	3	No	1HCl, 2 no	yellow		VOC 8260C ✓
	40mL	VOA	3	No	1HCl, 2 no			VOC 8260C-SIM (VC) ✓
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, Fe, Mn ✓ FILTERED
	500mL	HDPE	1	NO	HNO3			total Metals Fe, Mn ✓
	Small	OJ	1	NO	NO			Anions Cl, NO3, NO2, SO4 ✓
	1L	OJ	1	NO	NO			Alk ✓
	500mL	HDPE	1	No	H2SO4			NH3 (Ammonia) ✓
	500mL	HDPE	1	No	Zn acetate			Sulfide — NO Headspace ✓

METHODS

Parameters measured with (instrument model & serial number): YSI (yellow) call @ 4/1/13 9:30 Am
Purging Equipment: Dedicated bladder pump
Decon Equipment: Alconox + DI
Disposal of Discharged Water: Drum on Site
Observations/Comments: S/n: 10076

Recal DO @ 12:38 (after cleaning DO membrane) Precal: 97% post: 99.7

(Deposits form on DO membrane while purging. Cleared of membrane & took Reading after sampled!)

Aspect CONSULTING

Sample number SPL-GW-MW33-040113

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-33 Page: 1 of 1

Project Name: South Park
Project Number: 10016
Date: 4/1/13
Starting Water Level (ft TOC): 10.52
Sampled by: SM/CM
Casing Stickup (ft):
Measuring Point of Well:
Total Depth (ft TOC): 25'
Screened Interval (ft. TOC)
Casing Diameter (inches):
Filter Pack Interval (ft. TOC)

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf
Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	0.5 na	± 3% ±10%	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
1350 ~~1345~~										Start Purge
1355 ~~1350~~		0.3	10.53	14.7	1550	2.69	6.75	-90.9	clear	
1400 ~~1355~~			10.53	14.7	1550	2.99	6.75	-95.4		
1405			10.53	14.7	1549	3.09	6.75	-97.2		
1410			10.53	14.8	1537	3.22	6.75	-99.8		
1415			10.53	14.8	1520	3.28	6.75	-101.4	0.59	
14:50						2.53				

Total Gallons Purged: ~2.5 g
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
A:20	40mL	VOA	3	NO	1HCl, 2 no	yellowish		VOC 8260C
	40mL	VOA	3	NO	1HCl, 2 no			VOC 8260C-SIM (VC)
	500mL	HDPE	1	(YES)	HNO3			Dissolved Metals Na, K, Ca, Mg, FE, Mn
	500mL	HDPE	1	NO	HNO3			total Metals FE, Mn
	Small	OS	1	NO	NO			Anions Cl, NO3, NO2, SO4
	1L	OS	1	NO,	NO			Alk
	500mL	HDPE	1	NO	H2SO4			NH3 (Ammonia)
METHODS	500mL	HDPE	1	NO	Zn acetate			Sulfide

Parameters measured with (instrument model & serial number): YSI (yellow) cal @ 4/1/13 9:30 AM
Purging Equipment: peristaltic & dedicated tubing
Decon Equipment: Alconox + DI H2O
Disposal of Discharged Water: Drum on site
Observations/Comments: no pump in well, ~~installed~~ dedicated poly tubing in well & used peristaltic pump (cleaned DO membrane before start)

Cleaned DO after sample took readings

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Aspect CONSULTING

Sample number: SPL-GW-MW25-040113

GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-25 Page: 1 of 1

Project Name: South Park
Date: 4/1/13
Sampled by: SM/CM
Measuring Point of Well:
Screened Interval (ft. TOC):
Filter Pack Interval (ft. TOC):

Project Number: 100116
Starting Water Level (ft TOC): 13.40
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume ______ (ft Water) x ______ (Lpfv)(gpf) = ______ (L)(gal)
Casing volumes: 3/4" = 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4" = 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

PURGING MEASUREMENTS

Criteria:		Typical 0.1-0.5 Lpm	Stable	na (0.5)	± 3% (10%)	± 10%	± 0.1	± 10 mV	± 10%	
Time	Cumul. Volume (gal or L)	Purge Rate (gpm or Lpm)	Water Level (ft)	Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mv)	Turbidity (NTU)	Comments
~~15:15~~ 15:20										Start
15:25		0.250	13.40	13.6	508.3	3.50	6.97	-37.1	CLEAR	
15:30		↓	13.40	14.6	350.0	2.78	6.82	-41.4	↓	
15:35		↓	13.40	14.6	314.1	2.65	6.78	-41.4	↓	
15:40		↓	13.40	14.5	304.2	2.06	6.79	-44.4	↓	
15:45				14.6	294.3	1.31	6.77	-48.2	↓	
15:50				14.5	291.6	1.19	6.78	-52.4	↓	
15:55				14.5	288.8	1.20	6.78	-58.2	23.5	

Total Gallons Purged: Total Casing Volumes Removed:

Ending Water Level (ft TOC): Ending Total Depth (ft TOC):

SAMPLE INVENTORY

Time	Volume	Bottle Type	Quantity	Filtration	Preservation	Appearance: Color	Appearance: Turbidity & Sediment	Remarks
1600	40mL	VOA	3	No	1HCL, 2 no			VOC 8260C - Benzene +
↓	40mL	VOA	3	No	1HCL, 2 no			VOC 8260C-SIM (VC) +
	500mL	HDPE	1	YES	HNO3			Dissolved Metals Na, K, Ca, Mg, FE, Mn +
	500 ML	HDPE	1	NO	HNO3			total Metals FE, Mn +
	Small	OJ	1	NO	NO			Anions Cl, NO3, NO2, SO4 +
	1L	OJ	1	NO	NO			Alk +
↓	500mL	HDPE	1	No	H2SO4			NH3 (Ammonia) +
	500mL	~~HDPE~~ OJ	1	NO	Zn acetate			Sulfide NO Headspace +

METHODS

Parameters measured with (instrument model & serial number): YSI yellow Cal @ 4/1/13
Purging Equipment: dedicated bladder pump & tubing Decon Equipment: Alconox + DI
Disposal of Discharged Water: Drum on site
Observations/Comments: Collected Field Dup: SPL-GW-MW60-040113 (time 1630)
Cleaned DO membrane
Recal DO @ 15:19 pre: 106.0 post 100.0
bubbles in line until .546 fixed tubing

South Park Landfill

April 2013 Interim Site-wide Groundwater Monitoring Results

Appendix B
Laboratory Analytical Results

Analytical Resources, Incorporated
Analytical Chemists and Consultants

April 17, 2013

Stephen.Bentsen
Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101-2341

RE: Project: South Park Landfill
ARI Job No: WJ94

Dear Stephen:

Please find enclosed analytical results and chain of custody documentation (COC) for the project referenced above. Analytical Resources, Incorporated (ARI) accepted four water samples and two trip blanks on April 1, 2013. The samples were in good condition with no discrepancies in paperwork.

The samples were analyzed for VOCs, SIM VOCs, Total and Dissolved Metals, Alkalinity, Nitrate, Nitrite, Chloride, Sulfate, Sulfide, as requested on the COC.

The total metals method blank contained manganese. All associated samples contained greater then ten times the concentration found in the method blank, therefore no further corrective action was taken.

No other analytical complications were noted for these analyses. Quality control results are included for your review.

A copy of the reports and all associated raw data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
kellyb@arilabs.com
206-695-6211

Enclosures

cc: eFile WJ94

KB/kb

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: WJ94 ~~WJ93~~	Turn-around Requested: Standard
ARI Client Company: Aspect Consulting	Phone: 206.780.7719
Client Contact: John Strunk	
Client Project Name: South Park Landfill	
Client Project #: 100116	Samplers: Seann McClure

Page: 1	of 1
Date: 4/1/13	Ice Present? Y
No. of Coolers: 2	Cooler Temps: 1.6, 0.3

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Analysis Requested

Sample ID	Date	Time	Matrix	No. Containers	VOC by 8260C Cis-1,2-dichloroethene Trichloroethylene *See Note	VOCs by 8260C SIM Vinyl Chloride	Dissolved Metals by 6010B Na, K, Ca, Mg, Fe Mn	Total Metals by 6010B Fe, Mn	Major Anions by 300 Chloride, Sulfate, Nitrate, Nitrite	Major Anions by SM 2320B Alkalinity, Carbonate, Bicarbonate	General Chem by SM 4500 Ammonia, Sulfide	Benzene (as part of 8260C)	Notes/Comments
SPL-GW-MW32-040113	4/1/13	1230	H2O	12	X	X	X	X	X	X	X		*For 8260C please provide report for only the analytes listed. However please rdo dilutions and archive chromatographs for the full suite of analytes so additional analytes may be analyzed later if requested.
SPL-GW-MW33-040113	4/1/13	1420	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW25-040113	↓	1600	↓	12	X	X	X	X	X	X	X	X	
SPL-GW-MW60-040113	↓	1630	↓	12	X	X	X	X	X	X	X	X	
Trip Blank	4/1/13		↓	2	X	X							
Trip Blank	4/1/13		↓	2	X	X							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	[signature]	[signature]		
	Printed Name: Seann McClure	Printed Name: Taylor Strate	Printed Name:	Printed Name:
	Company: Aspect Consulting	Company: ARI	Company:	Company:
	Date & Time: 4/1/13 17:20	Date & Time: 4-1-13 1720	Date & Time:	Date & Time:

***Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Aspect

Project Name: South Park Landfill

COC No(s): JM (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: ~~WJ93~~ WJ94

Tracking No: (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	11.6 6.3	
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID#:	9687952

Cooler Accepted by: TB Date: 4-1-13 Time: 1720

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) (Gel Packs) Baggies (Foam Block) Paper Other:		
Was sufficient ice used (if appropriate)?	NA	~~YES~~ JM	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	3/25/13	

Was Sample Split by ARI: (NA) YES Date/Time: Equipment: Split by:

Samples Logged by: JM Date: 4/2/13 Time: 928

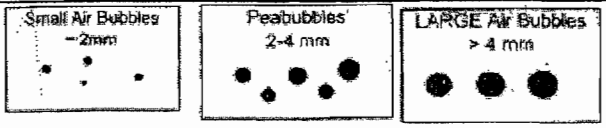
***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

Samples MW32 + MW33 in cooler with Trip Blank #1
Samples MW25 + MW60 in cooler with Trip Blank #2.

By: JM Date: 4/2/13



Small → "sm"	
Peabubbles → "pb"	
Large → "lg"	
Headspace → "hs"	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

JM
~~WJ915~~
WJ914

Cooler Temperature Compliance Form

Cooler#: C	Temperature(°C): 11.6 6.3	
Sample ID	**Bottle Count**	**Bottle Type**
Samples received above 1°C		

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Completed by: JS Date: 4-1-13 Time: 1725

WJ914 : 00004

Subject: FW: WJ94-South Park Landfill
From: "Jeremy M. Shaha" <jshaha@aspectconsulting.com>
Date: 4/2/2013 1:47 PM
To: Mark Harris <markh@arilabs.com>
CC: John Strunk <jstrunk@aspectconsulting.com>, Seann McClure <smcclure@aspectconsulting.com>

Hi Mark,

A slight modification to the COC for the South Park Landfill project. We would also like to report benzene for the trip blank (Trip Blank #2) in the cooler with SPL-GW-MW25-040113 and SPL-GW-MW60-040113. Please see the attached COC.

Let us know if you have questions.

Thanks,
Jeremy

Jeremy Shaha, LHG | Project Hydrogeologist | Direct: 206.780.7718 | Cell: 206.612.6420
Aspect Consulting LLC | 350 Madison Avenue N, Bainbridge Island, 98110 | www.aspectconsulting.com<http://www.aspectconsulting.com/>
Bainbridge Island - Seattle - Wenatchee - Yakima

-----Original Message-----
From: John Strunk
Sent: Tuesday, April 02, 2013 10:57 AM
To: Jeremy M. Shaha
Subject: FW: WJ94-South Park Landfill

Jeremy -

FYI....I contacted Seann regarding the temperature issue. Please check the COCs and make sure all analytes are accounted for.

Thanks -

John Strunk | Aspect Consulting, LLC |'Senior Associate | Direct: 206.780.7719

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: WJ94 ~~WJ93~~ | Turn-around Requested: Standard | Page: 1 of 1

ARI Client Company: Aspect Consulting | Phone: 206.780.7719 | Date: 4/1/13 | Ice Present? Y

Client Contact: John Strunk | No. of Coolers: 2 | Cooler Temps: 1.4, 6.3

Client Project Name: South Park Landfill

Client Project #: 100116 | Samplers: Seann McClure

Sample ID	Date	Time	Matrix	No. Containers	VOC by 8260C Cis-1,2-dichloroethene Trichloroethylene *See Note	VOCs by 8260C SIM Vinyl Chloride	Dissolved Metals by 6010B Na, K, Ca, Mg, Fe Mn	Total Metals by 6010B Fe, Mn	Major Anions by 300 Chloride, Sulfate, Nitrate, Nitrite	Major Anions by SM 2320B Alkalinity, Carbonate, Bicarbonate	General Chem by SM 4500 Ammonia, Sulfide	Benzene (as part of 8260C)	Notes/Comments
SPL-GW-MW32-040113	4/1/13	1230	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW33-040113	4/1/13	1420	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW25-040113	↓	1600	↓	12	X	X	X	X	X	X	X	X	
SPL-GW-MW60-040113	↓	1630	↓	12	X	X	X	X	X	X	X	X	
Trip Blank #1	4/1/13		↓	2	X	X							Cooler w/ MW32 and MW33
Trip Blank #2	4/1/13		↓	2	X	X						X	Cooler w/ MW25 and MW60
SMS 4/2/13													SMS 4/12/13

*For 8260C please provide report for only the analytes listed. However please do dilutions and archive chromatograph for the full suite of analytes so additional analytes may be analyzed later if requested.

