UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
BOSTON, MA 02109-3912

CERTIFIED MAIL RETURN RECEIPT REQUESTED

JUN 13 2011

Scott Beals,
Senior Engineering Technician
GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Re: Authorization to discharge under the Remediation General Permit (RGP) – MAG910000. Waverly Oaks Park/ Duffy Brothers Construction Inc., site located at 411 Waverly Oaks Road, Waltham 02452, Middlesex County; Authorization # MAG910153

Dear Mr. Beals:

Based on the review of a Notice of Intent (NOI) submitted on behalf of Duffy Brothers Construction Inc., by your firm GZA GeoEnvironmental, Inc., for the site referenced above, the U.S. Environmental Protection Agency (EPA) hereby authorizes you, as the named Operator, to discharge in accordance with the provisions of the RGP at that site. Your authorization number is listed above.

The checklist enclosed with this RGP authorization indicates the pollutants which you are required to monitor. Also indicated on the checklist are the effluent limits, test methods and minimum levels (MLs) for each pollutant. Please note that the checklist does not represent the complete requirements of the RGP. Operators must comply with all of the applicable requirements of this permit, including influent and effluent monitoring, narrative water quality standards, record keeping, and reporting requirements, found in Parts I and II, and Appendices I – VIII of the RGP. See EPA's website for the complete RGP and other information at: http://www.epa.gov/region1/npdes/mass.html#dgp.

Please note the enclosed checklist includes parameters that exceeded Appendix III limits. The checklist also includes other parameters for which your laboratory reports indicated there was insufficient sensitivity to detect these parameters at the minimum levels established in Appendix VI of the RGP.

Also, please note that the metals included on the checklist are dilution dependent pollutants and subject to limitations based on a dilution factor range (DFR). With the absence of dilution to Beaver Brook, EPA determined that the DFR for each parameter is in the one and five (1-5) range. (See the RGP Appendix IV for Massachusetts facilities)

Therefore, the limits for arsenic of 28ug/L, cadmium of 0.56ug/L, copper of 14.562ug/L, lead of 3.64ug/L, nickel of 81.2ug/L, zinc of 186.48ug/L and iron of 2,800ug/L, are required to achieve permit compliance at your site.

Finally, please note the checklist of pollutants attached to this authorization is subject to a recertification if the operations at the site result in a discharge lasting longer than six months. A recertification can be submitted to EPA within six (6) to twelve (12) months of operations in accordance with the 2010 RGP regulations.

This general permit and authorization to discharge will expire on September 9, 2015. You have reported that this project will terminate on 12/8/2015. If for any reason the discharge terminates sooner you are required to submit a Notice of Termination (NOT) to the attention of the contact person indicated below within 30 days of project completion.

Thank you in advance for your cooperation in this matter. Please contact Victor Alvarez at 617-918-1572 or Alvarez.Victor@epa.gov, if you have any questions.

Sincerely,

David M. Webster

David M. Webster, Chief
Industrial Permits Branch

Enclosure

cc: Kathleen Keohane, MassDEP
Rusell B. Parkman, GZA GeoEnvironmental Inc.

2010 Remediation General Permit
Summary of Monitoring Parameters[1]

NPDES Authorization Number:	**MAG910135**
Authorization Issued:	June, 2011
Facility/Site Name:	Waverly Oaks Park/ Duffy Brothers Construction Inc.
Facility/Site Address:	411 Waverly Oaks Road, Waltham 02452, Middlesex County
	Email address of owner: Kevinduffy@duffyproperties.com
Legal Name of Operator:	GZA GeoEnvironmental Inc.
Operator contact name, title, and Address:	Scott Beals, Senior Engineering Technician One Edgewater Drive, Norwood, MA 02062
	Email: Not Reported
Estimated Date of Completion:	12/8/2015
Category and Sub-Category:	Activity Category I- Petroleum Related Site Remediation. Sub-category C. Petroleum Sites with Additional Contamination
Receiving Water:	Beaver Brook

Monitoring & Limits are applicable if checked. All samples are to be collected as grab samples

	Parameter	**Effluent Limit/Method#/ML** (All Effluent Limits are shown as Daily Maximum Limit, unless denoted by a **, in that case it will be a Monthly Average Limit)
√	1. Total Suspended Solids (TSS)	30 milligrams/liter (mg/L) **, 50 mg/L for hydrostatic testing **, Me#60.2/ML5ug/L
	2. Total Residual Chlorine (TRC) [1]	Freshwater = 11 ug/L ** Saltwater = 7.5 ug/L **/ Me#330.5/ML 20ug/L
√	3. Total Petroleum Hydrocarbons (TPH)	5.0 mg/L/ Me# 1664A/ML 5.0mg/L
√	4. Cyanide (CN) [2, 3]	Freshwater = 5.2 ug/l ** Saltwater = 1.0 ug/L **/ Me#335.4/ML 10ug/L
√	5. Benzene (B)	5ug/L /50.0 ug/L for hydrostatic testing only/ Me#8260C/ML 2 ug/L
√	6. Toluene (T)	(limited as ug/L total BTEX)/ Me#8260C/ ML 2ug/L
√	7. Ethylbenzene (E)	(limited as ug/L total BTEX) Me#8260C/ ML 2ug/L
√	8. (m,p,o) Xylenes (X)	(limited as ug/L total BTEX) Me#8260C/ ML 2ug/L
√	9. Total Benzene, Toluene, Ethyl Benzene, and Xylenes (BTEX) [4]	100 ug/L/ Me#8260C/ ML 2ug/L

	Parameter	Effluent Limit/Method#/ML (All Effluent Limits are shown as Daily Maximum Limit, unless denoted by a **, in that case it will be a Monthly Average Limit)
√	10. Ethylene Dibromide (EDB) (1,2- Dibromoethane)	0.05 ug/l/ Me#8260C/ ML 10ug/L
√	11. Methyl-tert-Butyl Ether (MtBE)	70.0 ug/l/Me#8260C/ML 10ug/L
√	12.tert-Butyl Alcohol (TBA) (TertiaryButanol)	Monitor Only(ug/L)/Me#8260C/ML 10ug/L
√	13. tert-Amyl Methyl Ether (TAME)	Monitor Only(ug/L)/Me#8260C/ML 10ug/L
	14. Naphthalene [5]	20 ug/L /Me#8260C/ML 2ug/L
√	15. Carbon Tetrachloride	4.4 ug/L /Me#8260C/ ML 5ug/L
	16. 1,2 Dichlorobenzene (o-DCB)	600 ug/L /Me#8260C/ ML 5ug/L
	17. 1,3 Dichlorobenzene (m-DCB)	320 ug/L /Me#8260C/ ML 5ug/L
√	18. 1,4 Dichlorobenzene (p-DCB)	5.0 ug/L /Me#8260C/ ML 5ug/L
	18a. Total dichlorobenzene	763 ug/L - NH only /Me#8260C/ ML 5ug/L
√	19. 1,1 Dichloroethane (DCA)	70 ug/L /Me#8260C/ ML 5ug/L
√	20. 1,2 Dichloroethane (DCA)	5.0 ug/L /Me#8260C/ ML 5ug/L
√	21. 1,1 Dichloroethene (DCE)	3.2 ug/L/Me#8260C/ ML 5ug/L
√	22. cis-1,2 Dichloroethene (DCE)	70 ug/L/Me#8260C/ ML 5ug/L
√	23. Methylene Chloride	4.6 ug/L/Me#8260C/ ML 5ug/L
	24. Tetrachloroethene (PCE)	5.0 ug/L/Me#8260C/ ML 5ug/L
	25. 1,1,1 Trichloro-ethane (TCA)	200 ug/L/Me#8260C/ ML 5ug/L
√	26. 1,1,2 Trichloro-ethane (TCA)	5.0 ug/L /Me#8260C/ ML 5ug/L
√	27. Trichloroethene (TCE)	5.0 ug/L /Me#8260C/ ML 5ug/L
√	28. Vinyl Chloride (Chloroethene)	2.0 ug/L /Me#8260C/ ML 5ug/L
√	29. Acetone	Monitor Only(ug/L)/Me#8260C/ML 50ug/L
√	30. 1,4 Dioxane	Monitor Only /Me#1624C/ML 50ug/L
√	31. Total Phenols	300 ug/L Me#420.1&420.2/ML 2 ug/L/ Me# 420.4 /ML 50ug/L
√	32. Pentachlorophenol (PCP)	1.0 ug/L /Me#8270D/ML 5ug/L,Me#604 &625/ML 10ug/L
√	33. Total Phthalates (Phthalate esters) [6]	3.0 ug/L ** /Me#8270D/ML 5ug/L, Me#606/ML 10ug/L& Me#625/ML 5ug/L
√	34. Bis (2-Ethylhexyl) Phthalate [Di- (ethylhexyl) Phthalate]	6.0 ug/L /Me#8270D/ML 5ug/L,Me#606/ML 10ug/L & Me#625/ML 5ug/L
√	35. Total Group I Polycyclic Aromatic Hydrocarbons (PAH)	10.0 ug/L
√	a. Benzo(a) Anthracene [7]	0.0038 ug/L /Me#8270D/ ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L

	Parameter	Effluent Limit/Method#/ML (All Effluent Limits are shown as Daily Maximum Limit, unless denoted by a **, in that case it will be a Monthly Average Limit)
√	b. Benzo(a) Pyrene [7]	0.0038 ug/L /Me#8270D/ ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
√	c. Benzo(b)Fluoranthene [7]	0.0038 ug/L /Me#8270D/ ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
√	d. Benzo(k)Fluoranthene [7]	0.0038 ug/L /Me#8270D/ ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
√	e. Chrysene [7]	0.0038 ug/L /Me#8270D/ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
√	f. Dibenzo(a,h)anthracene [7]	0.0038 ug/L /Me#8270D/ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML 5ug/L
√	g. Indeno(1,2,3-cd) Pyrene [7]	0.0038 ug/L /Me#8270D/ML 5ug/L, Me#610/ML 5ug/L& Me#625/ML5ug/L
√	36. Total Group II Polycyclic Aromatic Hydrocarbons (PAH)	100 ug/L
√	h. Acenaphthene	X/Me#8270D/ML 5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	i. Acenaphthylene	X/Me#8270D/ML 5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	j. Anthracene	X/Me#8270D/ML 5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	k. Benzo(ghi) Perylene	X/Me#8270D/ML 5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	l. Fluoranthene	X/Me#8270D/ML 5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	m. Fluorene	X/Me#8270D/ML 5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	n. Naphthalene [5]	20 ug/l / Me#8270/ML 5ug/L, Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	o. Phenanthrene	X/Me#8270D/ML 5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	p. Pyrene	X/Me#8270D/ML5ug/L,Me#610/ML 5ug/L & Me#625/ML 5ug/L
√	37. Total Polychlorinated Biphenyls (PCBs) [8, 9]	0.000064 ug/L/Me# 608/ ML 0.5 ug/L
√	38. Chloride	Monitor only/Me# 300.0/ ML 0.1ug/L

	Metal parameter	Total Recoverable Metal Limit @ H [10]= 50 mg/l CaCO3 for discharges in Massachusetts (ug/l) [11/12]		Minimum level=ML	
		Freshwater	Saltwater		
	39. Antimony	5.6/ML 10			
√	40. Arsenic **	28/ML20	36/ML 20		

	Metal parameter	Total Recoverable Metal Limit @ H [10]= 50 mg/l CaCO3 for discharges in Massachusetts (ug/l) [11/12]		Minimum level=ML	
		Freshwater	Saltwater		
√	41. Cadmium **	0.56/ML10	8.9/ML 10		
	42. Chromium III (trivalent) **	48.8/ML15	100/ML 15		
	43. Chromium VI (hexavalent) **	11.4/ML10	50.3/ML 10		
√	44. Copper **	14.56/ML15	3.7/ML 15		
√	45. Lead **	3.64/ML20	8.5/ML 20		
	46. Mercury **	0.9/ML0.2	1.1/ML 0.2		
√	47. Nickel **	81.2/ML20	8.2/ML 20		
	48. Selenium **	5/ML20	71/ML 20		
	49. Silver	1.2/ML10	2.2/ML 10		
√	50. Zinc **	186.48/ML15	85.6/ML 15		
√	51. Iron	2,800/ML 20			

	Other Parameters	Limit
√	52. Instantaneous Flow	Site specific in CFS
√	53. Total Flow	Site specific in CFS
√	54. pH Range for Class A & Class B Waters in MA	6.5-8.3; 1/Month/Grab[13]
	55. pH Range for Class SA & Class SB Waters in MA	6.5-8.3; 1/Month/Grab[13]
	56. pH Range for Class B Waters in NH	6.5-8; 1/Month/Grab[13]
	57. Daily maximum temperature - Warm water fisheries	83°F; 1/Month/Grab[14]
	58. Daily maximum temperature - Cold water fisheries	68°F; 1/Month/Grab[14]
	59. Maximum Change in Temperature in MA - Any Class A water body	1.5°F; 1/Month/Grab[14]
	60. Maximum Change in Temperature in MA - Any Class B water body- Warm Water	5°F; 1/Month/Grab[14]
	61. Maximum Change in Temperature in MA – Any Class B water body - Cold water and Lakes/Ponds	3°F; 1/Month/Grab[14]
	62. Maximum Change in Temperature in MA – Any Class SA water body - Coastal	1.5°F; 1/Month/Grab[14]
	63. Maximum Change in Temperature in MA – Any Class SB water body - July to September	1.5°F; 1/Month/Grab[14]
	64. Maximum Change in Temperature in MA –Any Class SB water body - October to June	4°F; 1/Month/Grab[14]