Comments/Special Instructions:

	Relinquished by	Received by	Relinquished by	Received by
(Signature)	[signature]	[signature]		
Printed Name	Seann McClure	Taylor Strout		
Company	Aspect Consulting	ARI		
Date & Time	4/1/13 17:20	4-1-13 1720		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 04/02/13

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **WJ94**

PC: Mark
VTSR: 04/01/13

Inquiry Number: NONE
Analysis Requested: 04/02/13
Contact: Strunk, John
Client: Aspect Consulting
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #: 100116
Project: South Park Landfill
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-6927 **WJ94A**	SPL-GW-MW32-040113			P			TOT P						F					S=	>12		2ml NaOH 6N	4-2-13
13-6928 **WJ94B**	SPL-GW-MW33-040113			P			TOT P						F									
13-6929 **WJ94C**	SPL-GW-MW25-040113			P			TOT P						F									
13-6930 **WJ94D**	SPL-GW-MW60-040113			P			TOT P						F									
13-6933 **WJ94G**	SPL-GW-MW32-040113						DIS P									Y						
13-6934 **WJ94H**	SPL-GW-MW33-040113						DIS P									Y						
13-6935 **WJ94I**	SPL-GW-MW25-040113						DIS P									Y						
13-6936 **WJ94J**	SPL-GW-MW60-040113						DIS P									Y						

S2 only preserved with ZnOAc

Checked By JM Date 4/2/13

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: WJ94
Client: Aspect Consulting
Project Event: 100116
Project Name: South Park Landfill

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	SPL-GW-MW32-040113	WJ94A	13-6927	Water	04/01/13 12:30	04/01/13 17:20
2.	SPL-GW-MW33-040113	WJ94B	13-6928	Water	04/01/13 14:20	04/01/13 17:20
3.	SPL-GW-MW25-040113	WJ94C	13-6929	Water	04/01/13 16:00	04/01/13 17:20
4.	SPL-GW-MW60-040113	WJ94D	13-6930	Water	04/01/13 16:30	04/01/13 17:20
5.	Trip Blank 1	WJ94E	13-6931	Water	04/01/13	04/01/13 17:20
6.	Trip Blank 2	WJ94F	13-6932	Water	04/01/13	04/01/13 17:20
7.	SPL-GW-MW32-040113	WJ94G	13-6933	Water	04/01/13 12:30	04/01/13 17:20
8.	SPL-GW-MW33-040113	WJ94H	13-6934	Water	04/01/13 14:20	04/01/13 17:20
9.	SPL-GW-MW25-040113	WJ94I	13-6935	Water	04/01/13 16:00	04/01/13 17:20
10.	SPL-GW-MW60-040113	WJ94J	13-6936	Water	04/01/13 16:30	04/01/13 17:20

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW32-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94A
LIMS ID: 13-6927
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/06/13 03:25

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**1.5**	
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	98.0%
Bromofluorobenzene	98.0%
d4-1,2-Dichlorobenzene	104%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW33-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94B
LIMS ID: 13-6928
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/06/13 03:51

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.2%
d8-Toluene	99.5%
Bromofluorobenzene	95.0%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW25-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94C
LIMS ID: 13-6929
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/06/13 04:18

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**0.72**	
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	**Benzene**	**0.20**	**0.43**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	101%
Bromofluorobenzene	98.0%
d4-1,2-Dichlorobenzene	109%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW60-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94D
LIMS ID: 13-6930
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/06/13 04:45

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**0.80**	
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	**Benzene**	**0.20**	**0.40**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.3%
d8-Toluene	98.5%
Bromofluorobenzene	95.4%
d4-1,2-Dichlorobenzene	106%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: Trip Blank 1**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94E
LIMS ID: 13-6931
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/08/13 20:41

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	99.7%
Bromofluorobenzene	93.6%
d4-1,2-Dichlorobenzene	109%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: Trip Blank 2**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94F
LIMS ID: 13-6932
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/06/13 02:58

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	96.8%
Bromofluorobenzene	97.5%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-040513A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040513A
LIMS ID: 13-6929
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/05/13 22:58

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	96.5%
d8-Toluene	96.2%
Bromofluorobenzene	93.0%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-040813A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040813A
LIMS ID: 13-6931
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT2/JZ
Date Analyzed: 04/08/13 17:35

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

	CAS Number	Analyte	LOQ	Result	Q
	156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
	79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	101%
d8-Toluene	97.7%
Bromofluorobenzene	95.2%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
WJ94A	SPL-GW-MW32-040113	10	104%	98.0%	98.0%	104%	0
WJ94B	SPL-GW-MW33-040113	10	99.2%	99.5%	95.0%	101%	0
MB-040513A	Method Blank	10	96.5%	96.2%	93.0%	103%	0
LCS-040513A	Lab Control	10	95.2%	97.3%	97.9%	102%	0
LCSD-040513A	Lab Control Dup	10	93.3%	96.5%	102%	100%	0
WJ94C	SPL-GW-MW25-040113	10	102%	101%	98.0%	109%	0
WJ94D	SPL-GW-MW60-040113	10	99.3%	98.5%	95.4%	106%	0
MB-040813A	Method Blank	10	101%	97.7%	95.2%	103%	0
LCS-040813A	Lab Control	10	103%	98.6%	104%	103%	0
LCSD-040813A	Lab Control Dup	10	104%	100%	101%	99.9%	0
WJ94E	Trip Blank 1	10	103%	99.7%	93.6%	109%	0
WJ94F	Trip Blank 2	10	102%	96.8%	97.5%	101%	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-130)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 13-6927 to 13-6932

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-040513A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040513A
LIMS ID: 13-6929
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT2/JZ
LCSD: NT2/JZ
Date Analyzed LCS: 04/05/13 21:37
LCSD: 04/05/13 22:31

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
cis-1,2-Dichloroethene	9.72	10.0	97.2%	9.67	10.0	96.7%	0.5%
Trichloroethene	9.18	10.0	91.8%	9.18	10.0	91.8%	0.0%
Benzene	9.53	10.0	95.3%	9.55	10.0	95.5%	0.2%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	95.2%	93.3%
d8-Toluene	97.3%	96.5%
Bromofluorobenzene	97.9%	102%
d4-1,2-Dichlorobenzene	102%	100%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-040813A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040813A
LIMS ID: 13-6931
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT2/JZ
LCSD: NT2/JZ
Date Analyzed LCS: 04/08/13 13:48
LCSD: 04/08/13 14:33

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
cis-1,2-Dichloroethene	9.63	10.0	96.3%	9.54	10.0	95.4%	0.9%
Trichloroethene	9.36	10.0	93.6%	9.56	10.0	95.6%	2.1%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	103%	104%
d8-Toluene	98.6%	100%
Bromofluorobenzene	104%	101%
d4-1,2-Dichlorobenzene	103%	99.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW32-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94A
LIMS ID: 13-6927
Matrix: Water
Data Release Authorized: MW
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT7/LH
Date Analyzed: 04/03/13 18:30

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**0.28**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	119%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW33-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94B
LIMS ID: 13-6928
Matrix: Water
Data Release Authorized: MW
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT7/LH
Date Analyzed: 04/03/13 18:58

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**1.1**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	119%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW25-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94C
LIMS ID: 13-6929
Matrix: Water
Data Release Authorized: MW
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT7/LH
Date Analyzed: 04/03/13 19:25

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**1.4**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	121%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW60-040113**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94D
LIMS ID: 13-6930
Matrix: Water
Data Release Authorized:
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT7/LH
Date Analyzed: 04/03/13 19:53

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**1.4**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	118%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: Trip Blank 1**
 SAMPLE

Lab Sample ID: WJ94E
LIMS ID: 13-6931
Matrix: Water
Data Release Authorized:
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT7/LH
Date Analyzed: 04/03/13 12:49

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	120%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: Trip Blank 2**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WJ94F
LIMS ID: 13-6932
Matrix: Water
Data Release Authorized:
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Instrument/Analyst: NT7/LH
Date Analyzed: 04/03/13 13:18

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	126%

ANALYTICAL RESOURCES INCORPORATED

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116

Client ID	DCE	TOT OUT
MB-040313	114%	0
LCS-040313	112%	0
LCSD-040313	113%	0
SPL-GW-MW32-040113	119%	0
SPL-GW-MW33-040113	119%	0
SPL-GW-MW25-040113	121%	0
SPL-GW-MW60-040113	118%	0
Trip Blank 1	120%	0
Trip Blank 2	126%	0

	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(78-126)	(80-129)

Prep Method: SW5030
Log Number Range: 13-6927 to 13-6932

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-040313
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040313
LIMS ID: 13-6927
Matrix: Water
Data Release Authorized:
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT7/LH
LCSD: NT7/LH
Date Analyzed LCS: 04/03/13 09:58
LCSD: 04/03/13 10:25

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	0.979	1.00	97.9%	0.931	1.00	93.1%	5.0%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	112%	113%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: MB-040313**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040313
LIMS ID: 13-6927
Matrix: Water
Data Release Authorized:
Reported: 04/04/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT7/LH
Date Analyzed: 04/03/13 10:53

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	114%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW32-040113
SAMPLE

Lab Sample ID: WJ94A
LIMS ID: 13-6927
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**22.9**	
3010A	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**2.20**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW33-040113
SAMPLE

Lab Sample ID: WJ94B
LIMS ID: 13-6928
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**18.4**	
3010A	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**1.83**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW25-040113
SAMPLE

Lab Sample ID: WJ94C
LIMS ID: 13-6929
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**7.25**	
3010A	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**0.536**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW60-040113
SAMPLE

Lab Sample ID: WJ94D
LIMS ID: 13-6930
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**7.28**	
3010A	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**0.530**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW32-040113
MATRIX SPIKE

Lab Sample ID: WJ94A
LIMS ID: 13-6927
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Iron	6010C	22.9	25.1	2.00	110%	H
Manganese	6010C	2.20	2.72	0.500	104%	H

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW32-040113
DUPLICATE

Lab Sample ID: WJ94A
LIMS ID: 13-6927
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Iron	6010C	22.9	23.5	2.6%	+/- 20%	
Manganese	6010C	2.20	2.26	2.7%	+/- 20%	

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: WJ94LCS
LIMS ID: 13-6928
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Iron	6010C	2.08	2.00	104%	
Manganese	6010C	0.506	0.500	101%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: WJ94MB
LIMS ID: 13-6928
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/03/13	6010C	04/05/13	7439-89-6	Iron	0.05	0.05	U
3010A	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**0.001**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW32-040113
SAMPLE

Lab Sample ID: WJ94G
LIMS ID: 13-6933
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/03/13	6010C	04/05/13	**7440-70-2**	**Calcium**	0.05	**68.3**	
6010C	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**23.8**	
6010C	04/03/13	6010C	04/05/13	**7439-95-4**	**Magnesium**	0.05	**44.1**	
6010C	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**2.31**	
6010C	04/03/13	6010C	04/05/13	**7440-09-7**	**Potassium**	0.5	**14.9**	
6010C	04/03/13	6010C	04/05/13	**7440-23-5**	**Sodium**	0.5	**162**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW33-040113
SAMPLE

Lab Sample ID: WJ94H
LIMS ID: 13-6934
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/03/13	6010C	04/05/13	**7440-70-2**	**Calcium**	0.05	**37.1**	
6010C	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**18.4**	
6010C	04/03/13	6010C	04/05/13	**7439-95-4**	**Magnesium**	0.05	**22.1**	
6010C	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**1.84**	
6010C	04/03/13	6010C	04/05/13	**7440-09-7**	**Potassium**	0.5	**9.6**	
6010C	04/03/13	6010C	04/05/13	**7440-23-5**	**Sodium**	0.5	**265**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW25-040113
SAMPLE

Lab Sample ID: WJ94I
LIMS ID: 13-6935
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/03/13	6010C	04/05/13	**7440-70-2**	**Calcium**	0.05	**19.5**	
6010C	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**6.70**	
6010C	04/03/13	6010C	04/05/13	**7439-95-4**	**Magnesium**	0.05	**5.20**	
6010C	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**0.525**	
6010C	04/03/13	6010C	04/05/13	**7440-09-7**	**Potassium**	0.5	**2.8**	
6010C	04/03/13	6010C	04/05/13	**7440-23-5**	**Sodium**	0.5	**33.8**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW60-040113
SAMPLE

Lab Sample ID: WJ94J
LIMS ID: 13-6936
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/03/13	6010C	04/05/13	**7440-70-2**	**Calcium**	0.05	**19.7**	
6010C	04/03/13	6010C	04/05/13	**7439-89-6**	**Iron**	0.05	**6.68**	
6010C	04/03/13	6010C	04/05/13	**7439-95-4**	**Magnesium**	0.05	**5.23**	
6010C	04/03/13	6010C	04/05/13	**7439-96-5**	**Manganese**	0.001	**0.528**	
6010C	04/03/13	6010C	04/05/13	**7440-09-7**	**Potassium**	0.5	**2.8**	
6010C	04/03/13	6010C	04/05/13	**7440-23-5**	**Sodium**	0.5	**33.7**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW32-040113
MATRIX SPIKE

Lab Sample ID: WJ94G
LIMS ID: 13-6933
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Calcium	6010C	68.3	75.4	10.0	71.0%	H
Iron	6010C	23.8	24.6	2.00	40.0%	H
Magnesium	6010C	44.1	52.1	10.0	80.0%	H
Manganese	6010C	2.31	2.70	0.500	78.0%	H
Potassium	6010C	14.9	24.6	10.0	97.0%	
Sodium	6010C	162	170	10.0	80.0%	H

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW32-040113
DUPLICATE

Lab Sample ID: WJ94G
LIMS ID: 13-6933
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/01/13
Date Received: 04/01/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Calcium	6010C	68.3	66.2	3.1%	+/- 20%	
Iron	6010C	23.8	23.2	2.6%	+/- 20%	
Magnesium	6010C	44.1	42.8	3.0%	+/- 20%	
Manganese	6010C	2.31	2.24	3.1%	+/- 20%	
Potassium	6010C	14.9	14.6	2.0%	+/- 20%	
Sodium	6010C	162	158	2.5%	+/- 20%	

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: WJ94LCS
LIMS ID: 13-6934
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Calcium	6010C	10.1	10.0	101%	
Iron	6010C	2.06	2.00	103%	
Magnesium	6010C	10.5	10.0	105%	
Manganese	6010C	0.497	0.500	99.4%	
Potassium	6010C	10.2	10.0	102%	
Sodium	6010C	10.4	10.0	104%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: WJ94MB
LIMS ID: 13-6934
Matrix: Water
Data Release Authorized:
Reported: 04/08/13

QC Report No: WJ94-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/03/13	6010C	04/05/13	7440-70-2	Calcium	0.05	0.05	U
6010C	04/03/13	6010C	04/05/13	7439-89-6	Iron	0.05	0.05	U
6010C	04/03/13	6010C	04/05/13	7439-95-4	Magnesium	0.05	0.05	U
6010C	04/03/13	6010C	04/05/13	7439-96-5	Manganese	0.001	0.001	U
6010C	04/03/13	6010C	04/05/13	7440-09-7	Potassium	0.5	0.5	U
6010C	04/03/13	6010C	04/05/13	7440-23-5	Sodium	0.5	0.5	U

U-Analyte undetected at given RL
RL-Reporting Limit

SAMPLE RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Client ID: SPL-GW-MW32-040113
ARI ID: 13-6927 WJ94A

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	672
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	672
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/02/13 040213#1	EPA 300.0	mg/L	1.0	33.8
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/04/13 040413#1	EPA 350.1M	mg-N/L	0.100	9.35
Sulfate	04/02/13 040213#1	EPA 300.0	mg/L	0.5	12.8
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Client ID: SPL-GW-MW33-040113
ARI ID: 13-6928 WJ94B

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	661
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	661
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/02/13 040213#1	EPA 300.0	mg/L	2.0	88.6
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/04/13 040413#1	EPA 350.1M	mg-N/L	0.200	14.7
Sulfate	04/02/13 040213#1	EPA 300.0	mg/L	0.1	1.4
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Client ID: SPL-GW-MW25-040113
ARI ID: 13-6929 WJ94C

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	134
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	134
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/02/13 040213#1	EPA 300.0	mg/L	0.2	6.1
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/04/13 040413#1	EPA 350.1M	mg-N/L	0.050	2.11
Sulfate	04/02/13 040213#1	EPA 300.0	mg/L	0.1	4.0
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Client ID: SPL-GW-MW60-040113
ARI ID: 13-6930 WJ94D

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	136
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	136
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/02/13 040213#1	EPA 300.0	mg/L	0.2	6.2
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/04/13 040413#1	EPA 350.1M	mg-N/L	0.050	2.10
Sulfate	04/02/13 040213#1	EPA 300.0	mg/L	0.1	4.5
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: WJ94A Client ID: SPL-GW-MW32-040113							
Chloride	EPA 300.0	04/02/13	mg/L	33.8	50.9	20.0	85.5%
N-Nitrate	EPA 300.0	04/02/13	mg-N/L	< 0.1	1.9	2.0	95.0%
N-Nitrite	EPA 300.0	04/02/13	mg-N/L	< 0.1	1.9	2.0	95.0%
N-Ammonia	EPA 350.1M	04/04/13	mg-N/L	9.35	19.5	10.0	101.5%
Sulfate	EPA 300.0	04/02/13	mg/L	12.8	22.6	10.0	98.0%
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050	7.09	8.35	84.9%

REPLICATE RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/01/13
Date Received: 04/01/13

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: WJ94A Client ID: SPL-GW-MW32-040113						
Alkalinity	SM 2320	04/08/13	mg/L CaCO3	672	657	2.3%
Carbonate	SM 2320	04/08/13	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	04/08/13	mg/L CaCO3	672	657	2.3%
Hydroxide	SM 2320	04/08/13	mg/L CaCO3	< 1.0	< 1.0	NA
Chloride	EPA 300.0	04/02/13	mg/L	33.8	33.5	0.9%
N-Nitrate	EPA 300.0	04/02/13	mg-N/L	< 0.1	< 0.1	NA
N-Nitrite	EPA 300.0	04/02/13	mg-N/L	< 0.1	< 0.1	NA
N-Ammonia	EPA 350.1M	04/04/13	mg-N/L	9.35	9.31	0.4%
Sulfate	EPA 300.0	04/02/13	mg/L	12.8	12.7	0.8%
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050	< 0.050	NA

LAB CONTROL RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide	ICVL	04/08/13	mg/L	0.499	0.501	99.6%
EPA 376.2	PREP	04/08/13		7.70	8.35	92.2%

METHOD BLANK RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Chloride	EPA 300.0	04/02/13	mg/L	< 0.1 U	
N-Nitrate	EPA 300.0	04/02/13	mg-N/L	< 0.1 U	
N-Nitrite	EPA 300.0	04/02/13	mg-N/L	< 0.1 U	
N-Ammonia	EPA 350.1M	04/04/13	mg-N/L	< 0.010 U	FB
Sulfate	EPA 300.0	04/02/13	mg/L	< 0.1 U	
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050 U	
		04/08/13		< 0.050 U	

FB Filtration Blank

STANDARD REFERENCE RESULTS-CONVENTIONALS
WJ94-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity ERA #P114506	SM 2320	04/08/13	mg/L CaCO3	45.5	41.9	108.6%
Chloride ERA 210312	EPA 300.0	04/02/13	mg/L	3.0	3.0	100.0%
N-Nitrate EAR 230511	EPA 300.0	04/02/13	mg-N/L	3.0	3.0	100.0%
N-Nitrite ERA 490412	EPA 300.0	04/02/13	mg-N/L	3.0	3.0	100.0%
N-Ammonia ERA #15125	EPA 350.1M	04/04/13	mg-N/L	0.498	0.500	99.6%
Sulfate ERA 240312	EPA 300.0	04/02/13	mg/L	3.1	3.0	103.3%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

April 17, 2013

Stephen.Bentsen
Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101-2341

RE: Project: South Park Landfill
ARI Job No: WK09

Dear Stephen:

Please find enclosed analytical results and chain of custody documentation (COC) for the project referenced above. Analytical Resources, Incorporated (ARI) accepted eight water samples and two trip blanks on April 2, 2013. The samples were in good condition with no discrepancies in paperwork.

The samples were analyzed for VOCs, SIM VOCs, Total and Dissolved Metals, Alkalinity, Nitrate, Nitrite, Chloride, Sulfate, Sulfide, as requested on the COC.

No analytical complications were noted for these analyses. Quality control results are included for your review.

A copy of the reports and all associated raw data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
kellyb@arilabs.com
206-695-6211

Enclosures

cc: eFile WK09

KB/kb

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: WK09	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Aspect Consulting	Phone: 206.780.7719	Date: 4/2/13	Ice Present? Y
Client Contact: John Strunk		No. of Coolers: 2	Cooler Temps: 3.6, 1.6
Client Project Name: South Park Landfill			
Client Project #: 100116	Samplers: Seann McClure, Chris Marciniec		

Analysis Requested

Sample ID	Date	Time	Matrix	No. Containers	VOC by 8260C Cis-1,2 - dichloroethene Trichloroethylene *See Note	VOCs by 8260C SIM Vinyl Chloride	Dissolved Metals by 6010B Na, K, Ca, Mg, Fe Mn	Total Metals by 6010B Fe, Mn	Major Anions by 300 Chloride, Sulfate, Nitrate, Nitrite	Major Anions by SM 2320B Alkalinity, Carbonate, Bicarbonate	General Chem by SM 4500 Ammonia, Sulfide	~~Benzene (as part of 8260C)~~	Notes/Comments
SPL-GW-MW80-040213	4/2/13	1130	H2O	6	X	X							*For 8260C please provide report for only the analytes listed. However please rdo dilutions and archive chromatographs for the full suite of analytes so additional analytes may be analyzed later if requested.
SPL-GW-MW30-040213	↓	1015	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW31-040213		1110	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW29-040213		1235	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW26-040213		1350	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW08-040213		1445	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW27-040213		1550	H2O	12	X	X	X	X	X	X	X		
SPL-GW-MW10-040213		1640	H2O	12	X	X	X	X	X	X	X		
Trip Blank			H2O	2	X	X							
Trip Blank	↓		H2O	2	X	X							

Comments/Special Instructions	Relinquished by	Received by	Relinquished by	Received by
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Seann McClure	Printed Name: A. Valgardson	Printed Name:	Printed Name:
	Company: Aspect	Company: ARI	Company:	Company:
	Date & Time: 4/2/13 5:20pm	Date & Time: 4/2/13 1720	Date & Time:	Date & Time:

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: WK09
Client: Aspect Consulting
Project Event: 100116
Project Name: South Park Landfill

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	SPL-GW-MW30-040213	WK09A	13-7009	Water	04/02/13 10:15	04/02/13 17:20
2.	SPL-GW-MW31-040213	WK09B	13-7010	Water	04/02/13 11:10	04/02/13 17:20
3.	SPL-GW-MW24-040213	WK09C	13-7011	Water	04/02/13 12:35	04/02/13 17:20
4.	SPL-GW-MW26-040213	WK09D	13-7012	Water	04/02/13 13:50	04/02/13 17:20
5.	SPL-GW-MW08-040213	WK09E	13-7013	Water	04/02/13 14:45	04/02/13 17:20
6.	SPL-GW-MW27-040213	WK09F	13-7014	Water	04/02/13 15:50	04/02/13 17:20
7.	SPL-GW-MW10-040213	WK09G	13-7015	Water	04/02/13 16:40	04/02/13 17:20
8.	SPL-GW-MW80-040213	WK09H	13-7016	Water	04/02/13 11:30	04/02/13 17:20
9.	Trip Blanks (1)	WK09I	13-7017	Water	04/02/13	04/02/13 17:20
10.	Trip Blanks (2)	WK09J	13-7018	Water	04/02/13	04/02/13 17:20
11.	SPL-GW-MW30-040213	WK09K	13-7019	Water	04/02/13 10:15	04/02/13 17:20
12.	SPL-GW-MW31-040213	WK09L	13-7020	Water	04/02/13 11:10	04/02/13 17:20
13.	SPL-GW-MW24-040213	WK09M	13-7021	Water	04/02/13 12:35	04/02/13 17:20
14.	SPL-GW-MW26-040213	WK09N	13-7022	Water	04/02/13 13:50	04/02/13 17:20
15.	SPL-GW-MW08-040213	WK09O	13-7023	Water	04/02/13 14:45	04/02/13 17:20
16.	SPL-GW-MW27-040213	WK09P	13-7024	Water	04/02/13 15:50	04/02/13 17:20
17.	SPL-GW-MW10-040213	WK09Q	13-7025	Water	04/02/13 16:40	04/02/13 17:20

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Aspect Project Name: SouthPark Landfill

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: WK09 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	3.6 1.6 ___ ___ ___ ___	
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID#:	90877752

Cooler Accepted by: AV Date: 4/2/13 Time: 1720

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ...	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	YES	(NO)
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	3/25/13(1)	3/21/13(2)

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: AV Date: 4/3/13 Time: 1031

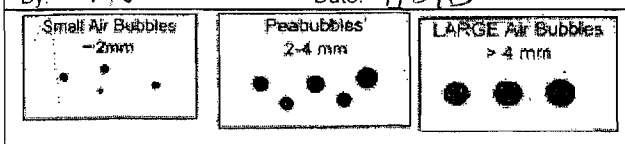
***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

TB(1) w/ MW30, MW31, MW34 MW31 = IPB
TB(2) w/ The Rest of Samples

By: AV Date: 4/3/13



Small → "sm"	
Peabubbles → "pb"	
Large → "lg"	
Headspace → "hs"	

PRESERVATION VERIFICATION 04/03/13
Page 1 of 2

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **WK09**

PC: ~~Mark~~ Kelly
VTSR: 04/02/13

Inquiry Number: NONE
Analysis Requested: 04/03/13
Contact: Strunk, John
Client: Aspect Consulting
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #: 100116
Project: South Park Landfill
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-7009 **WK09A**	SPL-GW-MW30-040213			P			TOT P						F[A]					2-	>12	2-ml NaOH 6N		4-3-13
13-7010 **WK09B**	SPL-GW-MW31-040213			P			TOT P						F									
13-7011 **WK09C**	SPL-GW-MW24-040213			P			TOT P						F									
13-7012 **WK09D**	SPL-GW-MW26-040213			P			TOT P						F									
13-7013 **WK09E**	SPL-GW-MW08-040213			P			TOT P						F									
13-7014 **WK09F**	SPL-GW-MW27-040213			P			TOT P						F									
13-7015 **WK09G**	SPL-GW-MW10-040213			P			TOT P						F									
13-7019 **WK09K**	SPL-GW-MW30-040213						DIS P									Y						
13-7020 **WK09L**	SPL-GW-MW31-040213						DIS P									Y						
13-7021 **WK09M**	SPL-GW-MW24-040213						DIS P									Y						
13-7022 **WK09N**	SPL-GW-MW26-040213						DIS P									Y						
13-7023 **WK09O**	SPL-GW-MW08-040213						DIS P									Y						
13-7024 **WK09P**	SPL-GW-MW27-040213						DIS P									Y						
13-7025 **WK09Q**	SPL-GW-MW10-040213						DIS P									Y						

S2 only preserved with ZnOAc, lab to adjust Ph.