Footnotes:

[1] Although the maximum values for TRC are 11ug/l and 7.5 ug/l for freshwater, and saltwater respectively, the compliance limits are equal to the minimum level (ML) of the test method used as listed in Appendix VI (i.e., Method 330.5, 20 ug/l).
[2] Limits for cyanide are based on EPA's water quality criteria expressed as micrograms per liter. There is currently no EPA approved test method for free cyanide. Therefore, total cyanide must be reported.
[3] Although the maximum values for cyanide are 5.2 ug/l and 1.0 ug/l for freshwater and saltwater, respectively, the compliance limits are equal to the minimum level (ML) of the Method 335.4 as listed in Appendix VI (i.e., 10 ug/l).
[4] BTEX = sum of Benzene, Toluene, Ethylbenzene, and total Xylenes.
[5] Naphthalene can be reported as both a purgeable (VOC) and extractable (SVOC) organic compound. If both VOC and SVOC are analyzed, the highest value must be used unless the QC criteria for one of the analyses is not met. In such cases, the value from the analysis meeting the QC criteria must be used.
[6] The sum of individual phthalate compounds(not including the #34, Bis (2-Ethylhexyl) Phthalate . The compliance limits are equal to the minimum level (ML) of the test method used as listed in Appendix VI.
Total values calculated for reporting on NOIs and discharge monitoring reports shall be calculated by adding the measured concentration of each constituent. If the measurement of a constituent is less than the ML, the permittee shall use a value of zero for that constituent. For each test, the permittee shall also attach the raw data for each constituent to the discharge monitoring report, including the minimum level and minimum detection level for the analysis.
[7] Although the maximum value for the individual PAH compounds is 0.0038 ug/l, the compliance limits are equal to the minimum level (ML) of the test method used as listed in Appendix VI.
[8] In the November 2002 WQC, EPA has revised the definition of Total PCBs for aquatic life as total PCBs is the sum of all homologue, all isomer, all congener, or all "Oroclor analyses."Total values calculated for reporting on NOIs and discharge monitoring reports shall be calculated by adding the measured concentration of each constituent. If the measure of a constituent is less than the ML, the permittee shall use a value of zero for that constituent. For each test, the permittee shall also attach the raw data for each constituent to the discharge monitoring report, including the minimum level and minimum detection level for the analysis.
[9]Although the maximum value for total PCBs is 0.000064 ug/l, the compliance limit is equal to the minimum level (ML) of the test method used as listed in Appendix VI (i.e., 0.5 ug/l for Method 608 or 0.00005 ug/l when Method 1668a is approved).
[10] Hardness. Cadmium, Chromium III, Copper, Lead, Nickel, Silver, and Zinc are Hardness Dependent.
[11] For a Dilution Factor (DF) from 1 to 5, metals limits are calculated using DF times the base limit for the metal. See Appendix IV. For example, iron limits are calculated using DF x 1,000ug/L (the iron base limit). Therefore DF is 1.5, the iron limit will be 1,500 ug/L; DF 2, then iron limit =1,000 x 2 =2,000 ug/L., etc. not to exceed the DF=5.
[12] Minimum Level (ML) is the lowest level at which the analytical system gives a recognizable signal and acceptable calibration point for the analyte. The ML represents the lowest concentration at which an analyte can be measured with a known level of confidence. The ML is calculated by multiplying the laboratory-determined method detection limit by 3.18 (see 40 CFR Part 136, Appendix B).
[13] pH sampling for compliance with permit limits may be performed using field methods as provided for in EPA test Method 150.1.
[14] Temperature sampling per Method 170.1

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

December 8, 2010
File No. 12820.90

Mr. Victor Alvarez
United States Environmental Protection Agency – Region 1
1 Congress Street, Suite 1100
Boston, Massachusetts 02114-2023

One Edgewater Drive
Norwood
Massachusetts
02062
781-278-3700
FAX 781-278-5701
http://www.gza.com

Re: Submittal of Notice of Intent (NOI)
411 Waverly Oaks Road
Waltham, Massachusetts
2005 RGP Authorization # MAG910153
MassDEP - RTN 3-0454

Dear Mr. Alvarez:

GZA GeoEnvironmental, Inc. (GZA), on behalf of our client, Duffy Brothers Construction, Inc. (Duffy), is submitting the attached Notice of Intent (NOI) form (Attachment 1) for the Remedial General Permit (RGP) for the groundwater extraction and treatment system located at 411 Waverly Oaks Road, Waltham, Massachusetts (the Site). Coverage under the RGP was issued by the United States Environmental Protection Agency (EPA) on December 13, 2005 for discharges associated with the groundwater and separate phase hydrocarbon (SPH) recovery system operating at the Site.

BACKGROUND

The Site address is 411 Waverley Oaks Road in Waltham, Massachusetts. In May of 1993, GZA submitted a report to the Massachusetts Department of Environmental Protection (MassDEP) entitled "Hydrogeologic and Remedial Investigation Report, Waverley Oaks Park, 411 Waverley Oaks Road, Waltham, Massachusetts" documenting the results of previous investigations and remedial activities performed at the Site, and summarizing the results of additional hydrogeologic and remedial investigation activities performed in November 1992. In general, these studies estimated the areal extent of SPH to be on the order of 45,000 square feet in the southeastern portion of the Site. Elevated concentrations of volatile organic compounds (VOCs), particularly petroleum-related VOCs and certain chlorinated VOCs, were detected in groundwater samples. These compounds included vinyl chloride, cis-1,2-dichloroethene, ethyl benzene, dichlorofluoromethane, and 1,2-dichloroethane. Polychlorinated biphenyls (PCBs) were detected in SPH and soil at elevated concentrations at the Site.

As part of the May 1993 submittal, GZA proposed certain modifications to an existing SPH recovery system at the Site. The proposed modifications included the installation of additional recovery wells and an SPH/groundwater recovery and treatment system to enhance product recovery operations in the southern portion of the Site. The primary purpose of these additional remedial measures was to increase SPH collection, further limit potential off-site migration of both SPH and the underlying groundwater, and begin remediating the groundwater. On April 7, 1994, MassDEP issued a letter approving the proposed modifications as a Short Term Measure (STM). The remediation system consisted of an oil/water separator where SPH was removed and stored in an aboveground storage tank. Separated water was pumped to the equalization tank along with the groundwater extracted from the recovery wells (in which dedicated groundwater

extraction pumps were installed). Recovered groundwater was then pumped to a tray aerator air stripper to remove VOCs and then filtered through bag filters and treated by liquid-phase activated carbon prior to discharge to the on-site pond.

On July 17, 2002, a RAM Plan was submitted to MassDEP to conduct two pilot tests as part of a Massachusetts Contingency Plan (MCP) Phase III feasibility study for the Site. On January 17, 2003, a RAM Plan Modification was submitted to MassDEP to connect recovery wells installed under the RAM Plan to the then existing STM system. Due to these alterations, the existing system ceased to operate as a Short Term Measure; all subsequent operation and reporting since that time has taken place in accordance with the RAM Plan Modification and/or the Comprehensive Response Action Provisions of the MCP (310 CMR 40.0444).

In late 2005, in response to the newly issued RGP, GZA, on behalf of Duffy, submitted a Notice of Intent (NOI) to EPA requesting RGP coverage. In a letter dated December 13, 2005, EPA granted Duffy approval to discharge under the RGP.

In October, 2007, GZA, on behalf of Duffy, submitted an MCP Phase IV report for the Site. This report described the expansion of the existing SPH recovery system and associated treatment components.

On April 23, 2008, a Notice of Change (NOC) was submitted to take into account dewatering at the site associated with MCP Phase IV construction activities. The modified treatment system began full-scale operation in April 2009.

On October 6, 2008, a Notice of Change (NOC) was submitted that described completion of remedial strategy construction activities and the modification of existing treatment system, and a change in operator information.

On October 29, 2009, a Notice of Change (NOC) was submitted for the addition of a chemical additive (sodium aluminate) to help precipitate iron and for removal from the clarifier as sludge, and the use of four 25 micron nominal bag filter housings in parallel operation directly upstream of the liquid phase activated carbon units to help protect the carbon units from fouling.

On August 10, 2010, a Notice of Change (NOC) was submitted for the addition of a frac tank prior to the oil/water separator for additional equalization to further improve treatment efficiency and operation.

NOTICE OF INTENT

This NOI has included a review of all literature pertaining to Areas of Critical Environmental Concern (ACEC), Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA), as documented below:

- Review of Appendix I “Areas of Critical Environmental Concern” (June 2009) found that there are no ACEC located in the City of Waltham, Massachusetts.
- Review of Appendix II “Federally Listed Endangered and Threatened Species in Massachusetts” (July 2008) found that there are no listed species in the City of Waltham, Massachusetts.
- Review of the Interactive Priority and Estimated Habitats provided by the MassWildlife online viewer (2008) shows that neither the Site nor the discharge point

is located within a National Heritage & Endangered Species Program (NHESP) Priority Habitats of Rare Species area or Estimated Habitats of Rare Wildlife area. In addition, this is not a new discharge; therefore, permit eligibility meets "Criterion A."

- An electronic review of the Massachusetts Cultural Resource Information System database, made available through Massachusetts Historical Commission, found that no area, building, burial ground, object, or structure is located on the property located at 411 Waverly Oaks Road, Waltham, MA. The documentation of this review can be found in Attachment 5. In addition, this is an existing discharge and no construction activities are required; therefore, permit eligibility meets "Criterion 1."

TREAMENT SYSTEM

GZA has installed 133 new extraction wells (Figure 2) where both groundwater and SPH will be extracted by a total fluids pump powered by compressed air. The groundwater and SPH extraction will be limited to operating at alternating portions of the Site to limit the maximum design flow rate to 100 gallons per minute (gpm) and enhance SPH removal. Additionally, the extraction wells are designed for high vacuum soil vapor extraction and reinjection of treated water.

Extracted groundwater and SPH will be pumped together from total fluids extraction pumps via an underground piping network to the treatment system installed in a dedicated building at the Site.

Recovered groundwater and SPH will be pumped to a frac tank and then two oil/water separators where SPH will be separated and removed and stored in an above ground product tank for off-site disposal. Groundwater which passes through the oil/water separators will discharge into the equalization tank. Additionally, groundwater or SPH removed by the high vacuum system will be pumped into the oil/water separator influent.

The groundwater will be then pumped by a centrifugal pump from the equalization tank to the mixed oxidation tank where sodium hydroxide from a sodium hydroxide storage tank, sodium aluminate and sodium permanganate from a sodium permanganate tote will also be added and mixed. Sodium hydroxide will be added to increase the pH of the groundwater to approximately 8.0, which is the target pH for iron precipitation from Site groundwater, sodium aluminate is a coagulant, and sodium permanganate will be added to oxidize iron into a precipitable form.

The effluent from the oxidation tank will discharge to an inclined plate clarifier where polymer will be added to enhance the floc size and where the suspended solids will settle to the base of the clarifier while the supernatant (treated water) discharges to the sand filter. The suspended solids (sludge) will be removed from the clarifier periodically and transferred to a sludge thickener, and then a filter press where the sludge will be transformed to filter cake for disposal. The automatic backwashing sand filter will further remove solids from the groundwater.

The sand filter effluent will be discharged to a wetwell where a dispersing agent is also added to prevent microfloc from fouling the equipment downstream. The water is then pumped through eight parallel bag filters, a heat exchanger (to remove residual heat from the high vacuum extraction blower effluent air) and then through activated carbon units prior to discharge to the surface water or to the reinjection tank, where treated water is reinjected into

selected extraction wells. The water temperature is anticipated to rise less than 2 degrees Fahrenheit above normal groundwater temperature after passing through the heat exchanger.

Discharge – Since the existing system discharge was designed for a maximum flowrate of 100 gpm and the modified system will also discharge at a maximum 100 gpm, the modified system will utilize the existing discharge location and subsurface discharge piping.