P=Pass F=Fail

Checked By AV Date 4/3/13

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: SPL-GW-MW30-040213
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09A
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 16:36

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**0.12**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	119%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: SPL-GW-MW31-040213
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09B
LIMS ID: 13-7010
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 17:04

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**4.7**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	127%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW24-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09C
LIMS ID: 13-7011
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 17:31

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**0.032**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	122%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW26-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09D
LIMS ID: 13-7012
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 17:59

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	121%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volåtiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: SPL-GW-MW08-040213
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09E
LIMS ID: 13-7013
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 18:26

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**0.063**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	120%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW27-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09F
LIMS ID: 13-7014
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 18:54

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**0.25**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	123%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW10-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09G
LIMS ID: 13-7015
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 19:22

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**1.2**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	119%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW80-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09H
LIMS ID: 13-7016
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 19:49

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	120%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: Trip Blanks (1)
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09I
LIMS ID: 13-7017
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 11:04

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	115%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: Trip Blanks (2)
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09J
LIMS ID: 13-7018
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 11:32

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	118%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: MB-040413**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040413
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/04/13 10:25

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	118%

ANALYTICAL RESOURCES INCORPORATED

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116

Client ID	DCE	TOT OUT
MB-040413	118%	0
LCS-040413	113%	0
LCSD-040413	115%	0
SPL-GW-MW30-040213	119%	0
SPL-GW-MW31-040213	127%	0
SPL-GW-MW24-040213	122%	0
SPL-GW-MW26-040213	121%	0
SPL-GW-MW08-040213	120%	0
SPL-GW-MW27-040213	123%	0
SPL-GW-MW10-040213	119%	0
SPL-GW-MW80-040213	120%	0
Trip Blanks (1)	115%	0
Trip Blanks (2)	118%	0

	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(78-126)	(80-129)

Prep Method: SW5030
Log Number Range: 13-7009 to 13-7018

FORM-II SW8260-SIM

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-040413
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-040413
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized:
Reported: 04/11/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT7/PAB
LCSD: NT7/PAB
Date Analyzed LCS: 04/04/13 09:29
LCSD: 04/04/13 09:57

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	0.962	1.00	96.2%	1.00	1.00	100%	3.9%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	113%	115%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW30-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09A
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 15:14

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**0.64**	
79-01-6	**Trichloroethene**	**0.20**	**0.60**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	101%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW31-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09B
LIMS ID: 13-7010
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 15:41

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**5.2**	
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	101%
Bromofluorobenzene	99.2%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW24-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09C
LIMS ID: 13-7011
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 16:07

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	101%
Bromofluorobenzene	104%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW26-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09D
LIMS ID: 13-7012
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 16:34

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**0.33**	
79-01-6	**Trichloroethene**	**0.20**	**0.31**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	99.3%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	104%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW08-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09E
LIMS ID: 13-7013
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 17:01

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	99.0%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW27-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09F
LIMS ID: 13-7014
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 17:28

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**0.40**	
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	98.9%
d8-Toluene	102%
Bromofluorobenzene	96.6%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW10-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09G
LIMS ID: 13-7015
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 17:54

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**1.8**	
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	99.1%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	100%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW80-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09H
LIMS ID: 13-7016
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 18:21

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	102%
Bromofluorobenzene	99.0%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: Trip Blanks (1)**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09I
LIMS ID: 13-7017
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 18:48

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	104%
Bromofluorobenzene	99.6%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: Trip Blanks (2)**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09J
LIMS ID: 13-7018
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 19:15

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	99.5%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	104%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-040513A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040513A
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 11:33

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	93.8%
d8-Toluene	100%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-040513A	Method Blank	10	93.8%	100%	102%	101%	0
LCS-040513A	Lab Control	10	92.0%	99.9%	103%	100%	0
LCSD-040513A	Lab Control Dup	10	90.5%	102%	104%	97.5%	0
WK09A	SPL-GW-MW30-040213	10	102%	101%	101%	102%	0
WK09B	SPL-GW-MW31-040213	10	104%	101%	99.2%	103%	0
WK09C	SPL-GW-MW24-040213	10	100%	101%	104%	101%	0
WK09D	SPL-GW-MW26-040213	10	104%	99.3%	101%	104%	0
WK09E	SPL-GW-MW08-040213	10	104%	99.0%	101%	103%	0
WK09F	SPL-GW-MW27-040213	10	98.9%	102%	96.6%	101%	0
WK09G	SPL-GW-MW10-040213	10	103%	99.1%	101%	100%	0
WK09H	SPL-GW-MW80-040213	10	103%	102%	99.0%	103%	0
WK09I	Trip Blanks (1)	10	100%	104%	99.6%	103%	0
WK09J	Trip Blanks (2)	10	102%	99.5%	102%	104%	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-130)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 13-7009 to 13-7018

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-040513A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040513A
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/PAB
LCSD: NT3/PAB
Date Analyzed LCS: 04/05/13 10:41
LCSD: 04/05/13 11:07

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
cis-1,2-Dichloroethene	9.19	10.0	91.9%	8.72	10.0	87.2%	5.2%
Trichloroethene	9.34	10.0	93.4%	9.74	10.0	97.4%	4.2%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	92.0%	90.5%
d8-Toluene	99.9%	102%
Bromofluorobenzene	103%	104%
d4-1,2-Dichlorobenzene	100%	97.5%

SAMPLE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Client ID: SPL-GW-MW30-040213
ARI ID: 13-7009 WK09A

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	171
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	171
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/03/13 040313#1	EPA 300.0	mg/L	1.0	37.3
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.010	0.299
Sulfate	04/03/13 040313#1	EPA 300.0	mg/L	0.5	19.4
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Client ID: SPL-GW-MW31-040213
ARI ID: 13-7010 WK09B

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	171
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	171
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/03/13 040313#1	EPA 300.0	mg/L	0.5	12.5
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.050	2.19
Sulfate	04/02/13 040213#1	EPA 300.0	mg/L	0.1	0.1
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Client ID: SPL-GW-MW24-040213
ARI ID: 13-7011 WK09C

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	420
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	420
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/03/13 040313#1	EPA 300.0	mg/L	1.0	33.2
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.050	3.52
Sulfate	04/02/13 040213#1	EPA 300.0	mg/L	0.1	0.3
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Client ID: SPL-GW-MW26-040213
ARI ID: 13-7012 WK09D

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	33.7
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	33.7
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/03/13 040313#1	EPA 300.0	mg/L	0.5	11.1
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.010	0.180
Sulfate	04/03/13 040313#1	EPA 300.0	mg/L	0.5	12.1
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Client ID: SPL-GW-MW08-040213
ARI ID: 13-7013 WK09E

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	375
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	375
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/03/13 040313#1	EPA 300.0	mg/L	5.0	189
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.050	2.96
Sulfate	04/02/13 040213#1	EPA 300.0	mg/L	0.1	3.8
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Client ID: SPL-GW-MW27-040213
ARI ID: 13-7014 WK09F

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	104
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	104
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/03/13 040313#1	EPA 300.0	mg/L	0.5	11.8
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.020	1.59
Sulfate	04/03/13 040313#1	EPA 300.0	mg/L	0.2	6.2
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Client ID: SPL-GW-MW10-040213
ARI ID: 13-7015 WK09G

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/08/13 040813#1	SM 2320	mg/L CaCO3	1.0	276
Carbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/08/13	SM 2320	mg/L CaCO3	1.0	276
Hydroxide	04/08/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/03/13 040313#1	EPA 300.0	mg/L	0.5	15.8
N-Nitrate	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/02/13 040213#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.050	3.74
Sulfate	04/03/13 040313#1	EPA 300.0	mg/L	2.0	56.3
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Chloride	EPA 300.0	04/03/13	mg/L	< 0.1 U	
N-Nitrate	EPA 300.0	04/02/13	mg-N/L	< 0.1 U	
N-Nitrite	EPA 300.0	04/02/13	mg-N/L	< 0.1 U	
N-Ammonia	EPA 350.1M	04/05/13	mg-N/L	< 0.010 U	FB
Sulfate	EPA 300.0	04/02/13	mg/L	< 0.1 U	
		04/03/13		< 0.1 U	
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050 U	
		04/08/13		< 0.050 U	

FB Filtration Blank

LAB CONTROL RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide	ICVL	04/08/13	mg/L	0.499	0.501	99.6%
EPA 376.2	PREP	04/08/13		7.70	8.35	92.2%

STANDARD REFERENCE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity	SM 2320	04/08/13	mg/L CaCO3	40.7	41.9	97.1%
ERA #P114506		04/08/13		45.5	41.9	108.6%
Chloride	EPA 300.0	04/03/13	mg/L	3.0	3.0	100.0%
ERA 210312						
N-Nitrate	EPA 300.0	04/02/13	mg-N/L	3.0	3.0	100.0%
EAR 230511						
N-Nitrite	EPA 300.0	04/02/13	mg-N/L	3.0	3.0	100.0%
ERA 490412						
N-Ammonia	EPA 350.1M	04/05/13	mg-N/L	0.506	0.500	101.2%
ERA #15125						
Sulfate	EPA 300.0	04/02/13	mg/L	3.1	3.0	103.3%
ERA 240312		04/03/13		3.1	3.0	103.3%

REPLICATE RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: WK09A Client ID: SPL-GW-MW30-040213						
N-Ammonia	EPA 350.1M	04/05/13	mg-N/L	0.299	0.319	6.5%
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050	< 0.050	NA
ARI ID: WK09D Client ID: SPL-GW-MW26-040213						
Alkalinity	SM 2320	04/08/13	mg/L CaCO3	33.7	33.4	0.9%
Carbonate	SM 2320	04/08/13	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	04/08/13	mg/L CaCO3	33.7	33.4	0.9%
Hydroxide	SM 2320	04/08/13	mg/L CaCO3	< 1.0	< 1.0	NA

MS/MSD RESULTS-CONVENTIONALS
WK09-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/10/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: WK09A Client ID: SPL-GW-MW30-040213							
N-Ammonia	EPA 350.1M	04/05/13	mg-N/L	0.299	0.791	0.500	98.4%
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050	0.220	0.250	88.0%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: SPL-GW-MW30-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09A
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**2.30**	
3010A	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.080**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW30-040213
DUPLICATE

Lab Sample ID: WK09A
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Iron	6010C	2.30	2.25	2.2%	+/- 20%	
Manganese	6010C	0.080	0.079	1.3%	+/- 20%	

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW30-040213
MATRIX SPIKE

Lab Sample ID: WK09A
LIMS ID: 13-7009
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Iron	6010C	2.30	4.40	2.00	105%	
Manganese	6010C	0.080	0.580	0.500	100%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW31-040213
SAMPLE

Lab Sample ID: WK09B
LIMS ID: 13-7010
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**18.3**	
3010A	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.505**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW24-040213
SAMPLE

Lab Sample ID: WK09C
LIMS ID: 13-7011
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**29.5**	
3010A	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**1.79**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW26-040213
SAMPLE

Lab Sample ID: WK09D
LIMS ID: 13-7012
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**8.26**	
3010A	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.136**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW08-040213
SAMPLE

Lab Sample ID: WK09E
LIMS ID: 13-7013
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**19.0**	
3010A	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**1.17**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: SPL-GW-MW27-040213**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK09F
LIMS ID: 13-7014
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**21.6**	
3010A	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.417**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW10-040213
SAMPLE

Lab Sample ID: WK09G
LIMS ID: 13-7015
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**18.4**	
3010A	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**1.05**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW30-040213
SAMPLE

Lab Sample ID: WK09K
LIMS ID: 13-7019
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	**7440-70-2**	**Calcium**	0.05	**65.1**	
6010C	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**2.21**	
6010C	04/04/13	6010C	04/08/13	**7439-95-4**	**Magnesium**	0.05	**12.3**	
6010C	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.079**	
6010C	04/04/13	6010C	04/08/13	**7440-09-7**	**Potassium**	0.5	**3.9**	
6010C	04/04/13	6010C	04/08/13	**7440-23-5**	**Sodium**	0.5	**14.3**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: SPL-GW-MW30-040213 DUPLICATE

Lab Sample ID: WK09K
LIMS ID: 13-7019
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/02/13
Date Received: 04/02/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Calcium	6010C	65.1	65.4	0.5%	+/- 20%	
Iron	6010C	2.21	2.21	0.0%	+/- 20%	
Magnesium	6010C	12.3	12.3	0.0%	+/- 20%	
Manganese	6010C	0.079	0.079	0.0%	+/- 20%	
Potassium	6010C	3.9	3.9	0.0%	+/- 20%	
Sodium	6010C	14.3	14.4	0.7%	+/- 20%	

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW30-040213
MATRIX SPIKE

Lab Sample ID: WK09K
LIMS ID: 13-7019
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Calcium	6010C	65.1	75.6	10.0	105%	H
Iron	6010C	2.21	4.35	2.00	107%	
Magnesium	6010C	12.3	23.4	10.0	111%	
Manganese	6010C	0.079	0.586	0.500	101%	
Potassium	6010C	3.9	14.4	10.0	105%	
Sodium	6010C	14.3	25.0	10.0	107%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW31-040213
SAMPLE

Lab Sample ID: WK09L
LIMS ID: 13-7020
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	**7440-70-2**	**Calcium**	0.05	**24.5**	
6010C	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**11.9**	
6010C	04/04/13	6010C	04/08/13	**7439-95-4**	**Magnesium**	0.05	**7.06**	
6010C	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.442**	
6010C	04/04/13	6010C	04/08/13	**7440-09-7**	**Potassium**	0.5	**4.2**	
6010C	04/04/13	6010C	04/08/13	**7440-23-5**	**Sodium**	0.5	**40.3**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW24-040213
SAMPLE

Lab Sample ID: WK09M
LIMS ID: 13-7021
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	**7440-70-2**	**Calcium**	0.05	**73.4**	
6010C	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**26.0**	
6010C	04/04/13	6010C	04/08/13	**7439-95-4**	**Magnesium**	0.05	**33.0**	
6010C	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**1.64**	
6010C	04/04/13	6010C	04/08/13	**7440-09-7**	**Potassium**	0.5	**12.3**	
6010C	04/04/13	6010C	04/08/13	**7440-23-5**	**Sodium**	0.5	**58.7**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW26-040213
SAMPLE

Lab Sample ID: WK09N
LIMS ID: 13-7022
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	**7440-70-2**	**Calcium**	0.05	**8.92**	
6010C	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**5.58**	
6010C	04/04/13	6010C	04/08/13	**7439-95-4**	**Magnesium**	0.05	**3.27**	
6010C	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.129**	
6010C	04/04/13	6010C	04/08/13	**7440-09-7**	**Potassium**	0.5	**2.9**	
6010C	04/04/13	6010C	04/08/13	**7440-23-5**	**Sodium**	0.5	**9.5**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW08-040213
SAMPLE

Lab Sample ID: WK090
LIMS ID: 13-7023
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	**7440-70-2**	**Calcium**	0.05	**46.0**	
6010C	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**19.1**	
6010C	04/04/13	6010C	04/08/13	**7439-95-4**	**Magnesium**	0.05	**47.8**	
6010C	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**1.19**	
6010C	04/04/13	6010C	04/08/13	**7440-09-7**	**Potassium**	0.5	**16.9**	
6010C	04/04/13	6010C	04/08/13	**7440-23-5**	**Sodium**	0.5	**157**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW27-040213
SAMPLE

Lab Sample ID: WK09P
LIMS ID: 13-7024
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	**7440-70-2**	**Calcium**	0.05	**16.2**	
6010C	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**12.5**	
6010C	04/04/13	6010C	04/08/13	**7439-95-4**	**Magnesium**	0.05	**4.36**	
6010C	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**0.395**	
6010C	04/04/13	6010C	04/08/13	**7440-09-7**	**Potassium**	0.5	**3.3**	
6010C	04/04/13	6010C	04/08/13	**7440-23-5**	**Sodium**	0.5	**30.3**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW10-040213
SAMPLE

Lab Sample ID: WK09Q
LIMS ID: 13-7025
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/02/13
Date Received: 04/02/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	**7440-70-2**	**Calcium**	0.05	**44.3**	
6010C	04/04/13	6010C	04/08/13	**7439-89-6**	**Iron**	0.05	**19.2**	
6010C	04/04/13	6010C	04/08/13	**7439-95-4**	**Magnesium**	0.05	**28.2**	
6010C	04/04/13	6010C	04/08/13	**7439-96-5**	**Manganese**	0.001	**1.10**	
6010C	04/04/13	6010C	04/08/13	**7440-09-7**	**Potassium**	0.5	**9.2**	
6010C	04/04/13	6010C	04/08/13	**7440-23-5**	**Sodium**	0.5	**59.4**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: WK09MB
LIMS ID: 13-7010
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/04/13	6010C	04/08/13	7439-89-6	Iron	0.05	0.05	U
3010A	04/04/13	6010C	04/08/13	7439-96-5	Manganese	0.001	0.001	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: WK09LCS
LIMS ID: 13-7010
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Iron	6010C	2.10	2.00	105%	
Manganese	6010C	0.495	0.500	99.0%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: METHOD BLANK**

Lab Sample ID: WK09MB
LIMS ID: 13-7020
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/04/13	6010C	04/08/13	7440-70-2	Calcium	0.05	0.05	U
6010C	04/04/13	6010C	04/08/13	7439-89-6	Iron	0.05	0.05	U
6010C	04/04/13	6010C	04/08/13	7439-95-4	Magnesium	0.05	0.05	U
6010C	04/04/13	6010C	04/08/13	7439-96-5	Manganese	0.001	0.001	U
6010C	04/04/13	6010C	04/08/13	7440-09-7	Potassium	0.5	0.5	U
6010C	04/04/13	6010C	04/08/13	7440-23-5	Sodium	0.5	0.5	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: LAB CONTROL**

Lab Sample ID: WK09LCS
LIMS ID: 13-7020
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK09-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Calcium	6010C	10.1	10.0	101%	
Iron	6010C	2.10	2.00	105%	
Magnesium	6010C	10.7	10.0	107%	
Manganese	6010C	0.502	0.500	100%	
Potassium	6010C	10.2	10.0	102%	
Sodium	6010C	10.2	10.0	102%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

April 17, 2013

Stephen.Bentsen
Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101-2341

RE: Project: South Park Landfill
ARI Job No: WK27

Dear Stephen:

Please find enclosed analytical results and chain of custody documentation (COC) for the project referenced above. Analytical Resources, Incorporated (ARI) accepted six water samples and two trip blanks on April 4, 2013. The samples were in good condition with no discrepancies in paperwork.

The samples were analyzed for VOCs, SIM VOCs, Total and Dissolved Metals, Alkalinity, Nitrate, Nitrite, Chloride, Sulfate, Sulfide, as requested on the COC.

No analytical complications were noted for these analyses. Quality control results are included for your review.

A copy of the reports and all associated raw data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
kellyb@arilabs.com
206-695-6211

Enclosures

cc: eFile WK27

KB/kb

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: WK77	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Aspect Consulting	Phone: 206.780.7719	Date: 4/4/13	Ice Present? Y
Client Contact: John Strunk		No. of Coolers: 2	Cooler Temps: 4.1, 3.6
Client Project Name: South Park Landfill			
Client Project #: 100116	Samplers: Seann McClure		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	VOC by 8260C Cis-1,2 - dichloroethene Trichloroethylene *See Note	VOCs by 8260C SIM Vinyl Chloride	Dissolved Metals by 6010B Na, K, Ca, Mg, Fe Mn	Total Metals by 6010B Fe, Mn	Major Anions by 300 Chloride, Sulfate, Nitrate, Nitrite	Major Anions by SM 2320B Alkalinity, Carbonate, Bicarbonate	General Chem by SM 4500 Ammonia, Sulfide	Benzene (as part of 8260C	Notes/Comments
					Analysis Requested								*For 8260C please provide report for only the analytes listed. However please rdo dilutions and archive chromatograph for the full suite of analytes so additional analytes may be analyzed later if requested.
TB-1	4/3/13		H_2O	2	X	X	X	X	X	X	X		Trip Blank
TB-2				2	X	X	X	X	X	X	X	X	Trip Blank
SPL-GW-MW18-040313		9:30		12	X	X	X	X	X	X	X		
SPL-GW-MW29-040313		10:35		12	X	X	X	X	X	X	X		
SPL-GW-MW14-040313		1130		12	X	X	X	X	X	X	X		
SPL-GW-MW12-040313		1230		12	X	X	X	X	X	X	X		
SPL-GW-KMW03A-040313		1400		12	X	X	X	X	X	X	X		
SPL-GW-KMW05-040313		1550		12	X	X	X	X	X	X	X	X	Sample pH ≤3 1/3/13.11

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Seann McClure	Printed Name: Taylor Stroebel	Printed Name:	Printed Name:
	Company: Aspect Consulting	Company: ART	Company:	Company:
	Date & Time: 4/4/13 9:00 AM	Date & Time: 11.4.13 900	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

WK77 · 99092

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Aspect Project Name: South Park Landfill

COC No(s): (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: WK27 Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.1 3.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90870952

Cooler Accepted by: TS Date: 4/4/13 Time: 900

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice (Gel Packs) Baggies (Foam Block) Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	3/21/13	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JM Date: 4/4/13 Time: 900

***** Notify Project Manager of discrepancies or concerns *****

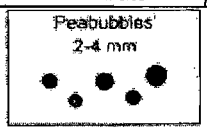
Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

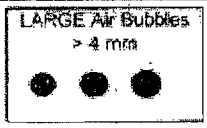
Additional Notes, Discrepancies, & Resolutions:

Samples MW18, MW22, MW14 + MW12 were in cooler with TB-1
Samples KMW03A + KMW05 were in cooler with TB-2.

By: JM Date: 4/4/13

TB-1 + TB-2 were marked for all analyses, only logged for VOA + Sim VC





Small → "sm"	
Peabubbles → "pb"	
Large → "lg"	
Headspace → "hs"	

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: WK27
Client: Aspect Consulting
Project Event: 100116
Project Name: South Park Landfill

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	SPL-GW-MW18-040313	WK27A	13-7128	Water	04/03/13 09:30	04/04/13 09:00
2.	SPL-GW-MW29-040313	WK27B	13-7129	Water	04/03/13 10:35	04/04/13 09:00
3.	SPL-GW-MW14-040313	WK27C	13-7130	Water	04/03/13 11:30	04/04/13 09:00
4.	SPL-GW-MW12-040313	WK27D	13-7131	Water	04/03/13 12:30	04/04/13 09:00
5.	SPL-GW-KMW03A-040313	WK27E	13-7132	Water	04/03/13 14:00	04/04/13 09:00
6.	SPL-GW-KMW05-040313	WK27F	13-7133	Water	04/03/13 15:50	04/04/13 09:00
7.	TB-1	WK27G	13-7134	Water	04/03/13	04/04/13 09:00
8.	TB-2	WK27H	13-7135	Water	04/03/13	04/04/13 09:00
9.	SPL-GW-MW18-040313	WK27I	13-7136	Water	04/03/13 09:30	04/04/13 09:00
10.	SPL-GW-MW29-040313	WK27J	13-7137	Water	04/03/13 10:35	04/04/13 09:00
11.	SPL-GW-MW14-040313	WK27K	13-7138	Water	04/03/13 11:30	04/04/13 09:00
12.	SPL-GW-MW12-040313	WK27L	13-7139	Water	04/03/13 12:30	04/04/13 09:00
13.	SPL-GW-KMW03A-040313	WK27M	13-7140	Water	04/03/13 14:00	04/04/13 09:00
14.	SPL-GW-KMW05-040313	WK27N	13-7141	Water	04/03/13 15:50	04/04/13 09:00

PRESERVATION VERIFICATION 04/04/13
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **WK27**

PC: Kelly
VTSR: 04/04/13

Inquiry Number: NONE
Analysis Requested: 04/04/13
Contact: Strunk, John
Client: Aspect Consulting
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #: 100116
Project: South Park Landfill
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-7128 **WK27A**	SPL-GW-MW18-040313			P			TOT P						F									
13-7129 **WK27B**	SPL-GW-MW29-040313			P			TOT P						F									
13-7130 **WK27C**	SPL-GW-MW14-040313			P			TOT P						F									
13-7131 **WK27D**	SPL-GW-MW12-040313			P			TOT P						F									
13-7132 **WK27E**	SPL-GW-KMW03A-040313			P			TOT P						F									
13-7133 **WK27F**	SPL-GW-KMW05-040313			F			TOT F						F									OKAY 4·4·13 DM
13-7136 **WK27I**	SPL-GW-MW18-040313						DIS P									Y						
13-7137 **WK27J**	SPL-GW-MW29-040313						DIS P									Y						
13-7138 **WK27K**	SPL-GW-MW14-040313						DIS P									Y						
13-7139 **WK27L**	SPL-GW-MW12-040313						DIS P									Y						
13-7140 **WK27M**	SPL-GW-KMW03A-040313						DIS P									Y						
13-7141 **WK27N**	SPL-GW-KMW05-040313						DIS F									Y			<2	MP2452	4ML	4·4·13 DM

P=Pass, F=fail

S2 only preserved with ZnOAc.

Checked By JM Date 4/4/13

PRESERVATION VERIFICATION 04/04/13
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **WK27**

Inquiry Number: NONE
Analysis Requested: 04/04/13
Contact: Strunk, John
Client: Aspect Consulting
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 04/04/13

Project #: 100116
Project: South Park Landfill
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-7128 **WK27A**	SPL-GW-MW18-040313			P			TOT P						F					S-	7/2	2ml NaOH 6N		4-4-13 W
13-7129 **WK27B**	SPL-GW-MW29-040313			P			TOT P						F									
13-7130 **WK27C**	SPL-GW-MW14-040313			P			TOT P						F									
13-7131 **WK27D**	SPL-GW-MW12-040313			P			TOT P						F									
13-7132 **WK27E**	SPL-GW-KMW03A-040313			P			TOT P						F									
13-7133 **WK27F**	SPL-GW-KMW05-040313			F			TOT F						F									
13-7136 **WK27I**	SPL-GW-MW18-040313						DIS P									Y						
13-7137 **WK27J**	SPL-GW-MW29-040313						DIS P									Y						
13-7138 **WK27K**	SPL-GW-MW14-040313						DIS P									Y						
13-7139 **WK27L**	SPL-GW-MW12-040313						DIS P									Y						
13-7140 **WK27M**	SPL-GW-KMW03A-040313						DIS P									Y						
13-7141 **WK27N**	SPL-GW-KMW05-040313						DIS F									Y						

P = Pass, F = fail

S2 only preserved with ZnOAc.

Checked By JM Date 4/4/13

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW18-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27A
LIMS ID: 13-7128
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 06:44

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	102%
Bromofluorobenzene	99.3%
d4-1,2-Dichlorobenzene	105%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW29-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27B
LIMS ID: 13-7129
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 07:10

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	102%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	106%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW14-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27C
LIMS ID: 13-7130
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 07:37

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	104%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW12-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27D
LIMS ID: 13-7131
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 08:03

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**3.1**	
79-01-6	**Trichloroethene**	**0.20**	**0.37**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	108%
d8-Toluene	99.0%
Bromofluorobenzene	99.2%
d4-1,2-Dichlorobenzene	106%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-KMW03A-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27E
LIMS ID: 13-7132
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 08:30

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	102%
Bromofluorobenzene	99.3%
d4-1,2-Dichlorobenzene	105%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-KMW05-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27F
LIMS ID: 13-7133
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 09:50

Sample Amount: 0.500 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	4.0	< 4.0	U
79-01-6	Trichloroethene	4.0	< 4.0	U
71-43-2	**Benzene**	**4.0**	**8.2**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	103%
Bromofluorobenzene	104%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TB-1**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27G
LIMS ID: 13-7134
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 08:57

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	109%
d8-Toluene	101%
Bromofluorobenzene	99.4%
d4-1,2-Dichlorobenzene	105%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TB-2**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27H
LIMS ID: 13-7135
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 09:24

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	109%
d8-Toluene	103%
Bromofluorobenzene	99.7%
d4-1,2-Dichlorobenzene	105%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-040513A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040513A
LIMS ID: 13-7133
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/06/13 00:56

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	102%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	105%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
WK27A	SPL-GW-MW18-040313	10	104%	102%	99.3%	105%	0
WK27B	SPL-GW-MW29-040313	10	104%	102%	102%	106%	0
WK27C	SPL-GW-MW14-040313	10	102%	104%	100%	103%	0
WK27D	SPL-GW-MW12-040313	10	108%	99.0%	99.2%	106%	0
WK27E	SPL-GW-KMW03A-040313	10	103%	102%	99.3%	105%	0
MB-040513A	Method Blank	10	100%	102%	102%	105%	0
LCS-040513A	Lab Control	10	91.5%	102%	106%	101%	0
LCSD-040513A	Lab Control Dup	10	100%	104%	105%	103%	0
WK27F	SPL-GW-KMW05-040313	10	102%	103%	104%	102%	0
WK27G	TB-1	10	109%	101%	99.4%	105%	0
WK27H	TB-2	10	109%	103%	99.7%	105%	0

	LCS/MB LIMITS	QC LIMITS
SW8260C		
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-130)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 13-7128 to 13-7135

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-040513A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040513A
LIMS ID: 13-7133
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/PAB
LCSD: NT3/PAB
Date Analyzed LCS: 04/06/13 00:02
LCSD: 04/06/13 00:29

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
cis-1,2-Dichloroethene	8.90	10.0	89.0%	9.62	10.0	96.2%	7.8%
Trichloroethene	10.2	10.0	102%	10.1	10.0	101%	1.0%
Benzene	9.83	10.0	98.3%	9.92	10.0	99.2%	0.9%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	91.5%	100%
d8-Toluene	102%	104%
Bromofluorobenzene	106%	105%
d4-1,2-Dichlorobenzene	101%	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW18-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27A
LIMS ID: 13-7128
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 20:09

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**0.072**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	122%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW29-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27B
LIMS ID: 13-7129
Matrix: Water
Data Release Authorized: MW
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 20:37

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	118%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW14-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27C
LIMS ID: 13-7130
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 21:05

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	127%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW12-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27D
LIMS ID: 13-7131
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 21:32

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.020**	**0.10**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	125%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-KMW03A-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27E
LIMS ID: 13-7132
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 22:00

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	0.020	0.30	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	121%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-KMW05-040313**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27F
LIMS ID: 13-7133
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 22:27