Please do not hesitate to contact the undersigned at (781) 278-3700, if you have any questions or require further information.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Russell B. Parkman, P.E.
Senior Project Manager

Patrick F. Sheehan, P.E.
Consultant/Reviewer

Albert J. Ricciardelli, P.E., LSP
Senior Principal

Attachments:
Attachment 1: NOI Form
Attachment 2: Figure 1 – Site Locus Map
Attachment 3: Figure 2 – Site Plan
Attachment 4: Figure 3 – Process Flow Diagram
Attachment 5: MHC Report
Attachment 6: NHESP Map
Attachment 7: Laboratory Analytical Results
Attachment 8: Supplemental Information – 7Q10 data for Watershed
Attachment 9: MSDS Sheets

cc: MassDEP – Northeastern Region

ATTACHMENT 1

NOI FORM

B. Suggested Form for Notice of Intent (NOI) for the Remediation General Permit

1. General facility/site information. Please provide the following information about the site:

a) Name of **facility/site**: Duffy Brothers Construction Inc.		**Facility/site** mailing address:		
Location of **facility/site**: longitude: -71.202144 latitude: 42.386900	Facility SIC code(s): 5900	Street: 411 Waverley Oaks Road		
b) Name of **facility/site owner:** Kevin P. Duffy		Town: Waltham		
Email address of facility/site owner: Kevinduffy@duffyproperties.com		State: MA	Zip: 02452	County: Middlesex
Telephone no. of facility/site **owner**: 781-647-5775				
Fax no. of facility/site **owner**: 781-893-6623		**Owner** is (check one): 1. Federal ○ 2. State/Tribal ○ 3. Private ⊙ 4. Other ○ if so, describe:		
Address of **owner** (if different from site):				
Street: 411 Waverley Oaks Road, Suite 340				
Town: Waltham	State: MA	Zip: 02452	County: Middlesex	
c) Legal name of **operator**:		**Operator** telephone no: 781-278-3700		
GZA GeoEnvironmental, Inc.		**Operator** fax no.: 781-278-5701	**Operator** email:	
Operator contact name and title: Scott Beals, Senior Engineering Technician				
Address of **operator** (if different from owner):	Street: One Edgewater Drive			
Town: Norwood	State: MA	Zip: 02062	County: Norfolk	

d) Check Y for "yes" or N for "no" for the following:
1. Has a prior NPDES permit exclusion been granted for the discharge? Y ⊙ N ○, if Y, number: November 9, 1994
2. Has a prior NPDES application (Form 1 & 2C) ever been filed for the discharge?
Y ⊙ N ○, if Y, date and tracking #: August 18, 1995
3. Is the discharge a "new discharge" as defined by 40 CFR 122.2? Y ○ N ⊙
4. For sites in Massachusetts, is the discharge covered under the Massachusetts Contingency Plan (MCP) and exempt from state permitting? Y ⊙ N ○

e) Is site/facility subject to any State permitting, license, or other action which is causing the generation of discharge? Y ⊙ N ○
If Y, please list:
1. site identification # assigned by the state of NH or MA: MA RTN 3-0454
2. permit or license # assigned: Tier IB Permit No. 83005
3. state agency contact information: name, location, and telephone number:

MA DEP Tel.: 978-694-3200
205B Lowell Street
Wilmington, MA 01887

f) Is the site/facility covered by any other EPA permit, including:
1. Multi-Sector General Permit? Y ○ N ⊙, if Y, number:
2. Final Dewatering General Permit? Y ○ N ⊙, if Y, number:
3. EPA Construction General Permit? Y ○ N ⊙, if Y, number:
4. Individual NPDES permit? Y ○ N ⊙, if Y, number:
5. any other water quality related individual or general permit? Y ○ N ⊙, if Y, number:

g) Is the site/facility located within or does it discharge to an Area of Critical Environmental Concern (ACEC)? Y ○ N ⊙

h) Based on the facility/site information and any historical sampling data, identify the sub-category into which the potential discharge falls.

Activity Category	**Activity Sub-Category**
I - Petroleum Related Site Remediation	A. Gasoline Only Sites ☐ B. Fuel Oils and Other Oil Sites (including Residential Non-Business Remediation Discharges) ☐ C. Petroleum Sites with Additional Contamination ☒
II - Non Petroleum Site Remediation	A. Volatile Organic Compound (VOC) Only Sites ☐ B. VOC Sites with Additional Contamination ☐ C. Primarily Heavy Metal Sites ☐
III - Contaminated Construction Dewatering	A. General Urban Fill Sites ☐ B. Known Contaminated Sites ☐

IV - Miscellaneous Related Discharges	A. Aquifer Pump Testing to Evaluate Formerly Contaminated Sites ☐ B. Well Development/Rehabilitation at Contaminated/Formerly Contaminated Sites ☐ C. Hydrostatic Testing of Pipelines and Tanks ☐ D. Long-Term Remediation of Contaminated Sumps and Dikes ☐ E. Short-term Contaminated Dredging Drain Back Waters (if not covered by 401/404 permit) ☐

2. Discharge information. Please provide information about the discharge, (attaching additional sheets as necessary) including:

a) Describe the discharge activities for which the owner/applicant is seeking coverage:

Discharge of treated groundwater by MCP response action to Beaver Brook.

b) Provide the following information about each discharge:

1) Number of discharge points: 1

2) What is the **maximum** and **average flow rate** of discharge (in cubic feet per second, ft^3/s)?
Max. flow 0.23 Is maximum flow a **design value**? Y ⊙ N ○
Average flow (include units) 0.13 ft ³/s Is average flow a design value or estimate? Estimate

3) Latitude and longitude of each discharge within 100 feet:

pt.1: lat	-71	long	42	pt.2: lat.		long.	;
pt.3: lat		long		pt.4: lat.		long.	;
pt.5: lat		long		pt.6: lat.		long.	;
pt.7: lat		long		pt.8: lat.		long.	; etc.

4) If hydrostatic testing, total volume of the discharge (gals): No

5) Is the discharge intermittent ⊙ or seasonal ○ ?
Is discharge ongoing? Y ⊙ N ○

c) Expected dates of discharge (mm/dd/yy): start 12/8/2010 end 12/8/2015

d) Please attach a line drawing or flow schematic showing water flow through the facility including:
1. sources of intake water, 2. contributing flow from the operation, 3. treatment units, and 4. discharge points and receiving waters(s).

3. Contaminant information.

a) Based on the sub-category selected (see Appendix III), indicate whether each listed chemical is **believed present** or **believed absent** in the potential discharge. Attach additional sheets as needed.

Parameter *	CAS Number	Believed Absent	Believed Present	# of Samples	Sample Type (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Average daily value	
								concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
1. Total Suspended Solids (TSS)		☐	☒	1	Grab	2540D	5000	218.000	118.6	218.000	118.6
2. Total Residual Chlorine (TRC)		☒	☐	1	Grab	4500CID	20				
3. Total Petroleum Hydrocarbons (TPH)		☐	☒	1	Grab	1664	5000	219.000	119.1	219.000	119.1
4. Cyanide (CN)	57125	☐	☒	1	Grab	SM-4500CN	5	6.1	0.003	6.1	0.003
5. Benzene (B)	71432	☐	☒	1	Grab	8260	100	650	0.35	650	0.35
6. Toluene (T)	108883	☐	☒	1	Grab	8260	100	200	0.11	200	0.11
7. Ethylbenzene (E)	100414	☐	☒	1	Grab	8260	100	880	0.48	880	0.48
8. (m,p,o) Xylenes (X)	108883; 106423; 95476; 1330207	☐	☒	1	Grab	8260	100	1510	0.82	1510	0.82
9. Total BTEX [2]	n/a	☐	☒	1	Grab	8260	100	3240	1.76	3240	1.76
10. Ethylene Dibromide (EDB) (1,2-Dibromoethane) [3]	106934	☒	☐	1	Grab	8260	200				
11. Methyl-tert-Butyl Ether (MtBE)	1634044	☒	☐	1	Grab	8260	100				
12. tert-Butyl Alcohol (TBA) (Tertiary-Butanol)	75650	☒	☐	1	Grab	8260	2500				

* Numbering system is provided to allow cross-referencing to Effluent Limits and Monitoring Requirements by Sub-Category included in Appendix III, as well as the Test Methods and Minimum Levels associated with each parameter provided in Appendix VI.

[2] BTEX = Sum of Benzene, Toluene, Ethylbenzene, total Xylenes.

[3] EDB is a groundwater contaminant at fuel spill and pesticide application sites in New England.

Parameter *	CAS Number	Believed Absent	Believed Present	# of Samples	Sample Type (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Average daily value	
								concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
13. tert-Amyl Methyl Ether (TAME)	9940508	☒	☐	1	Grab	8260	200				
14. Naphthalene	91203	☐	☒	1	Grab	8260	200	5500	2.99	5500	2.99
15. Carbon Tetrachloride	56235	☒	☐	1	Grab	8260	100				
16. 1,2 Dichlorobenzene (o-DCB)	95501	☒	☐	1	Grab	8260	100				
17. 1,3 Dichlorobenzene (m-DCB)	541731	☒	☐	1	Grab	8260	100				
18. 1,4 Dichlorobenzene (p-DCB)	106467	☒	☐	1	Grab	8260	100				
18a. Total dichlorobenzene		☒	☐	1	Grab	8260	100				
19. 1,1 Dichloroethane (DCA)	75343	☒	☐	1	Grab	8260	100				
20. 1,2 Dichloroethane (DCA)	107062	☒	☐	1	Grab	8260	100				
21. 1,1 Dichloroethene (DCE)	75354	☒	☐	1	Grab	8260	100				
22. cis-1,2 Dichloroethene (DCE)	156592	☐	☒	1	Grab	8260	100	220	0.12		0.12
23. Methylene Chloride	75092	☒	☐	1	Grab	8260	200				
24. Tetrachloroethene (PCE)	127184	☒	☐	1	Grab	8260	100				
25. 1,1,1 Trichloro-ethane (TCA)	71556	☒	☐	1	Grab	8260	100				
26. 1,1,2 Trichloro-ethane (TCA)	79005	☒	☐	1	Grab	8260	100				
27. Trichloroethene (TCE)	79016	☒	☐	1	Grab	8260	100				

Parameter *	CAS Number	Believed Absent	Believed Present	# of Samples	Sample Type (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Average daily value	
								concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
28. Vinyl Chloride (Chloroethene)	75014	☒	☐	1	Grab	8260	100				
29. Acetone	67641	☒	☐	1	Grab	8260	1000				
30. 1,4 Dioxane	123911	☒	☐	1	Grab	8260	10000				
31. Total Phenols	108952	☒	☐	1	Grab	8260	935				
32. Pentachlorophenol (PCP)	87865	☒	☐	1	Grab	8270	4670				
33. Total Phthalates (Phthalate esters) [4]		☒	☐	1	Grab	8270	935				
34. Bis (2-Ethylhexyl) Phthalate [Di-(ethylhexyl) Phthalate]	117817	☒	☐	1	Grab	8270	561				
35. Total Group I Polycyclic Aromatic Hydrocarbons (PAH)		☒	☐	1	Grab	8270	935				
a. Benzo(a) Anthracene	56553	☒	☐	1	Grab	8270	935				
b. Benzo(a) Pyrene	50328	☒	☐	1	Grab	8270	935				
c. Benzo(b)Fluoranthene	205992	☒	☐	1	Grab	8270	935				
d. Benzo(k)Fluoranthene	207089	☒	☐	1	Grab	8270	935				
e. Chrysene	21801	☒	☐	1	Grab	8270	935				
f. Dibenzo(a,h)anthracene	53703	☒	☐	1	Grab	8270	935				
g. Indeno(1,2,3-cd) Pyrene	193395	☒	☐	1	Grab	8270	935				
36. Total Group II Polycyclic Aromatic Hydrocarbons (PAH)		☐	☒	1	Grab	8270	935	25.690	13.98	25.690	13.98

[4] The sum of individual phthalate compounds.

Parameter *	CAS Number	Believed Absent	Believed Present	# of Samples	Sample Type (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Average daily value	
								concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
h. Acenaphthene	83329	☐	☒	1	Grab	8270	935	3060	1.66	3060	1.66
i. Acenaphthylene	208968	☐	☐	1	Grab	8270	935				
j. Anthracene	120127	☐	☒	1	Grab	8270	935	1360	0.74	1360	0.74
k. Benzo(ghi) Perylene	191242	☐	☒	1	Grab	8270	935				
l. Fluoranthene	206440	☐	☒	1	Grab	8270	935	1020	0.55	1020	0.55
m. Fluorene	86737	☐	☒	1	Grab	8270	935	2050	1.12	2050	1.12
n. Naphthalene	91203	☐	☒	1	Grab	8270	935	11.500	6.26	11.500	6.26
o. Phenanthrene	85018	☐	☒	1	Grab	8270	935	4990	2.71	4990	2.71
p. Pyrene	129000	☐	☒	1	Grab	8270	935	1710	0.93	1710	0.93
37. Total Polychlorinated Biphenyls (PCBs)	85687; 84742; 117840; 84662; 131113; 117817.	☐	☒	1	Grab	608	0.50	10.84	0.006	10.84	0.006
38. Chloride	16887006	☐	☒	1	Grab	300	2000	390.000	212.16	390.000	212.16
39. Antimony	7440360	☒	☐	1	Grab	6010	5				
40. Arsenic	7440382	☐	☒	1	Grab	6010	2	17	0.009	17	0.009
41. Cadmium	7440439	☐	☒	1	Grab	6010	1	2.2	0.001	2.2	0.001
42. Chromium III (trivalent)	16065831	☒	☐	1	Grab	Calc.					
43. Chromium VI (hexavalent)	18540299	☒	☐	1	Grab	3500CRD	10				
44. Copper	7440508	☐	☒	1	Grab	6010	5	14	0.008	14	0.008
45. Lead	7439921	☐	☒	1	Grab	6010	2	97	0.053	97	0.053
46. Mercury	7439976	☒	☐	1	Grab	6010	0.2				
47. Nickel	7440020	☐	☒	1	Grab	6010	2	6	0.003	6	0.003
48. Selenium	7782492	☒	☐	1	Grab	6010	5				
49. Silver	7440224	☒	☐	1	Grab	6010	1				
50. Zinc	7440666	☐	☒	1	Grab	6010	5	34	0.018	34	0.018
51. Iron	7439896	☐	☒	1	Grab	6010	10	29.000	15.78	29.000	15.78
Other (describe):		☐	☐	1	Grab						