Sample Amount: 0.500 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.40	< 0.40	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	117%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: TB-1**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27G
LIMS ID: 13-7134
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 22:55

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	124%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: TB-2
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK27H
LIMS ID: 13-7135
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 23:23

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	127%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: MB-040813**
 METHOD BLANK

Lab Sample ID: MB-040813
LIMS ID: 13-7128
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 17:14

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	116%

ANALYTICAL RESOURCES INCORPORATED

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116

Client ID	DCE	TOT OUT
MB-040813	116%	0
LCS-040813	112%	0
LCSD-040813	115%	0
SPL-GW-MW18-040313	122%	0
SPL-GW-MW29-040313	118%	0
SPL-GW-MW14-040313	127%	0
SPL-GW-MW12-040313	125%	0
SPL-GW-KMW03A-040313	121%	0
SPL-GW-KMW05-040313	117%	0
TB-1	124%	0
TB-2	127%	0

	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(78-126)	(80-129)

Prep Method: SW5030
Log Number Range: 13-7128 to 13-7135

FORM-II SW8260-SIM

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-040813
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040813
LIMS ID: 13-7128
Matrix: Water
Data Release Authorized: MW
Reported: 04/09/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT7/PAB
LCSD: NT7/PAB
Date Analyzed LCS: 04/08/13 16:19
LCSD: 04/08/13 16:47

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	0.940	1.00	94.0%	0.906	1.00	90.6%	3.7%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	112%	115%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW18-040313
SAMPLE

Lab Sample ID: WK27A
LIMS ID: 13-7128
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**59.6**	
3010A	04/05/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**1.57**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: SPL-GW-MW18-040313
DUPLICATE

Lab Sample ID: WK27A
LIMS ID: 13-7128
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Iron	6010C	59.6	59.8	0.3%	+/- 20%	
Manganese	6010C	1.57	1.57	0.0%	+/- 20%	

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW18-040313
MATRIX SPIKE

Lab Sample ID: WK27A
LIMS ID: 13-7128
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Iron	6010C	59.6	61.8	2.00	110%	H
Manganese	6010C	1.57	2.07	0.500	100%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW29-040313
SAMPLE

Lab Sample ID: WK27B
LIMS ID: 13-7129
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**16.6**	
3010A	04/05/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**1.36**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW14-040313
SAMPLE

Lab Sample ID: WK27C
LIMS ID: 13-7130
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**4.80**	
3010A	04/05/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**0.587**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW12-040313
SAMPLE

Lab Sample ID: WK27D
LIMS ID: 13-7131
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**11.3**	
3010A	04/05/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**0.769**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-KMW03A-040313
SAMPLE

Lab Sample ID: WK27E
LIMS ID: 13-7132
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**10.2**	
3010A	04/05/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**0.050**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-KMW05-040313
SAMPLE

Lab Sample ID: WK27F
LIMS ID: 13-7133
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.5	**5.7**	
3010A	04/05/13	6010C	04/11/13	7439-96-5	Manganese	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW18-040313
SAMPLE

Lab Sample ID: WK27I
LIMS ID: 13-7136
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/09/13	6010C	04/11/13	**7440-70-2**	**Calcium**	0.05	**70.8**	
3010A	04/09/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**59.5**	
3010A	04/09/13	6010C	04/11/13	**7439-95-4**	**Magnesium**	0.05	**62.2**	
3010A	04/09/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**1.57**	
3010A	04/09/13	6010C	04/11/13	**7440-09-7**	**Potassium**	0.5	**16.6**	
3010A	04/09/13	6010C	04/11/13	**7440-23-5**	**Sodium**	0.5	**33.8**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: SPL-GW-MW18-040313
DUPLICATE

Lab Sample ID: WK27I
LIMS ID: 13-7136
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Calcium	6010C	70.8	71.7	1.3%	+/- 20%	
Iron	6010C	59.5	60.2	1.2%	+/- 20%	
Magnesium	6010C	62.2	62.8	1.0%	+/- 20%	
Manganese	6010C	1.57	1.59	1.3%	+/- 20%	
Potassium	6010C	16.6	16.9	1.8%	+/- 20%	
Sodium	6010C	33.8	34.2	1.2%	+/- 20%	

Reported in mg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW18-040313
MATRIX SPIKE

Lab Sample ID: WK27I
LIMS ID: 13-7136
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Calcium	6010C	70.8	83.7	10.0	129%	H
Iron	6010C	59.5	63.4	2.00	195%	H
Magnesium	6010C	62.2	72.4	10.0	102%	H
Manganese	6010C	1.57	2.12	0.500	110%	
Potassium	6010C	16.6	28.3	10.0	117%	
Sodium	6010C	33.8	45.7	10.0	119%	

Reported in mg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW29-040313
SAMPLE

Lab Sample ID: WK27J
LIMS ID: 13-7137
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/09/13	6010C	04/11/13	**7440-70-2**	**Calcium**	0.05	**147**	
3010A	04/09/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**15.8**	
3010A	04/09/13	6010C	04/11/13	**7439-95-4**	**Magnesium**	0.05	**35.5**	
3010A	04/09/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**1.31**	
3010A	04/09/13	6010C	04/11/13	**7440-09-7**	**Potassium**	0.5	**10.8**	
3010A	04/09/13	6010C	04/11/13	**7440-23-5**	**Sodium**	0.5	**21.4**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW14-040313
SAMPLE

Lab Sample ID: WK27K
LIMS ID: 13-7138
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/09/13	6010C	04/11/13	**7440-70-2**	**Calcium**	0.05	**50.6**	
3010A	04/09/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**4.29**	
3010A	04/09/13	6010C	04/11/13	**7439-95-4**	**Magnesium**	0.05	**30.5**	
3010A	04/09/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**0.576**	
3010A	04/09/13	6010C	04/11/13	**7440-09-7**	**Potassium**	0.5	**4.9**	
3010A	04/09/13	6010C	04/11/13	**7440-23-5**	**Sodium**	0.5	**16.3**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW12-040313
SAMPLE

Lab Sample ID: WK27L
LIMS ID: 13-7139
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/09/13	6010C	04/11/13	**7440-70-2**	**Calcium**	0.05	**30.8**	
3010A	04/09/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**7.97**	
3010A	04/09/13	6010C	04/11/13	**7439-95-4**	**Magnesium**	0.05	**16.4**	
3010A	04/09/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**0.742**	
3010A	04/09/13	6010C	04/11/13	**7440-09-7**	**Potassium**	0.5	**4.0**	
3010A	04/09/13	6010C	04/11/13	**7440-23-5**	**Sodium**	0.5	**20.8**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-KMW03A-040313
SAMPLE

Lab Sample ID: WK27M
LIMS ID: 13-7140
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/09/13	6010C	04/11/13	**7440-70-2**	**Calcium**	0.05	**84.3**	
3010A	04/09/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.05	**10.4**	
3010A	04/09/13	6010C	04/11/13	**7439-95-4**	**Magnesium**	0.05	**27.1**	
3010A	04/09/13	6010C	04/11/13	**7439-96-5**	**Manganese**	0.001	**0.048**	
3010A	04/09/13	6010C	04/11/13	**7440-09-7**	**Potassium**	0.5	**15.5**	
3010A	04/09/13	6010C	04/11/13	**7440-23-5**	**Sodium**	0.5	**24.5**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-KMW05-040313
SAMPLE

Lab Sample ID: WK27N
LIMS ID: 13-7141
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/09/13	6010C	04/11/13	**7440-70-2**	**Calcium**	0.5	**9.8**	
3010A	04/09/13	6010C	04/11/13	**7439-89-6**	**Iron**	0.5	**5.0**	
3010A	04/09/13	6010C	04/11/13	7439-95-4	Magnesium	0.5	0.5	U
3010A	04/09/13	6010C	04/11/13	7439-96-5	Manganese	0.01	0.01	U
3010A	04/09/13	6010C	04/11/13	**7440-09-7**	**Potassium**	5	**4,160**	
3010A	04/09/13	6010C	04/11/13	**7440-23-5**	**Sodium**	5	**1,520**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: WK27MB
LIMS ID: 13-7129
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/11/13	7439-89-6	Iron	0.05	0.05	U
3010A	04/05/13	6010C	04/11/13	7439-96-5	Manganese	0.001	0.001	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: WK27LCS
LIMS ID: 13-7129
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Iron	6010C	1.94	2.00	97.0%	
Manganese	6010C	0.478	0.500	95.6%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: WK27MB
LIMS ID: 13-7137
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/09/13	6010C	04/11/13	7440-70-2	Calcium	0.05	0.05	U
3010A	04/09/13	6010C	04/11/13	7439-89-6	Iron	0.05	0.05	U
3010A	04/09/13	6010C	04/11/13	7439-95-4	Magnesium	0.05	0.05	U
3010A	04/09/13	6010C	04/11/13	7439-96-5	Manganese	0.001	0.001	U
3010A	04/09/13	6010C	04/11/13	7440-09-7	Potassium	0.5	0.5	U
3010A	04/09/13	6010C	04/11/13	7440-23-5	Sodium	0.5	0.5	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: LAB CONTROL**

Lab Sample ID: WK27LCS
LIMS ID: 13-7137
Matrix: Water
Data Release Authorized:
Reported: 04/12/13

QC Report No: WK27-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Calcium	6010C	10.2	10.0	102%	
Iron	6010C	2.01	2.00	100%	
Magnesium	6010C	10.9	10.0	109%	
Manganese	6010C	0.495	0.500	99.0%	
Potassium	6010C	10.4	10.0	104%	
Sodium	6010C	10.2	10.0	102%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

SAMPLE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Client ID: SPL-GW-MW18-040313
ARI ID: 13-7128 WK27A

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	430
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	430
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/05/13 040513#1	EPA 300.0	mg/L	0.5	16.3
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.050	2.27
Sulfate	04/05/13 040513#1	EPA 300.0	mg/L	2.0	76.5
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Client ID: SPL-GW-MW29-040313
ARI ID: 13-7129 WK27B

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	259
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	259
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/05/13 040513#1	EPA 300.0	mg/L	0.5	17.8
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.010	0.754
Sulfate	04/05/13 040513#1	EPA 300.0	mg/L	10.0	282
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Client ID: SPL-GW-MW14-040313
ARI ID: 13-7130 WK27C

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	261
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	261
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/05/13 040513#1	EPA 300.0	mg/L	0.5	13.1
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.010	0.236
Sulfate	04/04/13 040413#1	EPA 300.0	mg/L	0.1	2.3
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Client ID: SPL-GW-MW12-040313
ARI ID: 13-7131 WK27D

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	153
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	153
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/05/13 040513#1	EPA 300.0	mg/L	0.5	17.4
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.010	0.692
Sulfate	04/05/13 040513#1	EPA 300.0	mg/L	0.5	17.8
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Client ID: SPL-GW-KMW03A-040313
ARI ID: 13-7132 WK27E

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	368
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	368
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/05/13 040513#1	EPA 300.0	mg/L	0.5	12.9
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.050	3.04
Sulfate	04/04/13 040413#1	EPA 300.0	mg/L	0.1	0.4
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Client ID: SPL-GW-KMW05-040313
ARI ID: 13-7133 WK27F

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	7,510
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	2,640
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	4,860
Chloride	04/04/13 040413#1	EPA 300.0	mg/L	5.0	158
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	5.0	< 5.0 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	5.0	< 5.0 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	2.00	74.3
Sulfate	04/05/13 040513#1	EPA 300.0	mg/L	50.0	1,150
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	2.52	30.6

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Chloride	EPA 300.0	04/04/13	mg/L	< 0.1 U	
		04/05/13		< 0.1 U	
N-Nitrate	EPA 300.0	04/04/13	mg-N/L	< 0.1 U	
N-Nitrite	EPA 300.0	04/04/13	mg-N/L	< 0.1 U	
N-Ammonia	EPA 350.1M	04/05/13	mg-N/L	< 0.010 U	FB
Sulfate	EPA 300.0	04/04/13	mg/L	< 0.1 U	
		04/05/13		< 0.1 U	
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050 U	
		04/08/13		< 0.050 U	

FB Filtration Blank

LAB CONTROL RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide	ICVL	04/08/13	mg/L	0.499	0.501	99.6%
EPA 376.2	PREP	04/08/13		7.70	8.35	92.2%

STANDARD REFERENCE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity ERA #P114506	SM 2320	04/09/13	mg/L CaCO3	45.2	41.9	107.9%
Chloride	EPA 300.0	04/04/13	mg/L	3.0	3.0	100.0%
ERA 210312		04/05/13		3.0	3.0	100.0%
N-Nitrate EAR 230511	EPA 300.0	04/04/13	mg-N/L	3.0	3.0	100.0%
N-Nitrite ERA 490412	EPA 300.0	04/04/13	mg-N/L	3.0	3.0	100.0%
N-Ammonia ERA #15125	EPA 350.1M	04/05/13	mg-N/L	0.506	0.500	101.2%
Sulfate	EPA 300.0	04/04/13	mg/L	3.1	3.0	103.3%
ERA 240312		04/05/13		3.1	3.0	103.3%

REPLICATE RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: WK27A Client ID: SPL-GW-MW18-040313						
Alkalinity	SM 2320	04/09/13	mg/L CaCO3	430	430	0.0%
Carbonate	SM 2320	04/09/13	mg/L CaCO3	< 1.0	< 1.0	NA
Bicarbonate	SM 2320	04/09/13	mg/L CaCO3	430	430	0.0%
Hydroxide	SM 2320	04/09/13	mg/L CaCO3	< 1.0	< 1.0	NA
Chloride	EPA 300.0	04/05/13	mg/L	16.3	16.4	0.6%
N-Nitrate	EPA 300.0	04/04/13	mg-N/L	< 0.1	< 0.1	NA
N-Nitrite	EPA 300.0	04/04/13	mg-N/L	< 0.1	< 0.1	NA
Sulfate	EPA 300.0	04/05/13	mg/L	76.5	75.9	0.8%

MS/MSD RESULTS-CONVENTIONALS
WK27-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/03/13
Date Received: 04/04/13

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: WK27A Client ID: SPL-GW-MW18-040313							
Chloride	EPA 300.0	04/05/13	mg/L	16.3	34.8	20.0	92.5%
N-Nitrate	EPA 300.0	04/04/13	mg-N/L	< 0.1	1.9	2.0	95.0%
N-Nitrite	EPA 300.0	04/04/13	mg-N/L	< 0.1	2.0	2.0	100.0%
Sulfate	EPA 300.0	04/05/13	mg/L	76.5	173	100	96.5%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

April 18, 2013

Stephen.Bentsen
Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101-2341

RE: Project: South Park Landfill
ARI Job No: WK40

Dear Stephen:

Please find enclosed analytical results and chain of custody documentation (COC) for the project referenced above. Analytical Resources, Incorporated (ARI) accepted two water samples and a trip blank on April 4, 2013. The samples were in good condition with no discrepancies in paperwork.