Parameter *	CAS Number	Believed Absent	Believed Present	# of Samples	Sample Type (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Average daily value	
								concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
		☐	☐								
		☐	☐								

b) For discharges where **metals** are believed present, please fill out the following (attach results of any calculations):

Step 1: Do any of the metals in the influent exceed the effluent limits in Appendix III (i.e., the limits set at zero dilution)? Y ⊙ N ○	If yes, which metals? Iron, Lead, Arsenic, Cadmium, Copper
Step 2: For any metals which exceed the **Appendix III** limits, calculate the **dilution factor (DF)** using the formula in Part I.A.3.c (step 2) of the NOI instructions or as determined by the State prior to the submission of this NOI. What is the dilution factor for applicable metals? Metal: Iron DF: 1.6 Metal: Lead DF: 1.6 Metal: Arsenic DF: 1.6 Metal: Cadmium DF: 1.6 Etc. Copper DF: 1.6	Look up the limit calculated at the corresponding dilution factor in **Appendix IV.** Do any of the metals in the **influent** have the potential to exceed the corresponding **effluent** limits in Appendix IV (i.e., is the influent concentration above the limit set at the calculated dilution factor)? Y ⊙ N ○ If Y, list which metals: Lead, Iron, Arsenic, Cadmium, Copper

4. Treatment system information. Please describe the treatment system using separate sheets as necessary, including:

a) A description of the treatment system, including a schematic of the proposed or existing treatment system:

GW/SPH extracted from recovery wells is pumped to the treatment system via an underground piping network. The GW/SPH flows through a frac tank followed by two oil/water separators which remove product. Recovered product is piped to a storage tank. The remaining groundwater is pumped to an oxidation tank with chemical addition to an inclined plate clarifier, a sand filter, a series of eight bag filters and, lastly, through two GAC filters prior to discharge. Discharge may be to surface water or reinjection.

b) Identify each applicable treatment unit (check all that apply):	Frac. tank ☒	Air stripper ☐	Oil/water separator ☒	Equalization tanks ☒	Bag filter ☒	GAC filter ☒
	Chlorination ☐	De-chlorination ☐	Other (please describe):	Oxidation tank, sludge thickening tank, sand filter		

c) Proposed **average** and **maximum flow rates** (gallons per minute) for the discharge and the **design flow rate**(s) (gallons per minute) of the treatment system:
Average flow rate of discharge 60 gpm Maximum flow rate of treatment system 100 gpm
Design flow rate of treatment system 100 gpm

d) A description of chemical additives being used or planned to be used (attach MSDS sheets):

pH Adjustment - Sodium Hydroxide
Oxidant - Sodium Permanganate
Polymer - NalClear 7763
Dispersing Agent - Redux 340
Coagulant - Sodium Aluminate

5. Receiving surface water(s). Please provide information about the receiving water(s), using separate sheets as necessary:

a) Identify the discharge pathway:	Direct to receiving water ☒	Within facility (sewer) ☐	Storm drain ☐	Wetlands ☐	Other (describe):

b) Provide a narrative description of the discharge pathway, including the name(s) of the receiving waters:
Discharge via existing on-site drain system to Beaver Brook.

c) Attach a detailed map(s) indicating the site location and location of the outfall to the receiving water:
1. For multiple discharges, number the discharges sequentially.
2. For indirect dischargers, indicate the location of the discharge to the indirect conveyance and the discharge to surface water
The map should also include the location and distance to the nearest sanitary sewer as well as the locus of nearby sensitive receptors (based on USGS topographical mapping), such as surface waters, drinking water supplies, and wetland areas.

d) Provide the state water quality classification of the receiving water B

e) Provide the reported or calculated seven day-ten year low flow (7Q10) of the receiving water 0.13 cfs
Please attach any calculation sheets used to support stream flow and dilution calculations.

f) Is the receiving water a listed 303(d) water quality impaired or limited water? Y ⊙ N ○ If yes, for which pollutant(s)?
Excess growth E.Coli; dissolved oxygen, sedimentation, turbidity, organic enrichment, taste/odor, phosphorous (tdd).
Is there a final TMDL? Y ○ N ⊙ If yes, for which pollutant(s)?

6. ESA and NHPA Eligibility.

Please provide the following information according to requirements of Permit Parts I.A.4 and I.A.5 Appendices II and VII.

a) Using the instructions in Appendix VII and information on Appendix II, under which criterion listed in Part I.C are you eligible for coverage under this general permit?

A ⊙ B ○ C ○ D ○ E ○ F ○

b) If you selected Criterion D or F, has consultation with the federal services been completed? Y ○ N ○ Underway ○

c) If consultation with U.S. Fish and Wildlife Service and/or NOAA Fisheries Service was completed, was a written concurrence finding that the discharge is "not likely to adversely affect" listed species or critical habitat received? Y ○ N ○

d) Attach documentation of ESA eligibility as described in the NOI instructions and required by Appendix VII, Part I.C, Step 4.

e) Using the instructions in Appendix VII, under which criterion listed in Part II.C are you eligible for coverage under this general permit?

1 ⊙ 2 ○ 3 ○

f) If Criterion 3 was selected, attach all written correspondence with the State or Tribal historic preservation officers, including any terms and conditions that outline measures the applicant must follow to mitigate or prevent adverse effects due to activities regulated by the RGP.

7. Supplemental information.

Please provide any supplemental information. Attach any analytical data used to support the application. Attach any certification(s) required by the general permit.

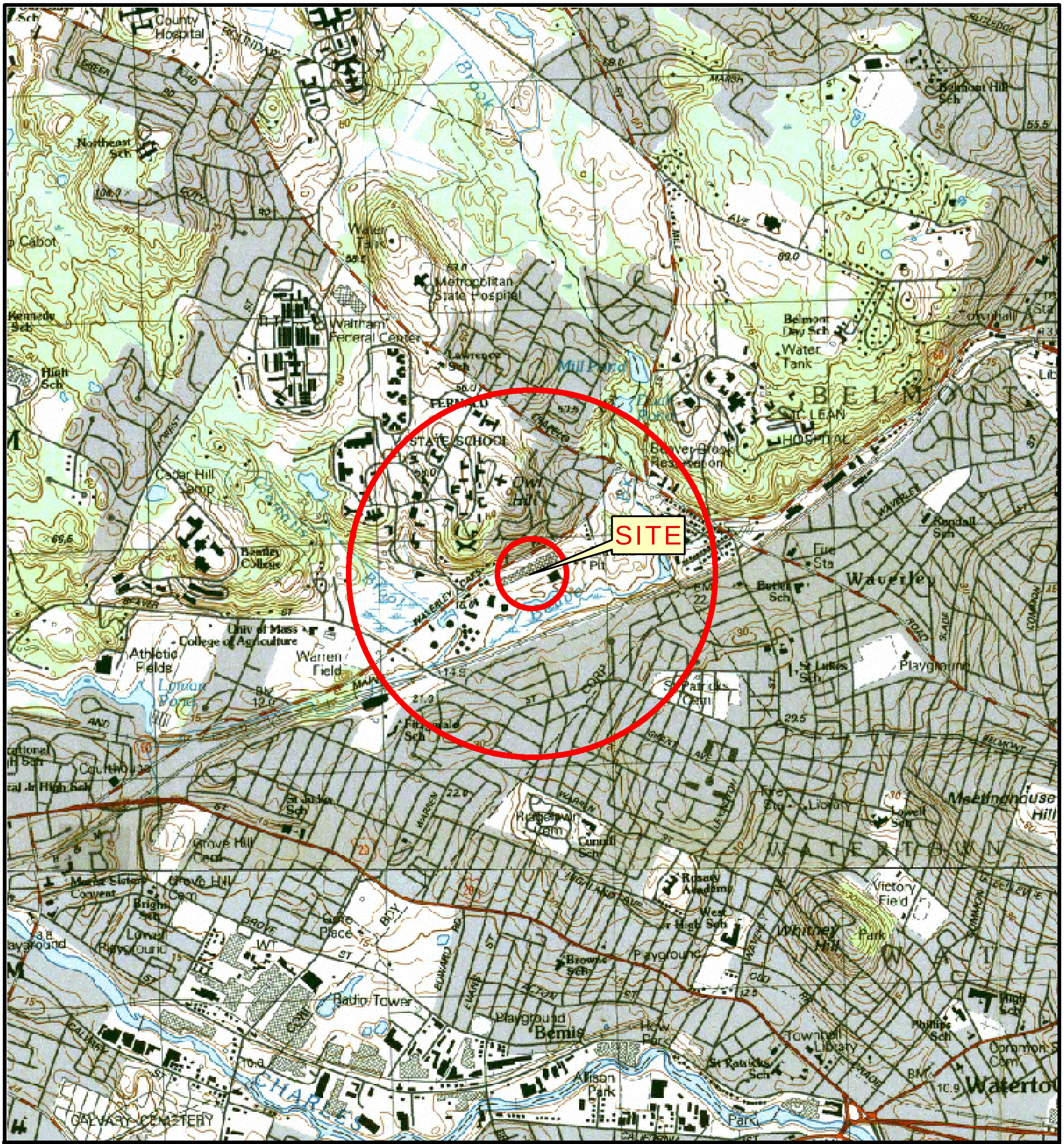
8. Signature Requirements: The Notice of Intent must be signed by the operator in accordance with the signatory requirements of 40 CFR Section 122.22, including the following certification:

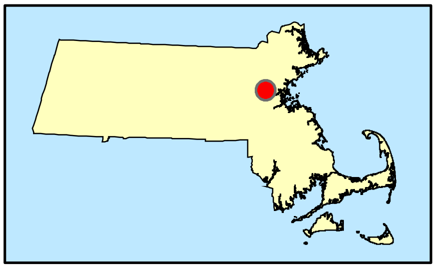
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I certify that I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Facility/Site Name:	Duffy Brothers Construction Inc.
Operator signature:	
Printed Name &Title:	Russell B. Parkman, Senior Project Manager (For Scott Beals) GZA
Date:	12/8/10

ATTACHMENT 2

FIGURE 1 – SITE LOCUS MAP





SOURCE : SCANNED USGS TOPOGRAPHIC QUADRANGLES SCANNED BY THE MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, MASSGIS. DISTRIBUTED JUNE, 2001.

Data Supplied by :

MASS GIS

0 | 1,000 | 2,000 | 4,000 | 6,000 Feet

N W E S

PROJ. MGR.: PFS
DESIGNED BY: EMD
REVIEWED BY: PFS
OPERATOR: GAS

DATE: 02-13-2007

SITE LOCATION MAP SHOWING 500 FOOT & 1/2 MILE RADII

411 WAVERLEY OAKS
WALTHAM, MASSACHUSETTS

JOB NO.
01.0012820.90

FIGURE NO.
1

I:\12820\12820-90.PFS\Figures\GIS\MXD Documents\12820-90_F01_Site Locus.mxd

ATTACHMENT 3

FIGURE 2 – SITE PLAN

LEGEND

EW-A1	EXTRACTION WELLS - EWA1-32, EWB1-31, EWC1-36, EWD1-13, AND EWE1-21
CO9	TOTAL FLUID CLEANOUT
▭	AIR MANIFOLD CABINET 1-6
TF13	TOTAL FLUIDS GATE VALVE
R13	REINJECTION GATE VALVE
——	SURFACE WATER DISCHARGE LINE
——	1½" HDPE TOTAL FLUIDS LINE
——	3" HDPE TOTAL FLUIDS LINE

NOTE:

PROPOSED FRAC TANK IS 8'WX41'L, PROPOSED SECONDARY CONTAINMENT IS 15'WX50'LX2'8"H. MAXIMUM VOLUME OF CONTAINMENT IS APPROXIMATELY 9,500 GALLONS. SECONDARY CONTAINMENT VOLUME IS APPROXIMATELY 14,000 GALLONS. SEE INSERT FOR SECONDARY CONTAINMENT SECTION.

NO.	ISSUE/DESCRIPTION	BY	DATE

411 WAVERLEY OAKS ROAD
WALTHAM, MASSACHUSETTS

SITE MAP

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists
ONE EDGEWATER DRIVE
NORWOOD, MASSACHUSETTS 02062
(781) 278-3700

PREPARED FOR: DUFFY BROTHERS CONSTRUCTION, INC.
411 WAVERLEY OAKS ROAD
WALTHAM, MASSACHUSETTS 02452

PROJ MGR: RJM	REVIEWED BY: RJM	CHECKED BY:	FIGURE
DESIGNED BY: SMR	DRAWN BY: OCO/GAS	SCALE: 1" = 30'	2
DATE: 05-10-2010	PROJECT NO. 12820.90	REVISION NO.	

ATTACHMENT 4

FIGURE 3 – PROCESS FLOW DIAGRAM

LEGEND

- BF — BAG FILTER
- TOTAL FLUIDS
- VAPOR
- PRODUCT
- CHEMICAL ADDITIVE
- SLUDGE

EXTRACTION WELLS

FRAC TANK

HIGH VACUUM EXTRACTION

AIR WATER SEPARATOR

VAPOR PHASE ACTIVATED CARBON FILTER

VAPOR PHASE ACTIVATED CARBON FILTER

DISCHARGE TO ATMOSPHERE

OIL WATER SEPARATOR

OIL WATER SEPARATOR

PRODUCT STORAGE TANK

OFFSITE DISPOSAL

SODIUM PERMANGANATE

SODIUM ALUMINATE

SODIUM HYDROXIDE

ANIONIC POLYMER

EQ TANK

OXIDATION TANK

CLARIFIER

SLUDGE THICKENING TANK

FILTER PRESS

OFFSITE DISPOSAL

SAND FILTER

DISPERSING AGENT

EQ TANK

BF

BF

BF

BF

BF

BF

BF

BF

LIQUID PHASE ACTIVATED CARBON FILTER

LIQUID PHASE ACTIVATED CARBON FILTER

DISCHARGE TO SURFACE WATER

REINJECTION

APPROVED:

NO.	ISSUE/DESCRIPTION	BY	DATE
2			
1			

411 WAVERLEY OAKS ROAD
WALTHAM, MASSACHUSETTS

PROCESS FLOW DIAGRAM

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
DUFFY BROTHERS CONSTRUCTION, INC.

PROJ MGR: RJM	REVIEWED BY: RJM	CHECKED BY:	FIGURE 3
DESIGNED BY: SMR	DRAWN BY: GAS	SCALE: NOT TO SCALE	
DATE: 12-02-2010	PROJECT NO. 12820.90	REVISION NO.	

ATTACHMENT 5

MHC REPORT

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

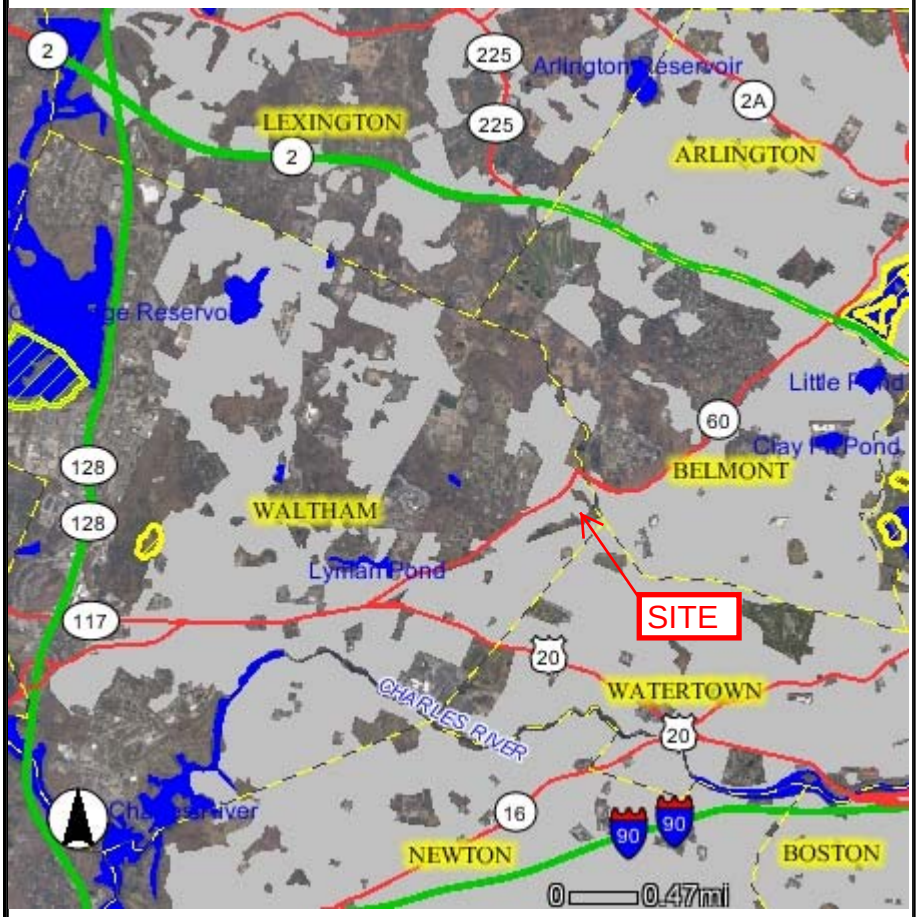
Search Criteria: Town(s): Waltham; Street No: 411; Street Name: waverly oaks Rd; Resource Type(s): Area, Building, Burial Ground, Object, Structure;

Inv. No.	Property Name	Street	Town	Year

ATTACHMENT 6

NHESP MAP

2008 Priority Habitat and Estimated Habitat Natural Heritage & Endangered Species Program



Legend

- Land Feature Names
- Major EOT-OTP Roads
- Alternate Route Numbers

Major EOT-OTP Roads

- Limited Access Highway
- Multi-lane Hwy, Not Limited Access
- Other Numbered Hwy

- Place Names
- Surrounding States Labels
- Surrounding States
- NHESP 2008 Priority Habitats of Rare Species and also Estimated Habitats of Rare Wildlife
- NHESP 2008 MA Priority Habitats of Rare Species
- Major Lakes and Ponds
- Major Urban Area
- Color Orthos 2005
- Town Boundary

ATTACHMENT 7

LABORATORY ANALYTICAL RESULTS

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

Laboratory Identification Numbers:
MA and ME: **MA092** NH: **2028**
CT: **PH0579** RI: **LAO00236**
NELAC - NYS DOH: **11063**

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project No.: **01.0012820.90**
Work Order No.: **1011-00115**
Date Received: **11/16/2010**
Date Reported: **11/23/2010**

SAMPLE INFORMATION

Date Sampled	Matrix	Laboratory ID	Sample ID
11/16/2010	Aqueous	1011-00115 001	RGP RECERT 111610
11/16/2010	Aqueous	1011-00115 002	SYS MID 111610
11/16/2010	Aqueous	1011-00115 003	SYS EFF 111610

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

PROJECT NARRATIVE:

1. Sample Receipt

The samples were received on 11/16/10 via _x_GZA courier, __EC, __FEDEX, or ___hand delivered. The temperature of the __temperature blank/_x_cooler air, was 4.6 degrees C. The temperature requirement for most analyses is above freezing to 6 degrees C. The samples were received intact for all requested analyses.

The chain of custody indicates that the samples, when required, were chemically preserved in accordance with the method they reference. Soil samples for high level VOC analysis were received preserved in methanol.

2. Subcontracted Analyses

Analyses for SVOC, TSS, TRC, TPH, PCB, and Cyanide were performed by ESS Laboratory, Cranston, RI.

3. Method SM 18 3500 Cr(D) - Hexavalent Chromium

Attach QC 11/16/10

4. EPA Method 8260 - VOCs

The reporting limit (RL) for 1,4-dioxane is elevated due to the poor analytical sensitivity of this analyte. If 1,4-dioxane is a contaminant of concern, the MA CAM requires special analytical techniques be used.

The elevated reporting limits for samples RGP RECERT 111610 (1011-00115-001) and SYS MID 111610 (1011-00115-002) are due to initial dilution of the sample in order to get target compounds within the calibration range of the instrument. The dilution was based upon screening data for the sample.

The following analyte(s) in the lowest ICAL (Initial Calibration) standard did not meet the minimum RF criteria specified in Table 4 of Method 8260C, but were above 0.050: acetone (0.080).

The following analytes in the CCV did not meet the minimum RF criteria specified in Table 4 of Method 8260C, but were above 0.050: acetone (0.069)

The Continuing Calibration Verification Standard (CCV) (11/18/10 S) had MA MCP 8260 List analytes outside of the 80-120% acceptance criteria. Specific outliers include: bromomethane (79.2%), diethyl ether (79.6%), and carbon disulfide (79.6%). MA CAM permits up to 14 outliers if within 60-140%.

Attach QC 8260 11/18/10 "S" - Aqueous

5. EPA Method 300.0 - Anions

Attach QC 300.0 11/19/10 A - Aqueous

6. EPA Method 6010C/7470A - Metals

All samples were pre-concentrated 5 times in order to reach the required reporting limits for Cu (0.005

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

mg/L).

Attach QC 6010C 11/17/10 - Aqueous
Attach QC 7470A 11/18/10 - Aqueous

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Data Authorized By: _____

Digitally signed by
Andrew Yaroshefski
Date: 2010.11.23
16:44:23 -05'00'

NELAC certification, as indicated by the NELAC Lab ID Number, is per analyte. For a complete list of NELAC validated analytes, please contact the laboratory.

Abbreviations:
% R = % Recovery
DF = Dilution Factor
DFS = Dilution Factor Solids
CF = Calculation Factor
DO = Diluted Out

Method Key:
Method 8260: The current version of the method is 8260B.
Method 8270: The current version of the method is 8270D.
Method 6010: The current version of the method is 6010C.

Please note that the laboratory signed copy of the chain of custody record is an integral part of the data report.

Soil data is reported on a dry weight basis unless otherwise specified.
Matrix Spike / Matrix Spike Duplicate sets are performed as per method and are reported at the end of the analytical report if assigned on the Chain of Custody.

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Sample ID: **RGP RECERT 111610** Sample No.: **001**
Sample Date: **11/16/2010**

Test Performed	Method	Results	Reporting Limit	Units	Tech	Analysis Date
VOLATILE ORGANICS	EPA 8260				MQS	11/18/2010
Dichlorodifluoromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Chloromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Vinyl Chloride	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromomethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Chloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Trichlorofluoromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Diethylether	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Acetone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
1,1-Dichloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Freon 113	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Carbon Disulfide	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Dichloromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
tert-Butyl alcohol (TBA)	EPA 8260	<2500	2500	ug/L	MQS	11/18/2010
Methyl-Tert-Butyl-Ether	EPA 8260	<100	100	ug/L	MQS	11/18/2010
trans-1,2-Dichloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1-Dichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Di-isopropyl ether (DIPE)	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Ethyl tert-butyl ether ETBE	EPA 8260	<200	200	ug/L	MQS	11/18/2010
2-Butanone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
2,2-Dichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
cis-1,2-Dichloroethene	EPA 8260	220	100	ug/L	MQS	11/18/2010
Chloroform	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromochloromethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Tetrahydrofuran	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
1,1,1-Trichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1-Dichloropropene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Carbon Tetrachloride	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Benzene	EPA 8260	650	100	ug/L	MQS	11/18/2010
tert-Amyl methyl ether TAME	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Trichloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,4-Dioxane	EPA 8260	<10000	10000	ug/L	MQS	11/18/2010
1,2-Dichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromodichloromethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Sample ID: **RGP RECERT 111610** Sample No.: **001**
Sample Date: **11/16/2010**

Test Performed	Method	Results	Reporting Limit	Units	Tech	Analysis Date
Dibromomethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
4-Methyl-2-Pentanone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
cis-1,3-Dichloropropene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Toluene	EPA 8260	200	100	ug/L	MQS	11/18/2010
trans-1,3-Dichloropropene	EPA 8260	<200	200	ug/L	MQS	11/18/2010
1,1,2-Trichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
2-Hexanone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
1,3-Dichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Tetrachloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Dibromochloromethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dibromoethane (EDB)	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Chlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1,1,2-Tetrachloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Ethylbenzene	EPA 8260	880	100	ug/L	MQS	11/18/2010
m&p-Xylene	EPA 8260	990	200	ug/L	MQS	11/18/2010
o-Xylene	EPA 8260	520	100	ug/L	MQS	11/18/2010
Styrene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromoform	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Isopropylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1,2,2-Tetrachloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2,3-Trichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
N-Propylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
2-Chlorotoluene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,3,5-Trimethylbenzene	EPA 8260	120	100	ug/L	MQS	11/18/2010
4-Chlorotoluene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
tert-Butylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2,4-Trimethylbenzene	EPA 8260	430	100	ug/L	MQS	11/18/2010
sec-Butylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
p-Isopropyltoluene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,3-Dichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,4-Dichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
n-Butylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dibromo-3-Chloropropane	EPA 8260	<200	200	ug/L	MQS	11/18/2010

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Sample ID: **RGP RECERT 111610** Sample No.: **001**
Sample Date: **11/16/2010**

Test Performed	Method	Results	Reporting Limit	Units	Tech	Analysis Date
1,2,4-Trichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Hexachlorobutadiene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Naphthalene	EPA 8260	5500	200	ug/L	MQS	11/18/2010
1,2,3-Trichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Surrogates:	EPA 8260					
***Dibromofluoromethane	EPA 8260	102	70-130	% R	MQS	11/18/2010
***1,2-Dichlorobenzene-D4	EPA 8260	108	70-130	% R	MQS	11/18/2010
***4-Bromofluorobenzene	EPA 8260	99.7	70-130	% R	MQS	11/18/2010
Preparation	EPA 5030B	100		CF	MQS	11/18/2010
METALS						
Lead	EPA 6010B	0.097	0.0020	mg/L	LLZ	11/20/2010
Iron	EPA 6010B	29	0.010	mg/L	LLZ	11/20/2010
Antimony	EPA 6010B	<0.0050	0.0050	mg/L	LLZ	11/20/2010
Arsenic	EPA 6010B	0.017	0.0020	mg/L	LLZ	11/20/2010
Cadmium	EPA 6010B	0.0022	0.0010	mg/L	LLZ	11/20/2010
Chromium	EPA 6010B	0.0027	0.0010	mg/L	LLZ	11/20/2010
Copper	EPA 6010B	0.014	0.0050	mg/L	LLZ	11/22/2010
Mercury	EPA 7470A	<0.00020	0.00020	mg/L	GDD	11/19/2010
Nickel	EPA 6010B	0.0060	0.0020	mg/L	LLZ	11/20/2010
Selenium	EPA 6010B	<0.0050	0.0050	mg/L	LLZ	11/20/2010
Silver	EPA 6010B	<0.0010	0.0010	mg/L	LLZ	11/20/2010
Zinc	EPA 6010B	0.034	0.0050	mg/L	LLZ	11/20/2010
Hexavalent Chromium	SM 3500CrD	<0.010	0.010	mg/L	LLZ	11/16/2010
Trivalent Chromium calc.		<0.010	0.010	mg/L	AJY	11/23/2010
ANIONS - ION CHROMATOGRAPHY	EPA 300.0				TAJ	11/19/2010
Chloride	EPA 300.0	390	2.0	mg/L	TAJ	11/19/2010
SUBCONTRACTED ANALYTES						
Total Suspended Solids	SM-2540D	218	5	mg/L	XXX	11/16/2010
PCB	EPA 608				XXX	
TPH via Method 1664	EPA 1664A	219	5	mg/L	XXX	11/18/2010
Total Cyanide	SM-4500CN-C E	0.0061	0.0050	mg/L	XXX	11/22/2010
Residual Chlorine	SM4500-CL D	<0.02	0.02	mg/L	XXX	11/16/2010
GC-MS SEMIVOLATILES					XXX	