The samples were analyzed for VOCs, SIM VOCs, Total and Dissolved Metals, Alkalinity, Nitrate, Nitrite, Chloride, Sulfate, Sulfide, as requested on the COC.

No analytical complications were noted for these analyses. Quality control results are included for your review.

A copy of the reports and all associated raw data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
kellyb@arilabs.com
206-695-6211

Enclosures

cc: eFile WK40

KB/kb

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: WK40	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Aspect Consulting	Phone: 206.780.7719	Date: 4/4/13	Ice Present? Y
Client Contact: John Strunk		No. of Coolers: 1	Cooler Temps: 1.8
Client Project Name: South Park Landfill			
Client Project #: 100116	Samplers: Seann McClure		

Sample ID	Date	Time	Matrix	No. Containers	VOC by 8260C Cis-1,2 - dichloroethene Trichloroethylene *See Note	VOCs by 8260C SIM Vinyl Chloride	Dissolved Metals by 6010B Na, K, Ca, Mg, Fe Mn	Total Metals by 6010B Fe, Mn	Major Anions by 300 Chloride, Sulfate, Nitrate, Nitrite	Major Anions by SM 2320B Alkalinity, Carbonate, Bicarbonate	General Chem by SM 4500 Ammonia, Sulfide	Benzene (as part of 8260C)	Notes/Comments
SPL-GW-KMW08-040413	4/4/13	1050	H2O	12	X	X	X	X	X	X	X	X	*For 8260C please provide report for only the analytes listed. However please rdo dilutions and archive chromatographs for the full suite of analytes so additional analytes may be analyzed later if requested.
~~SPL-GW-KMW~~													
SPL-GW-MW61-040413	4/4/13	1130	H2O	12	X	X	X	X	X	X	X	X	
Trip Blank				2	X	X						X	

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature)	(Signature)	(Signature)	(Signature)
	Printed Name: Seann McClure	Printed Name: Jennifer Millsap	Printed Name:	Printed Name:
	Company: Aspect Consulting	Company: ARI	Company:	Company:
	Date & Time: 4/4/13 1310	Date & Time: 4/4/13 1310	Date & Time:	Date & Time:

***Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Aspect Project Name: South Kuk Landfill

COC No(s): _____ NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: WKU0 Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 1.8

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90577952

Cooler Accepted by: JM Date: 4/4/13 Time: 1310

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used?	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA	4-4-13	

Was Sample Split by ARI: NA YES Date/Time: _____ Equipment: _____ Split by: _____

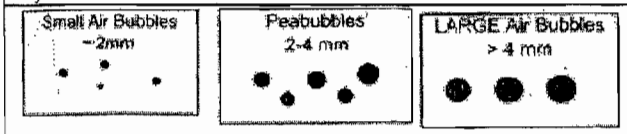
Samples Logged by: TS Date: 4-4-13 Time: 1356

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



Small → "sm"	
Peabubbles → "pb"	
Large → "lg"	
Headspace → "hs"	

PRESERVATION VERIFICATION 04/04/13

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **WK40**

PC: Kelly
VTSR: 04/04/13

Inquiry Number: NONE
Analysis Requested: 04/04/13
Contact: Strunk, John
Client: Aspect Consulting
Logged by: TS
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #: 100116
Project: South Park Landfill
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-7162 **WK40A**	SPL-GW-KMW08-040413			P			DIS P						F			Y		S	>12		2 ml NaOH 6N	4-4-13 w
13-7163 **WK40B**	SPL-GW-MW61-040413			P			DIS P						F			Y						
13-7164 **WK40C**	SPL-GW-KMW08-040413						TOT P															
13-7165 **WK40D**	SPL-GW-MW61-040413						TOT P															

P = Pass
F = fail

Checked By TS Date 4-4-13

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: WK40
Client: Aspect Consulting
Project Event: 100116
Project Name: South Park Landfill

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	SPL-GW-KMW08-040413	WK40A	13-7162	Water	04/04/13 10:50	04/04/13 13:10
2.	SPL-GW-MW61-040413	WK40B	13-7163	Water	04/04/13 11:30	04/04/13 13:10
3.	SPL-GW-KMW08-040413	WK40C	13-7164	Water	04/04/13 10:50	04/04/13 13:10
4.	SPL-GW-MW61-040413	WK40D	13-7165	Water	04/04/13 11:30	04/04/13 13:10
5.	Trip Blanks	WK40E	13-7166	Water	04/04/13	04/04/13 13:10

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-KMW08-040413**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK40A
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 20:08

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	101%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	104%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: SPL-GW-MW61-040413**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK40B
LIMS ID: 13-7163
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 20:35

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	100%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	106%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: Trip Blanks**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK40E
LIMS ID: 13-7166
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 21:01

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	105%
d8-Toluene	101%
Bromofluorobenzene	98.8%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-040513A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040513A
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized: hww
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/PAB
Date Analyzed: 04/05/13 11:33

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	93.8%
d8-Toluene	100%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-040513A	Method Blank	10	93.8%	100%	102%	101%	0
LCS-040513A	Lab Control	10	92.0%	99.9%	103%	100%	0
LCSD-040513A	Lab Control Dup	10	90.5%	102%	104%	97.5%	0
WK40A	SPL-GW-KMW08-040413	10	102%	101%	103%	104%	0
WK40B	SPL-GW-MW61-040413	10	106%	100%	100%	106%	0
WK40E	Trip Blanks	10	105%	101%	98.8%	103%	0

	LCS/MB LIMITS	QC LIMITS
SW8260C		
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-130)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 13-7162 to 13-7166

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-040513A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-040513A
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized: MW
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/PAB
LCSD: NT3/PAB
Date Analyzed LCS: 04/05/13 10:41
LCSD: 04/05/13 11:07

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
cis-1,2-Dichloroethene	9.19	10.0	91.9%	8.72	10.0	87.2%	5.2%
Trichloroethene	9.34	10.0	93.4%	9.74	10.0	97.4%	4.2%
Benzene	9.26	10.0	92.6%	9.59	10.0	95.9%	3.5%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	92.0%	90.5%
d8-Toluene	99.9%	102%
Bromofluorobenzene	103%	104%
d4-1,2-Dichlorobenzene	100%	97.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-KMW08-040413**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK40A
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized: MW
Reported: 04/09/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 23:50

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	120%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: SPL-GW-MW61-040413**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK40B
LIMS ID: 13-7163
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/09/13 00:18

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	121%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: Trip Blanks**
Page 1 of 1 **SAMPLE**

Lab Sample ID: WK40E
LIMS ID: 13-7166
Matrix: Water
Data Release Authorized: MW
Reported: 04/09/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/09/13 00:46

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	129%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: MB-040813
 METHOD BLANK

Lab Sample ID: MB-040813
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized:
Reported: 04/09/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill 100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT7/PAB
Date Analyzed: 04/08/13 17:14

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	116%

ANALYTICAL RESOURCES INCORPORATED

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116

Client ID	DCE	TOT OUT
MB-040813	116%	0
LCS-040813	112%	0
LCSD-040813	115%	0
SPL-GW-KMW08-040413	120%	0
SPL-GW-MW61-040413	121%	0
Trip Blanks	129%	0

	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(78-126)	(80-129)

Prep Method: SW5030
Log Number Range: 13-7162 to 13-7166

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-040813
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040813
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized: MW
Reported: 04/09/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT7/PAB
LCSD: NT7/PAB
Date Analyzed LCS: 04/08/13 16:19
LCSD: 04/08/13 16:47

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	0.940	1.00	94.0%	0.906	1.00	90.6%	3.7%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	112%	115%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-KMW08-040413
SAMPLE

Lab Sample ID: WK40A
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/05/13	6010C	04/09/13	**7440-70-2**	**Calcium**	0.05	**40.3**	
6010C	04/05/13	6010C	04/09/13	**7439-89-6**	**Iron**	0.05	**0.07**	
6010C	04/05/13	6010C	04/09/13	**7439-95-4**	**Magnesium**	0.05	**8.89**	
6010C	04/05/13	6010C	04/09/13	**7439-96-5**	**Manganese**	0.001	**0.240**	
6010C	04/05/13	6010C	04/09/13	**7440-09-7**	**Potassium**	0.5	**22.9**	
6010C	04/05/13	6010C	04/09/13	**7440-23-5**	**Sodium**	0.5	**22.7**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: SPL-GW-MW61-040413
SAMPLE

Lab Sample ID: WK40B
LIMS ID: 13-7163
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/05/13	6010C	04/09/13	**7440-70-2**	**Calcium**	0.05	**40.3**	
6010C	04/05/13	6010C	04/09/13	**7439-89-6**	**Iron**	0.05	**0.07**	
6010C	04/05/13	6010C	04/09/13	**7439-95-4**	**Magnesium**	0.05	**8.89**	
6010C	04/05/13	6010C	04/09/13	**7439-96-5**	**Manganese**	0.001	**0.242**	
6010C	04/05/13	6010C	04/09/13	**7440-09-7**	**Potassium**	0.5	**22.8**	
6010C	04/05/13	6010C	04/09/13	**7440-23-5**	**Sodium**	0.5	**22.3**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-KMW08-040413
SAMPLE

Lab Sample ID: WK40C
LIMS ID: 13-7164
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/09/13	**7439-89-6**	**Iron**	0.05	**0.15**	
3010A	04/05/13	6010C	04/09/13	**7439-96-5**	**Manganese**	0.001	**0.241**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: SPL-GW-MW61-040413
SAMPLE

Lab Sample ID: WK40D
LIMS ID: 13-7165
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/09/13	**7439-89-6**	**Iron**	0.05	**0.15**	
3010A	04/05/13	6010C	04/09/13	**7439-96-5**	**Manganese**	0.001	**0.241**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: METHOD BLANK**

Lab Sample ID: WK40MB
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	04/05/13	6010C	04/09/13	7440-70-2	Calcium	0.05	0.05	U
6010C	04/05/13	6010C	04/09/13	7439-89-6	Iron	0.05	0.05	U
6010C	04/05/13	6010C	04/09/13	7439-95-4	Magnesium	0.05	0.05	U
6010C	04/05/13	6010C	04/09/13	7439-96-5	Manganese	0.001	0.001	U
6010C	04/05/13	6010C	04/09/13	7440-09-7	Potassium	0.5	0.5	U
6010C	04/05/13	6010C	04/09/13	7440-23-5	Sodium	0.5	0.5	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: LAB CONTROL**

Lab Sample ID: WK40LCS
LIMS ID: 13-7162
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Calcium	6010C	9.78	10.0	97.8%	
Iron	6010C	1.95	2.00	97.5%	
Magnesium	6010C	10.3	10.0	103%	
Manganese	6010C	0.481	0.500	96.2%	
Potassium	6010C	10.1	10.0	101%	
Sodium	6010C	9.8	10.0	98.0%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: WK40MB
LIMS ID: 13-7164
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
3010A	04/05/13	6010C	04/09/13	7439-89-6	Iron	0.05	0.05	U
3010A	04/05/13	6010C	04/09/13	7439-96-5	Manganese	0.001	0.001	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: WK40LCS
LIMS ID: 13-7164
Matrix: Water
Data Release Authorized:
Reported: 04/10/13

QC Report No: WK40-Aspect Consulting
Project: South Park Landfill
100116
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Iron	6010C	1.97	2.00	98.5%	
Manganese	6010C	0.482	0.500	96.4%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

SAMPLE RESULTS-CONVENTIONALS
WK40-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Client ID: SPL-GW-KMW08-040413
ARI ID: 13-7162 WK40A

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	154
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	154
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/05/13 040513#1	EPA 300.0	mg/L	0.2	9.5
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.010	0.220
Sulfate	04/05/13 040513#1	EPA 300.0	mg/L	1.0	27.9
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
WK40-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: 04/04/13
Date Received: 04/04/13

Client ID: SPL-GW-MW61-040413
ARI ID: 13-7163 WK40B

Analyte	Date Batch	Method	Units	RL	Sample
Alkalinity	04/09/13 040913#1	SM 2320	mg/L CaCO3	1.0	158
Carbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Bicarbonate	04/09/13	SM 2320	mg/L CaCO3	1.0	158
Hydroxide	04/09/13	SM 2320	mg/L CaCO3	1.0	< 1.0 U
Chloride	04/05/13 040513#1	EPA 300.0	mg/L	0.2	9.4
N-Nitrate	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Nitrite	04/04/13 040413#1	EPA 300.0	mg-N/L	0.1	< 0.1 U
N-Ammonia	04/05/13 040513#1	EPA 350.1M	mg-N/L	0.010	0.235
Sulfate	04/05/13 040513#1	EPA 300.0	mg/L	1.0	27.6
Sulfide	04/08/13 040813#1	EPA 376.2	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
WK40-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Chloride	EPA 300.0	04/05/13	mg/L	< 0.1 U	
N-Nitrate	EPA 300.0	04/04/13	mg-N/L	< 0.1 U	
N-Nitrite	EPA 300.0	04/04/13	mg-N/L	< 0.1 U	
N-Ammonia	EPA 350.1M	04/05/13	mg-N/L	< 0.010 U	FB
Sulfate	EPA 300.0	04/05/13	mg/L	< 0.1 U	
Sulfide	EPA 376.2	04/08/13	mg/L	< 0.050 U	
		04/08/13		< 0.050 U	

FB Filtration Blank

LAB CONTROL RESULTS-CONVENTIONALS
WK40-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide	ICVL	04/08/13	mg/L	0.499	0.501	99.6%
EPA 376.2	PREP	04/08/13		7.70	8.35	92.2%