GZA GEOENVIRONMENTAL, INC.
ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 7196A/SM 18 3500 CR (d) ANALYSIS
Hexavalent Chromium by Colorometric Method

QUALITY CONTROL - AQUEOUS

Date Prepared: 11/16/10

QC Sample	Method Blank	Lab Control Sample	Lab Control Sample Duplicate	LC/LCD Difference
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	80-120	80-120	20%
Analyte				
Hex Cr (Cr+6)	<0.010	90.0	90.0	0.0

RPD = Relative Percent Difference

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748

EPA Method 8260 / 524.2 Aqueous Method Blank (MB) and Laboratory Control Sample/Duplicate (LCS/LCSD) Data

Method Blank			Laboratory Control Sample				Laboratory Control Sample Duplicate						
Date Analyzed:	11/18/10		Date Analyzed:	11/18/10			11/18/10						
Volatile Organics	Conc. ug/L	Acceptance Limit	Spike Concentration = 20ug/L	% Recovery	Acceptance Limits	Verdict	% Recovery	Acceptance Limits	Verdict	RPD	Limit	Verdict
dichlorodifluoromethane	< 1.0	< 1.0	dichlorodifluoromethane	95.2	70-130	ok	93.6	70-130	ok	1.73	<25	ok
chloromethane	< 1.0	< 1.0	chloromethane	89.4	70-130	ok	86.6	70-130	ok	3.28	<25	ok
vinyl chloride	< 0.5	< 0.5	vinyl chloride	85.4	80-120	ok	84.7	70-130	ok	0.80	<25	ok
bromomethane	< 1.0	< 1.0	bromomethane	79.2	70-130	ok	77.5	70-130	ok	2.22	<25	ok
chloroethane	< 0.5	< 0.5	chloroethane	81.2	70-130	ok	85.0	70-130	ok	4.51	<25	ok
trichlorofluoromethane	< 1.0	< 1.0	trichlorofluoromethane	91.3	70-130	ok	89.0	70-130	ok	2.52	<25	ok
diethyl ether	< 2.5	< 2.5	diethyl ether	79.6	70-130	ok	74.1	70-130	ok	7.19	<25	ok
acetone	< 10	< 10	acetone	85.7	70-130	ok	89.1	70-130	ok	3.84	<25	ok
1,1-dichloroethene	< 0.5	< 0.5	1,1-dichloroethene	84.5	80-120	ok	85.4	70-130	ok	1.12	<25	ok
carbon disulfide	< 5.0	< 5.0	carbon disulfide	79.6	70-130	ok	80.0	70-130	ok	0.49	<25	ok
dichloromethane	< 1.0	< 1.0	dichloromethane	85.2	70-130	ok	84.2	70-130	ok	1.22	<25	ok
methyl-tert-butyl-ether	< 0.5	< 0.5	methyl-tert-butyl-ether	88.2	70-130	ok	88.0	70-130	ok	0.24	<25	ok
trans-1,2-dichloroethene	< 0.5	< 0.5	trans-1,2-dichloroethene	91.9	70-130	ok	88.4	70-130	ok	3.83	<25	ok
1,1-dichloroethane	< 0.5	< 0.5	1,1-dichloroethane	91.5	70-130	ok	88.5	70-130	ok	3.32	<25	ok
di-isopropyl ether (DIPE)	< 1.0	< 1.0	di-isopropyl ether (DIPE)	90.5	70-130	ok	88.0	70-130	ok	2.82	<25	ok
ethyl tert-butyl ether (EtBE)	< 1.0	< 1.0	ethyl tert-butyl ether (EtBE)	88.1	70-130	ok	87.6	70-130	ok	0.54	<25	ok
2-butanone	< 10	< 10	2-butanone	89.5	70-130	ok	88.3	70-130	ok	1.33	<25	ok
2,2-dichloropropane	< 0.5	< 0.5	2,2-dichloropropane	94.7	70-130	ok	90.4	70-130	ok	4.74	<25	ok
cis-1,2-dichloroethene	< 0.5	< 0.5	cis-1,2-dichloroethene	91.5	70-130	ok	89.9	70-130	ok	1.75	<25	ok
chloroform	< 0.5	< 0.5	chloroform	90.2	80-120	ok	89.7	70-130	ok	0.53	<25	ok
bromochloromethane	< 0.5	< 0.5	bromochloromethane	93.8	70-130	ok	95.8	70-130	ok	2.05	<25	ok
tetrahydrofuran	< 5.0	< 5.0	tetrahydrofuran	94.6	70-130	ok	101	70-130	ok	6.37	<25	ok
1,1,1-trichloroethane	< 0.5	< 0.5	1,1,1-trichloroethane	92.3	70-130	ok	90.1	70-130	ok	2.48	<25	ok
1,1-dichloropropene	< 0.5	< 0.5	1,1-dichloropropene	91.1	70-130	ok	88.5	70-130	ok	2.80	<25	ok
carbon tetrachloride	< 0.5	< 0.5	carbon tetrachloride	96.0	70-130	ok	94.7	70-130	ok	1.31	<25	ok
1,2-dichloroethane	< 0.5	< 0.5	1,2-dichloroethane	95.7	70-130	ok	92.6	70-130	ok	3.29	<25	ok
benzene	< 0.5	< 0.5	benzene	92.9	70-130	ok	89.9	70-130	ok	3.22	<25	ok
tert-amyl methyl ether (TAME)	< 1.0	< 1.0	tert-amyl methyl ether (TAME)	90.7	70-130	ok	90.4	70-130	ok	0.41	<25	ok
trichloroethene	< 0.5	< 0.5	trichloroethene	95.7	70-130	ok	92.8	70-130	ok	3.10	<25	ok
1,2-dichloropropane	< 0.5	< 0.5	1,2-dichloropropane	90.8	80-120	ok	91.9	70-130	ok	1.27	<25	ok
bromodichloromethane	< 0.5	< 0.5	bromodichloromethane	90.3	70-130	ok	93.0	70-130	ok	2.96	<25	ok
1,4-Dioxane	< 50	< 50	1,4-Dioxane	83.7	70-130	ok	95.1	70-130	ok	12.8	<25	ok
dibromomethane	< 0.5	< 0.5	dibromomethane	92.7	70-130	ok	94.6	70-130	ok	1.96	<25	ok
4-methyl-2-pentanone	< 10	< 10	4-methyl-2-pentanone	90.5	70-130	ok	93.2	70-130	ok	2.99	<25	ok
cis-1,3-dichloropropene	< 0.5	< 0.5	cis-1,3-dichloropropene	93.1	70-130	ok	93.2	70-130	ok	0.11	<25	ok
toluene	< 0.5	< 0.5	toluene	91.4	80-120	ok	92.1	70-130	ok	0.75	<25	ok
trans-1,3-dichloropropene	< 1.0	< 1.0	trans-1,3-dichloropropene	91.4	70-130	ok	90.8	70-130	ok	0.63	<25	ok
1,1,2-trichloroethane	< 0.5	< 0.5	1,1,2-trichloroethane	94.7	70-130	ok	95.7	70-130	ok	1.06	<25	ok
2-hexanone	< 10	< 10	2-hexanone	98.6	70-130	ok	101	70-130	ok	2.00	<25	ok
1,3-dichloropropane	< 0.5	< 0.5	1,3-dichloropropane	94.3	70-130	ok	95.2	70-130	ok	0.94	<25	ok
tetrachloroethene	< 0.5	< 0.5	tetrachloroethene	95.4	70-130	ok	97.8	70-130	ok	2.50	<25	ok
dibromochloromethane	< 0.5	< 0.5	dibromochloromethane	98.0	70-130	ok	99.3	70-130	ok	1.32	<25	ok
1,2-dibromoethane (EDB)	< 1.0	< 1.0	1,2-dibromoethane (EDB)	100	70-130	ok	102	70-130	ok	2.14	<25	ok
chlorobenzene	< 0.5	< 0.5	chlorobenzene	99.1	70-130	ok	100	70-130	ok	1.41	<25	ok
1,1,1,2-tetrachloroethane	< 0.5	< 0.5	1,1,1,2-tetrachloroethane	92.1	70-130	ok	94.7	70-130	ok	2.84	<25	ok
ethylbenzene	< 0.5	< 0.5	ethylbenzene	96.3	80-120	ok	97.4	70-130	ok	1.12	<25	ok
1,1,2,2-tetrachloroethane	< 0.5	< 0.5	1,1,2,2-tetrachloroethane	94.0	70-130	ok	98.4	70-130	ok	4.62	<25	ok
m&p-xylene	< 1.0	< 1.0	m&p-xylene	96.0	70-130	ok	95.5	70-130	ok	0.50	<25	ok
o-xylene	< 0.5	< 0.5	o-xylene	89.5	70-130	ok	87.7	70-130	ok	2.00	<25	ok
styrene	< 0.5	< 0.5	styrene	94.9	70-130	ok	92.9	70-130	ok	2.11	<25	ok
bromoform	< 1.0	< 1.0	bromoform	94.0	70-130	ok	93.7	70-130	ok	0.30	<25	ok
isopropylbenzene	< 0.5	< 0.5	isopropylbenzene	92.2	70-130	ok	86.1	70-130	ok	6.85	<25	ok
1,2,3-trichloropropane	< 0.5	< 0.5	1,2,3-trichloropropane	87.5	70-130	ok	88.5	70-130	ok	1.14	<25	ok
bromobenzene	< 0.5	< 0.5	bromobenzene	94.1	70-130	ok	92.6	70-130	ok	1.60	<25	ok
n-propylbenzene	< 0.5	< 0.5	n-propylbenzene	92.6	70-130	ok	89.8	70-130	ok	3.08	<25	ok
2-chlorotoluene	< 0.5	< 0.5	2-chlorotoluene	90.0	70-130	ok	88.8	70-130	ok	1.42	<25	ok
1,3,5-trimethylbenzene	< 0.5	< 0.5	1,3,5-trimethylbenzene	91.2	70-130	ok	89.9	70-130	ok	1.45	<25	ok
4-chlorotoluene	< 0.5	< 0.5	4-chlorotoluene	91.9	70-130	ok	92.2	70-130	ok	0.33	<25	ok
tert-butyl-benzene	< 0.5	< 0.5	tert-butyl-benzene	92.6	70-130	ok	89.2	70-130	ok	3.81	<25	ok
1,2,4-trimethylbenzene	< 0.5	< 0.5	1,2,4-trimethylbenzene	93.2	70-130	ok	90.6	70-130	ok	2.86	<25	ok
sec-butyl-benzene	< 0.5	< 0.5	sec-butyl-benzene	91.6	70-130	ok	88.4	70-130	ok	3.58	<25	ok
p-isopropyltoluene	< 0.5	< 0.5	p-isopropyltoluene	94.2	70-130	ok	90.7	70-130	ok	3.84	<25	ok
1,3-dichlorobenzene	< 0.5	< 0.5	1,3-dichlorobenzene	94.5	70-130	ok	95.4	70-130	ok	0.91	<25	ok
1,4-dichlorobenzene	< 0.5	< 0.5	1,4-dichlorobenzene	97.1	70-130	ok	95.5	70-130	ok	1.73	<25	ok
n-butylbenzene	< 0.5	< 0.5	n-butylbenzene	94.7	70-130	ok	91.2	70-130	ok	3.76	<25	ok
1,2-dichlorobenzene	< 0.5	< 0.5	1,2-dichlorobenzene	95.2	70-130	ok	94.6	70-130	ok	0.60	<25	ok
1,2-dibromo-3-chloropropane	< 2.5	< 2.5	1,2-dibromo-3-chloropropane	92.3	70-130	ok	92.9	70-130	ok	0.68	<25	ok
1,2,4-trichlorobenzene	< 0.5	< 0.5	1,2,4-trichlorobenzene	94.3	70-130	ok	95.6	70-130	ok	1.32	<25	ok
hexachlorobutadiene	< 0.5	< 0.5	hexachlorobutadiene	95.1	70-130	ok	96.9	70-130	ok	1.95	<25	ok
naphthalene	< 1.0	< 1.0	naphthalene	90.3	70-130	ok	93.5	70-130	ok	3.51	<25	ok
1,2,3-trichlorobenzene	< 0.5	< 0.5	1,2,3-trichlorobenzene	89.6	70-130	ok	92.4	70-130	ok	3.02	<25	ok

Surrogates:	Recovery (%)	Acceptance Limits	Surrogates:	Recovery (%)	Acceptance Limits	Verdict	Recovery (%)	Acceptance Limits	Verdict	RPD	Acceptance Limits	Verdict
DIBROMOFLUOROMETHANE	107	70-130	DIBROMOFLUOROMETHANE	105	70-130	ok	105	70-130	ok	0.04	<25	ok
1,2-DICHLOROETHANE-D4	104	70-130	1,2-DICHLOROETHANE-D4	103	70-130	ok	105	70-130	ok	2.07	<25	ok
TOLUENE-D8	109	70-130	TOLUENE-D8	108	70-130	ok	106	70-130	ok	1.57	<25	ok
4-BROMOFLUOROBENZENE	99.7	70-130	4-BROMOFLUOROBENZENE	107	70-130	ok	106	70-130	ok	0.75	<25	ok
1,2-DICHLOROBENZENE-D4	92.9	70-130	1,2-DICHLOROBENZENE-D4	103	70-130	ok	103	70-130	ok	0.11	<25	ok

Instrument: HP GC/MS "S"

ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 300.0 ANALYSIS
Anions by Ion Chromatography

QUALITY CONTROL - AQUEOUS

DATE PREPARED: 11/19/10 A

QC Sample	Method Blank	Lab Control Sample	Lab Control Sample Duplicate	LC/LCD Difference
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	90-110%	90-110%	20%
Analyte				
Fluoride	NA	NA	NA	NA
Chloride	<0.20	103	101	2.36
Nitrite	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA
Phosphate	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA

RPD = Relative Percent Difference

GZA GEOENVIRONMENTAL, INC.
ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 6010C ANALYSIS
Metals by ICP

QUALITY CONTROL - AQUEOUS

DATE PREPARED: 11/17/2010

QC Sample	Method Blank	Lab Control Sample	LC Duplicate	LC/LCD Diff.
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	80-120	80-120	<20
Analyte				
Silver (Ag)	<0.001	97.8	97.4	0.43
Aluminum (Al)	NA	NA	NA	NA
Arsenic (As)	<0.002	103	103	0.20
Boron (B)	NA	NA	NA	NA
Barium (Ba)	NA	NA	NA	NA
Beryllium (Be)	NA	NA	NA	NA
Calcium (Ca)	NA	NA	NA	NA
Cadmium (Cd)	<0.001	102	102	0.35
Cobalt (Co)	NA	NA	NA	NA
Chromium (Cr)	<0.001	102	103	0.95
Copper (Cu)	<0.005	115	114	1.19
Iron (Fe)	<0.010	104	105	0.18
Magnesium (Mg)	NA	NA	NA	NA
Manganese (Mn)	NA	NA	NA	NA
Molybdenum (Mo)	NA	NA	NA	NA
Nickel (Ni)	<0.002	104	105	0.74
Lead (Pb)	<0.002	104	105	1.35
Antimony (Sb)	<0.005	102	102	0.01
Selenium (Se)	<0.005	106	106	0.38
Tin (Sn)	NA	NA	NA	NA
Titanium (Ti)	NA	NA	NA	NA
Thallium (Tl)	NA	NA	NA	NA
Vanadium (V)	NA	NA	NA	NA
Zinc (Zn)	<0.005	106	105	0.71
Zirconium (Zr)	NA	NA	NA	NA

RPD = Relative Percent Difference
NA = Not Applicable
NC = Not Calculated
CRM = Certified Reference Material

GZA GEOENVIRONMENTAL, INC.
ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 7470A ANALYSIS
Mercury by Cold Vapor Atomic Absorption

QUALITY CONTROL - AQUEOUS

Date Prepared : 11/18/10

QC Sample	Method Blank	Lab Control Sample	Lab Control Sample Duplicate	LC/LCD Difference
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	80-120	80-120	20%
Analyte				
Mercury (Hg)	<0.00020	98.6	100	1.81

RPD = Relative Percent Difference
LC concentration = 0.005 mg/L

W.O. # 1011-00115
(for lab use only)

CHAIN-OF-CUSTODY RECORD

Sample I.D.	Date/Time Sampled	Matrix (A=Air, S=Soil, GW=Ground W., SW=Surface W., WW=Waste W., DW=Drinking W., P=Product, Other (specify))	ANALYSIS REQUIRED	Total No. of Cont.	Note #
RGPRECERT 111610	11/16/10 0925	GW	EPA 8260 X; EPA 8270 SVOCs X; Metals (List Below) ** (1) (6) X; TSS (2) X; TRC (3) X; TPH (4) X; PCB (5) X	12	
SYS MID 111610	11/16/10 0915	GW	EPA 8260 X	3	
SYS EFF 111610	11/16/10 0905	GW	EPA 8260 X; EPA 8270 SVOCs X; Metals (List Below) ** (1) (6) X; TSS (2) X; TRC (3) X; TPH (4) X; PCB (5) X	12	

PRESERVATIVE (Cl-HCl, M-Methanol, N-HNO3, S-H2SO4, Na-NaOH, O-Other) *: EPA 8260: Cl; Metals (List Below) **: N; TSS: P; TRC: P; TPH: Cl; PCB: G

CONTAINER TYPE (P-Plastic, G-Glass, V-Vial, T-Teflon, O-Other)*: EPA 8260: V; EPA 8270 SVOCs: G; Metals (List Below) **: P; TSS: P; TRC: P; TPH: G; PCB: G

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
A. MOORE (GZA)	11/16/10	[illegible] 11/16/10
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
[illegible]	11/16/10 1225	[illegible] 11/16/10 1330
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:

NOTES: (Unless otherwise noted, all samples have been refrigerated to 4 +/- 2°C)
*Specify "Other" preservatives and container types in this space.

(1) TEST FOR LEAD & IRON, LEAD RL = 40.1 mg/L VIA 6010B
(2) METHOD SM2540D
(3) METHOD SM4500 ELD
(4) METHOD 1664
(5) METHOD 608
(6) TEST RGPRECERT 111610 FOR METALS LISTED IN APPENDIX III VIA 6010B & 7470 LEAD RL = 40.1 mg/L

Project Manager: RUSS PARKMAN

GZA GEOENVIRONMENTAL, INC.
Laboratory Division

106 South Street
Hopkinton, MA 01748
(781) 278-4700
FAX (508)435-9912

TURNAROUND TIME: (Standard) Rush _____ Days, Approved by: _____

LAB USE: TEMP. OF COOLER 4.6 °C Temp Blank / Cooler Air 10.3

11/16/10 1135 (H)

GZA FILE NO: 01.0012820.90 TASK NO: 0003 P.O. NO. _____

PROJECT DUFFY BROTHERS O&M

LOCATION 411 WAVERLY OAKS RD, WALTHAM, MA 02452

COLLECTOR(S) A. MOORE SHEET 1 OF 2

W.O. # 1011-00115
(for lab use only)

CHAIN-OF-CUSTODY RECORD

Sample I.D.	Date/Time Sampled	Matrix (A=Air, S=Soil, GW=Ground W., SW=Surface W., WW=Waste W, DW=Drinking W., P=Product, Other (specify))	ANALYSIS REQUIRED: ☐ pH ☐ Cond.	GC Methane, Ethane, Ethene	EPA 8260	EPA 8260-8010 List (Chlor.)	EPA 8260-8021 list	EPA 8021-8020 List (BTEX)	EPA 524.2 DW VOCs	EPA 624 WW VOCs	☐ 601 ☐ 602 WW VOCs	EPA 8270 SVOCs	EPA 8270 ☐ PAH ☐ A ☐ BN	EPA 625 WW SVOCs	EPA 8082-PCBs	EPA 8081-Pest	TPH-GC (Mod. 8100)	TPH-GC w/FING	EPH (MA DEP)	VPH (MA DEP)	Metals ☐ PPM-13 ☐ R-8	MCP 14 Metals	Metals (List Below) **	TCLP - Specify Below	SPLP - Specify Below	EPA 300 ☐ Cl ☐ NO3 ☐ SO3	(7) HEX. CHROMIUM	(8) TRI+ CHROMIUM	(9) CYANIDE	(10) CHLORIDE			Total No. of Cont.	Note #
REP RECEIPT 111610	11/16/10 0925	GW																								X	X	X	X				
PRESERVATIVE (Cl-HCl, M-Methanol, N-HNO3, S-H2SO4, Na-NaOH, O-Other) *																											—	Na						
CONTAINER TYPE (P-Plastic, G-Glass, V-Vial, T-Teflon, O-Other)*																										P	—	P	P				

RELINQUISHED BY: A. MOORE (GZA) 11/16/10 — DATE/TIME — RECEIVED BY: [illegible] 11/16/10

RELINQUISHED BY: [illegible] 11/16/10 1235 — DATE/TIME — RECEIVED BY: [illegible] 11/16/10 1330

RELINQUISHED BY: — DATE/TIME — RECEIVED BY:

NOTES: (Unless otherwise noted, all samples have been refrigerated to 4 +/- 2°C)
*Specify "Other" preservatives and container types in this space.
(7) ANALYZE FOR HEXAVALENT
(8) TRIVALENT CHROMIUM VIA CALCULATION
(9) METHOD SM 4500 CN/E
(10) METHOD 300.0

Project Manager: RUSS PARKMAN

GZA GEOENVIRONMENTAL, INC.
Laboratory Division

106 South Street
Hopkinton, MA 01748
(781) 278-4700
FAX (508)435-9912

TURNAROUND TIME: (Standard) Rush ____ Days. Approved by: ____ LAB USE: TEMP. OF COOLER 4.6 °C Temp Blank: Cooler Air 10.3

GZA FILE NO: 01.0012820.90 TASK NO: 0003 P.O. NO. ____

PROJECT DUFFY BROTHERS O&M

LOCATION 411 WAVERLY OAKS RD, WALTHAM, MA 02452

COLLECTOR(S) A. MOORE SHEET 2 OF 2

11/16/10 1235 (GW)

CERTIFICATE OF ANALYSIS

Michelle Mirenda
GZA GeoEnvironmental, Inc. (MA)
106 South Street
Hopkinton, MA 01748

RE: Duffy Brothers (01.0012820.90)
ESS Laboratory Work Order Number: 1011222

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Digitally signed by Laurel Stoddard
Date: 2010.11.22 17:16:45 -05'00'

Laurel Stoddard
Laboratory Director

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

ESS Laboratory certifies that the test results meet the requirements of NELAC and A2LA, except where noted within this project narrative.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

SAMPLE RECEIPT

The following samples were received on November 16, 2010 for the analyses specified on the enclosed Chain of Custody Record.

The samples and analyses listed below were analyzed in accordance with the Guidelines Establishing Test Procedures for the Analysis of Pollutants, 40 CFR Part 136, as amended.

Sodium Hydroxide preserved sample was not received for Total Cyanide. Analysis was performed on the unpreserved sample.

Lab Number	SampleName	Matrix	Analysis
1011222-01	RGP Recert 111610	Ground Water	1664A, 2540D, 4500 CN CE, 4500Cl D, 608, 8270D
1011222-02	SYS EFF 111610	Ground Water	1664A, 2540D, 4500Cl D, 608, 8270D

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

1011222-01	**Elevated Method Reporting Limits due to sample matrix (EL).**
1011222-01	**Surrogate recovery(ies) diluted below the MRL (SD).** 1,2-Dichlorobenzene-d4 (% @ 30-130%), 2,4,6-Tribromophenol (% @ 15-110%), 2-Chlorophenol-d4 (% @ 15-110%), 2-Fluorobiphenyl (% @ 30-130%), 2-Fluorophenol (% @ 15-110%), Nitrobenzene-d5 (% @ 30-130%), Phenol-d6 (% @ 15-110%), p-Terphenyl-d14 (% @ 30-130%)
CK01623-BSD1	**Relative percent difference for duplicate is outside of criteria (D+).** Benzo(k)fluoranthene (24%), N-Nitrosodimethylamine (27%)
CTK0134-CCV1	**Benzidine tailing factor >2.**
CTK0134-CCV1	**Calibration required quadratic regression (Q).** 2,4-Dinitrophenol (125% @ 80-120%)
CTK0134-CCV1	**Continuing Calibration recovery is above upper control limit (C+).** 2,4-Dinitrophenol (125% @ 80-120%)
CTK0134-CCV1	**Initial Calibration Verification recovery is outside of control limit (ICV).** 3+4-Methylphenol
CTK0134-CCV1	**Pentachlorophenol tailing factor > 2.**
CTK0165-CCV1	**Benzidine tailing factor >2.**
CTK0165-CCV1	**Calibration required quadratic regression (Q).** 2,4-Dinitrophenol (94% @ 80-120%)
CTK0165-CCV1	**Initial Calibration Verification recovery is outside of control limit (ICV).** 3+4-Methylphenol
CTK0165-CCV1	**Pentachlorophenol tailing factor > 2.**

Classical Chemistry

1011222-01	**The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**
1011222-02	**The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**

No other observations noted.

End of Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

DATA USABILITY LINKS

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 5
Extraction Method: 3510C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: ML
Prepared: 11/18/10 10:40

All methods used are in accordance with 40 CFR 136.