STANDARD REFERENCE RESULTS-CONVENTIONALS
WK40-Aspect Consulting

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 04/11/13

Project: South Park Landfill
Event: 100116
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Alkalinity ERA #P114506	SM 2320	04/09/13	mg/L CaCO3	45.2	41.9	107.9%
Chloride ERA 210312	EPA 300.0	04/05/13	mg/L	3.0	3.0	100.0%
N-Nitrate EAR 230511	EPA 300.0	04/04/13	mg-N/L	3.0	3.0	100.0%
N-Nitrite ERA 490412	EPA 300.0	04/04/13	mg-N/L	3.0	3.0	100.0%
N-Ammonia ERA #15125	EPA 350.1M	04/05/13	mg-N/L	0.506	0.500	101.2%
Sulfate ERA 240312	EPA 300.0	04/05/13	mg/L	3.1	3.0	103.3%

South Park Landfill

April 2013 Interim Site-wide Groundwater Monitoring Results

Appendix C
Data Validation Results

April 2013 Groundwater Sampling Event
South Park Landfill

Data Validation Report

Prepared for
Seattle Public Utilities

Prepared by
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July 2013

Table of Contents

List of Appendices

List of Abbreviations and Acronyms

Abbreviation/ Acronym	Definition
ARI	Analytical Resources, Inc. Laboratory
CLP	Contract Laboratory Program
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MS	Matrix spike

Abbreviation/ Acronym	Definition
RPD	Relative percent difference
QC	Quality control
SDG	Sample Delivery Group
USEPA	U. S. Environmental Protection Agency
VOC	Volatile organic compound

1.0 Project Narrative

1.1 OVERVIEW OF DATA VALIDATION

This report summarizes the results of the Compliance Screening (Level I) performed on the groundwater and field quality control (QC) sample data for the South Park Landfill April 2013 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

SDG (Batch)	Sample ID	Lab ID	8260C	8260C-SIM	6010B
WJ94	SPL-GW-MW32-040113	WJ94A/WJ94G	X	X	X
WJ94	SPL-GW-MW33-040113	WJ94B/WG94H	X	X	X
WJ94	SPL-GW-MW25-040113	WJ94C/WJ94I	X	X	X
WJ94	SPL-GW-MW60-040113	WJ94D/WJ94J	X	X	X
WJ94	TripBlank #1	WJ94E	X	X	
WJ94	TripBlank #2	WJ94F	X	X	
WK09	SPL-GW-MW30-040213	WK09A/WK09/K	X	X	X
WK09	SPL-GW-MW31-040213	WK09B/WK09L	X	X	X
WK09	SPL_GW-MW24-040213	WK09C/WK09M	X	X	X
WK09	SPL-GW-MW26-040213	WK09D/WK09N	X	X	X
WK09	SPL-GW-MW08-040213	WK09E/WK09O	X	X	X
WK09	SPL-GW-MW27-040213	WK09F/WK09P	X	X	X
WK09	SPL-GW-MW10-040213	WK09G/WK09Q	X	X	X
WK09	SPL-GW-MW80-040213	WK09H	X	X	X
WK09	TripBlank #1	WK09I	X	X	
WK09	TripBlank #2	WK09J	X	X	
WK27	SPL-GW-MW18-040313	WK27A/WK27I	X	X	X
WK27	SPL-GW-MW29-040313	WK27B/WK27J	X	X	X
WK27	SPL-GW-MW14-040313	WK27C/WK27K	X	X	X
WK27	SPL-GW-MW12-040313	WK27D/WK27L	X	X	X
WK27	SPL-GW-KMW03A-040313	WK27E/WK27M	X	X	X
WK27	SPL-GW-KMW05-040313	WK27F/WK27N	X	X	X
WK27	TripBlank #1	WK27G	X	X	
WK27	TripBlank #2	WK27H	X	X	
WK40	SPL-GW-KMW08-040413	WK40A/WK40C	X	X	X
WK40	SPL-GW-MW61-040413	WK40B/WK40C	X	X	X
WK40	TripBlank #1	WK40E	X	X	

The chemical analyses were performed by Analytical Resources, Inc. (ARI) located in Tukwila, Washington. Groundwater samples were collected between April 1 and April 4, 2013 and submitted to ARI for chemical analyses. The analytical methods include the following:

- Select volatile organic compounds (VOCs)—U.S. Environmental Protection Agency (USEPA) Method 8260C
- Vinyl chloride—USEPA Method 8260C-SIM
- Select metals—USEPA Method 6010B

The data were reviewed using guidance and QC criteria documented in the analytical methods, *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 and 2004), *National Functional Guidelines for Organic Data Review* (USEPA 1999 and 2008), and the *Sampling and Analysis Plan, Appendix D of the Remedial Investigation/Feasibility Study Work Plan for South Park Landfill Site* (Farallon Consulting, LLC 2010).

Conventional parameters such as alkalinity, nitrate, nitrite, chloride, sulfate, and sulfide were also analyzed; however, they do not have data quality compliance requirements, and, therefore, the results were not included in this data validation report.

Floyd|Snider's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reasons, and validation criteria are included as Appendix A. As no data were qualified for this data set, the standard Qualified Data Summary Table was not populated, and has not been included as an attachment. Data validation worksheets (excel worksheets) will be kept on file at Floyd|Snider.

2.0 Data Validation Report
Select VOCs by USEPA Method 8260C

This report documents the review of analytical data from the analyses of groundwater and field QC samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

2.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

2.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

[1]	Cooler temperature and preservation	Surrogate recoveries
	Extraction and analysis holding times	Target analyte list
	Blank contamination	Reporting limits and reported results
	Laboratory control sample (LCS) and LCS duplicate (LCSD)	

Notes:
1 Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

2.2.1 Cooler Temperature and Preservation

For Sample Delivery Group (SDG) WJ94 the laboratory noted that the sample cooler temperatures (11.3°C and 6.3°C) were outside of the laboratory standard of 4±2°C. Samples were delivered to the laboratory the same day they were collected from the field. Only 60 minutes elapsed between when the final sample was collected and the cooler was delivered to the laboratory, leaving insufficient time for the cooler temperature to drop within the standard range. It is with professional judgment that no sample results be qualified based on cooler temperature, as the samples were delivered with minimal holding time.

2.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD relative percent difference (RPD).

All data, as reported by the laboratory, are acceptable for use.

3.0 Data Validation Report
Vinyl Chloride by USEPA Method 8260C-SIM

This report documents the review of analytical data from the analyses of groundwater and field QC samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

3.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

[1]	Cooler temperature and preservation	Surrogate recoveries
	Extraction and analysis holding times	Target analyte list
	Blank contamination	Reporting limits and reported results
	LCS and LCSD	

Notes:
1 Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

3.2.1 Cooler Temperature and Preservation

For SDG WJ94 the laboratory noted that the sample cooler temperatures (11.3°C and 6.3°C) were outside of the laboratory standard of 4±2°C. Samples were delivered to the laboratory the same day they were collected from the field. Only 60 minutes elapsed between when the final sample was collected and the cooler was delivered to the laboratory, leaving insufficient time for the cooler temperature to drop within the standard range. It is with professional judgment that no sample results be qualified based on cooler temperature, as the samples were delivered with minimal holding time.

3.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4.0 Data Validation Report
Select Metals by USEPA Method 6010B

This report documents the review of analytical data from the analyses of groundwater and field QC samples and the associated laboratory QC samples. Samples were analyzed by ARI. Compliance Screening (Level I) was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

4.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

[1]	Cooler temperature and preservation	[1]	Lab Sample and Lab Sample Duplicate
	Extraction and analysis holding times		Target analyte list
	Blank contamination		Reporting limits and reported results
[1]	Matrix Spike (MS)		

Notes:
1 Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

4.2.1 Cooler Temperature and Preservation

For SDG WJ94 the laboratory noted that the sample cooler temperatures (11.3°C and 6.3°C) were outside of the laboratory standard of 4±2°C. Samples were delivered to the laboratory the same day they were collected from the field. Only 60 minutes elapsed between when the final sample was collected and the cooler was delivered to the laboratory, leaving insufficient time for the cooler temperature to drop within the standard range. It is with professional judgment that no sample results be qualified based on cooler temperature, as the samples were delivered with minimal holding time.

4.2.2 Matrix Spike

For the analysis of total metals in SDG WJ94, the laboratory noted that the MS for iron and manganese may not be applicable, as the original concentrations in the sample exceeded the spike concentration by a factor of four (4x) or greater. Recoveries were still within control limits. Consistent with USEPA Contract Laboratory Program (CLP) guidance, it is with professional judgment that no total metal results be qualified based on this MS recovery information.

For the analysis of dissolved metals in SDG WJ94, the laboratory noted that the MS for calcium, iron, magnesium, manganese, and sodium may not be applicable, as the original concentrations in the sample exceeded the spike concentration by a factor of four (4x) or greater. Magnesium, manganese, and sodium had recoveries that were still within control limits. Calcium was spiked at 10 milligrams per liter (mg/L) with an original concentration of 68.3 mg/L, and iron was spiked at 2 mg/L with an original concentration of 23.8 mg/L. Per USEPA guidelines spike recovery limits do not apply when a sample concentration exceeds the spike concentration by a factor of four (4x) or greater. In such an event, the results shall be reported unqualified even if the percent recovery does not meet the acceptance criteria. Consistent with USEPA CLP guidance, it is with professional judgment that no dissolved metal results be qualified based on this MS recovery information.

For the analysis of dissolved metals in SDG WK04, the laboratory noted that the MS recovery for calcium may not be applicable, as the original concentration in the sample exceeded the spike concentration by a factor of four (4x) or greater. The recovery was still within control limits. Consistent with USEPA CLP guidance, it is with professional judgment that no dissolved calcium results be qualified based on this MS recovery information.

For the analysis of total metals in SDG WK27A, the laboratory noted that the MS recovery for iron may not be applicable, as the original concentration in the sample exceeded the spike concentration by a factor of four (4x) or greater. The recovery was still within control limits. Consistent with USEPA CLP guidance, it is with professional judgment that no total iron results be qualified based on this MS recovery information.

For the analysis of dissolved metals in SDG WK27A, the laboratory noted that the MS recoveries for calcium, iron, and magnesium may not be applicable, as the original concentrations in the sample exceeded the spike concentration by a factor of four (4x) or greater. The magnesium recovery was still within control limits. Calcium was spiked at 10 mg/L with an original concentration of 70.8 mg/L, and iron was spiked at 2 mg/L with an original concentration of 59.5 mg/L. Per USEPA guidelines, spike recovery limits do not apply when a sample concentration exceeds the spike concentration by a factor of four (4x) or greater. In such an event, the results shall be reported unqualified even if the percent recovery does not meet the acceptance criteria. Consistent with USEPA CLP guidance, it is with professional judgment that no dissolved metal results be qualified based on this MS recovery information.

4.2.3 Lab Sample and Lab Sample Duplicate

For the analysis of total and dissolved metals in SDG WK40, no sample/sample duplicate was run, as there were only two samples in the sample delivery group. It is with professional judgment that no results be qualified based on missing duplicate analysis, as all other sample delivery groups for this event demonstrated adequate precision for this laboratory for this method.

4.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the sample/sample duplicate RPDs as discussed above.

All data, as reported by the laboratory, are acceptable for use.

5.0 References

Farallon Consulting, LLC. 2010. *Sampling and Analysis Plan, Appendix D of the Remedial Investigation/Feasibility Study Work Plan for South Park Landfill Site*.

U.S. Environmental Protection Agency (USEPA). 2004, 1994. *National Functional Guidelines for Inorganic Data Review*.

———. 2008, 1999. *National Functional Guidelines for Organic Data Review*.

April 2013 Groundwater Sampling Event
South Park Landfill

Data Validation Report

Appendix A
Data Qualifier Definitions and Criteria Tables

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is a Floyd|Snider qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

Floyd|Snider Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Floyd|Snider Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled Frozen tissues—HT extended to 2 years	J/UJ if holding time exceeded
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. < 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J/UJ if tune criteria not met
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J/UJ if r<0.995 (for multi point cal)
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J/UJ if %R 75–89% J if %R = 111-125% R if %R > 125% R if %R < 75%
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J/UJ if %R = 75–89% J if %R 111-125% R if %R > 125% R if %R < 75%

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+)blanks, U results < action level
		For (-) blanks, J/UJ results < action level

Validation QC Element	Acceptance Criteria	Action
Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R, < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J < 2x RL, UJ if %R 50-69% (30%-49% Co,Mn, Zn) J < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R < 2x RL if %R > 180% (200% Co, Mn, Zn)
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R if %R < 50% J if %R >120% J/UJ if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U results < action level
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R if %R < 50% J/UJ if %R = 50-79% J if %R >120%
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J/UJ if < LCL, J if > UCL
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J if %R>125% J/UJ if %R <75% J/R if %R<30% or J/UJ if Post Spike %R 75%-125% Qualify all samples in batch
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J/UJ if RPD > 20% or diff > RL All samples in batch
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J/UJ if %D >10% All samples in batch

Validation QC Element	Acceptance Criteria	Action
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J /UJ all analytes associated with IS outlier
Field Blank	Blank < MDL	Action level is 5x blank conc. U sample values < AL in associated field samples only
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J/UJ in parent samples only
Linear Range	Sample concentrations must fall within range	J values over range

Floyd|Snider Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Floyd|Snider Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled Frozen tissues—HT extended to 2 years	J/UJ if holding time exceeded
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. < 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J/UJ if tune criteria not met
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J/UJ if r<0.995 (for multi point cal)
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J/UJ if %R 75–89% J if %R = 111-125% R if %R > 125% R if %R < 75%
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J/UJ if %R = 75–89% J if %R 111-125% R if %R > 125% R if %R < 75%

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+)blanks, U results < action level
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Validation QC Element	Acceptance Criteria	Action
Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R, < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J < 2x RL, UJ if %R 50-69% (30%-49% Co,Mn, Zn) J < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R < 2x RL if %R > 180% (200% Co, Mn, Zn)
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R if %R < 50% J if %R >120% J/UJ if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U results < action level
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R if %R < 50% J/UJ if %R = 50-79% J if %R >120%
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J/UJ if < LCL, J if > UCL
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J if %R>125% J/UJ if %R <75% J/R if %R<30% or J/UJ if Post Spike %R 75%-125% Qualify all samples in batch
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J/UJ if RPD > 20% or diff > RL All samples in batch
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J/UJ if %D >10% All samples in batch

Validation QC Element	Acceptance Criteria	Action
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J /UJ all analytes associated with IS outlier
Field Blank	Blank < MDL	Action level is 5x blank conc. U sample values < AL in associated field samples only
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J/UJ in parent samples only
Linear Range	Sample concentrations must fall within range	J values over range