608 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1221	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1232	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1242	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1248	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1254	**6.55** (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1260	**4.29** (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1262	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1268	ND (0.50)		1	11/19/10 2:21		CK01808

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*87 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*57 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*51 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*30 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 11/17/10 19:00

All methods used are in accordance with 40 CFR 136.

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
1,2-Dichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
1,3-Dichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
1,4-Dichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4,5-Trichlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4,6-Trichlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dichlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dimethylphenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dinitrophenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dinitrotoluene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,6-Dinitrotoluene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Chloronaphthalene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Chlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Methylnaphthalene	**11100** (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Methylphenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Nitrophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
3,3'-Dichlorobenzidine	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
3+4-Methylphenol	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
4-Bromophenyl-phenylether	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
4-Chloroaniline	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
4-Nitrophenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
Acenaphthene	**3060** (935)		100	11/20/10 0:08	CTK0165	CK01623
Acenaphthylene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Acetophenone	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Aniline	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Anthracene	**1360** (935)		100	11/20/10 0:08	CTK0165	CK01623
Azobenzene	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(a)anthracene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(a)pyrene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(b)fluoranthene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(g,h,i)perylene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 11/17/10 19:00

All methods used are in accordance with 40 CFR 136.

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	Limit	DF	Analyzed	Sequence	Batch
Benzo(k)fluoranthene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-Chloroethoxy)methane	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-Chloroethyl)ether	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-chloroisopropyl)Ether	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-Ethylhexyl)phthalate	ND (561)		100	11/20/10 0:08	CTK0165	CK01623
Butylbenzylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Chrysene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Dibenzo(a,h)Anthracene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Dibenzofuran	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Diethylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Dimethylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Di-n-butylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Di-n-octylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Fluoranthene	**1020** (935)		100	11/20/10 0:08	CTK0165	CK01623
Fluorene	**2050** (935)		100	11/20/10 0:08	CTK0165	CK01623
Hexachlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Hexachlorobutadiene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Hexachloroethane	ND (467)		100	11/20/10 0:08	CTK0165	CK01623
Indeno(1,2,3-cd)Pyrene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Isophorone	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Naphthalene	**11500** (935)		100	11/20/10 0:08	CTK0165	CK01623
Nitrobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
N-Nitrosodimethylamine	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Pentachlorophenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
Phenanthrene	**4990** (935)		100	11/20/10 0:08	CTK0165	CK01623
Phenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Pyrene	**1710** (935)		100	11/20/10 0:08	CTK0165	CK01623

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	%	SD	30-130
Surrogate: 2,4,6-Tribromophenol	%	SD	15-110
Surrogate: 2-Chlorophenol-d4	%	SD	15-110
Surrogate: 2-Fluorobiphenyl	%	SD	30-130

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 11/17/10 19:00

All methods used are in accordance with 40 CFR 136.

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)			Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		%	SD	15-110				
Surrogate: Nitrobenzene-d5		%	SD	30-130				
Surrogate: Phenol-d6		%	SD	15-110				
Surrogate: p-Terphenyl-d14		%	SD	30-130				

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Total Cyanide (LL)	**0.0061** (0.0050)	4500 CN CE		1	EEM	11/22/10 11:50	mg/L	CK02206
Total Petroleum Hydrocarbon	**219** (5)	1664A		1	LRF	11/18/10 13:30	mg/L	CK01824
Total Residual Chlorine	ND (0.02)	4500Cl D		1	KJK	11/16/10 19:43	mg/L	CK01630
Total Suspended Solids	**218** (5)	2540D		1	EEM	11/16/10 20:00	mg/L	CK01603

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
608 Polychlorinated Biphenyls (PCB)										
Batch CK01808 - 3510C										
Blank										
Aroclor 1016	ND	0.50	ug/L							
Aroclor 1221	ND	0.50	ug/L							
Aroclor 1232	ND	0.50	ug/L							
Aroclor 1242	ND	0.50	ug/L							
Aroclor 1248	ND	0.50	ug/L							
Aroclor 1254	ND	0.50	ug/L							
Aroclor 1260	ND	0.50	ug/L							
Aroclor 1262	ND	0.50	ug/L							
Aroclor 1268	ND	0.50	ug/L							
Surrogate: Decachlorobiphenyl	*0.218*		ug/L	*0.2500*		*87*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.238*		ug/L	*0.2500*		*95*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.224*		ug/L	*0.2500*		*90*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.224*		ug/L	*0.2500*		*89*	*30-150*			
LCS										
Aroclor 1016	4.76	0.50	ug/L	5.000		95	40-140			
Aroclor 1260	4.63	0.50	ug/L	5.000		93	40-140			
Surrogate: Decachlorobiphenyl	*0.229*		ug/L	*0.2500*		*92*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.258*		ug/L	*0.2500*		*103*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.243*		ug/L	*0.2500*		*97*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.231*		ug/L	*0.2500*		*93*	*30-150*			
LCS Dup										
Aroclor 1016	5.03	0.50	ug/L	5.000		101	40-140	6	50	
Aroclor 1260	4.88	0.50	ug/L	5.000		98	40-140	5	50	
Surrogate: Decachlorobiphenyl	*0.236*		ug/L	*0.2500*		*94*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.264*		ug/L	*0.2500*		*106*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.249*		ug/L	*0.2500*		*100*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.241*		ug/L	*0.2500*		*96*	*30-150*			
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
Blank										
1,2,4-Trichlorobenzene	ND	10.0	ug/L							
1,2-Dichlorobenzene	ND	10.0	ug/L							
1,3-Dichlorobenzene	ND	10.0	ug/L							
1,4-Dichlorobenzene	ND	10.0	ug/L							
2,4,5-Trichlorophenol	ND	10.0	ug/L							
2,4,6-Trichlorophenol	ND	10.0	ug/L							
2,4-Dichlorophenol	ND	10.0	ug/L							
2,4-Dimethylphenol	ND	50.0	ug/L							
2,4-Dinitrophenol	ND	50.0	ug/L							
2,4-Dinitrotoluene	ND	10.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
2,6-Dinitrotoluene	ND	10.0	ug/L							
2-Chloronaphthalene	ND	10.0	ug/L							
2-Chlorophenol	ND	10.0	ug/L							
2-Methylnaphthalene	ND	10.0	ug/L							
2-Methylphenol	ND	10.0	ug/L							
2-Nitrophenol	ND	10.0	ug/L							
3,3´-Dichlorobenzidine	ND	20.0	ug/L							
3+4-Methylphenol	ND	20.0	ug/L							
4-Bromophenyl-phenylether	ND	10.0	ug/L							
4-Chloroaniline	ND	20.0	ug/L							
4-Nitrophenol	ND	50.0	ug/L							
Acenaphthene	ND	10.0	ug/L							
Acenaphthylene	ND	10.0	ug/L							
Acetophenone	ND	10.0	ug/L							
Aniline	ND	10.0	ug/L							
Anthracene	ND	10.0	ug/L							
Azobenzene	ND	20.0	ug/L							
Benzo(a)anthracene	ND	10.0	ug/L							
Benzo(a)pyrene	ND	10.0	ug/L							
Benzo(b)fluoranthene	ND	10.0	ug/L							
Benzo(g,h,i)perylene	ND	10.0	ug/L							
Benzo(k)fluoranthene	ND	10.0	ug/L							
bis(2-Chloroethoxy)methane	ND	10.0	ug/L							
bis(2-Chloroethyl)ether	ND	10.0	ug/L							
bis(2-chloroisopropyl)Ether	ND	10.0	ug/L							
bis(2-Ethylhexyl)phthalate	ND	6.0	ug/L							
Butylbenzylphthalate	ND	10.0	ug/L							
Chrysene	ND	10.0	ug/L							
Dibenzo(a,h)Anthracene	ND	10.0	ug/L							
Dibenzofuran	ND	10.0	ug/L							
Diethylphthalate	ND	10.0	ug/L							
Dimethylphthalate	ND	10.0	ug/L							
Di-n-butylphthalate	ND	10.0	ug/L							
Di-n-octylphthalate	ND	10.0	ug/L							
Fluoranthene	ND	10.0	ug/L							
Fluorene	ND	10.0	ug/L							
Hexachlorobenzene	ND	10.0	ug/L							
Hexachlorobutadiene	ND	10.0	ug/L							
Hexachloroethane	ND	5.0	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	10.0	ug/L							
Isophorone	ND	10.0	ug/L							
Naphthalene	ND	10.0	ug/L							
Nitrobenzene	ND	10.0	ug/L							
N-Nitrosodimethylamine	ND	10.0	ug/L							
Pentachlorophenol	ND	50.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
Phenanthrene	ND	10.0	ug/L							
Phenol	ND	10.0	ug/L							
Pyrene	ND	10.0	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*53.1*		ug/L	*100.0*		*53*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*122*		ug/L	*150.0*		*81*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*59.0*		ug/L	*150.0*		*39*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*62.9*		ug/L	*100.0*		*63*	*30-130*			
Surrogate: 2-Fluorophenol	*33.6*		ug/L	*150.0*		*22*	*15-110*			
Surrogate: Nitrobenzene-d5	*69.9*		ug/L	*100.0*		*70*	*30-130*			
Surrogate: Phenol-d6	*67.7*		ug/L	*150.0*		*45*	*15-110*			
Surrogate: p-Terphenyl-d14	*89.1*		ug/L	*100.0*		*89*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	88.1	10.0	ug/L	100.0		88	40-140			
1,2-Dichlorobenzene	75.9	10.0	ug/L	100.0		76	40-140			
1,3-Dichlorobenzene	72.0	10.0	ug/L	100.0		72	40-140			
1,4-Dichlorobenzene	72.6	10.0	ug/L	100.0		73	40-140			
2,4,5-Trichlorophenol	91.4	10.0	ug/L	100.0		91	30-130			
2,4,6-Trichlorophenol	93.5	10.0	ug/L	100.0		94	30-130			
2,4-Dichlorophenol	92.8	10.0	ug/L	100.0		93	30-130			
2,4-Dimethylphenol	92.6	50.0	ug/L	100.0		93	30-130			
2,4-Dinitrophenol	99.1	50.0	ug/L	100.0		99	30-130			
2,4-Dinitrotoluene	103	10.0	ug/L	100.0		103	40-140			
2,6-Dinitrotoluene	100	10.0	ug/L	100.0		100	40-140			
2-Chloronaphthalene	80.7	10.0	ug/L	100.0		81	40-140			
2-Chlorophenol	75.4	10.0	ug/L	100.0		75	30-130			
2-Methylnaphthalene	93.3	10.0	ug/L	100.0		93	40-140			
2-Methylphenol	84.0	10.0	ug/L	100.0		84	30-130			
2-Nitrophenol	88.4	10.0	ug/L	100.0		88	30-130			
3,3'-Dichlorobenzidine	84.6	20.0	ug/L	100.0		85	40-140			
3+4-Methylphenol	179	20.0	ug/L	200.0		89	30-130			
4-Bromophenyl-phenylether	96.7	10.0	ug/L	100.0		97	40-140			
4-Chloroaniline	80.8	20.0	ug/L	100.0		81	40-140			
4-Nitrophenol	84.2	50.0	ug/L	100.0		84	30-130			
Acenaphthene	96.7	10.0	ug/L	100.0		97	40-140			
Acenaphthylene	90.2	10.0	ug/L	100.0		90	40-140			
Acetophenone	89.4	10.0	ug/L	100.0		89	40-140			
Aniline	72.6	10.0	ug/L	100.0		73	40-140			
Anthracene	96.8	10.0	ug/L	100.0		97	40-140			
Azobenzene	83.9	20.0	ug/L	100.0		84	40-140			
Benzo(a)anthracene	102	10.0	ug/L	100.0		102	40-140			
Benzo(a)pyrene	98.6	10.0	ug/L	100.0		99	40-140			
Benzo(b)fluoranthene	107	10.0	ug/L	100.0		107	40-140			
Benzo(g,h,i)perylene	95.1	10.0	ug/L	100.0		95	40-140			
Benzo(k)fluoranthene	70.7	10.0	ug/L	100.0		71	40-140			
bis(2-Chloroethoxy)methane	88.0	10.0	ug/L	100.0		88	40-140			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
bis(2-Chloroethyl)ether	84.9	10.0	ug/L	100.0		85	40-140			
bis(2-chloroisopropyl)Ether	85.9	10.0	ug/L	100.0		86	40-140			
bis(2-Ethylhexyl)phthalate	92.8	6.0	ug/L	100.0		93	40-140			
Butylbenzylphthalate	93.5	10.0	ug/L	100.0		93	40-140			
Chrysene	102	10.0	ug/L	100.0		102	40-140			
Dibenzo(a,h)Anthracene	94.4	10.0	ug/L	100.0		94	40-140			
Dibenzofuran	93.3	10.0	ug/L	100.0		93	40-140			
Diethylphthalate	97.9	10.0	ug/L	100.0		98	40-140			
Dimethylphthalate	97.2	10.0	ug/L	100.0		97	40-140			
Di-n-butylphthalate	93.7	10.0	ug/L	100.0		94	40-140			
Di-n-octylphthalate	97.0	10.0	ug/L	100.0		97	40-140			
Fluoranthene	105	10.0	ug/L	100.0		105	40-140			
Fluorene	103	10.0	ug/L	100.0		103	40-140			
Hexachlorobenzene	96.4	10.0	ug/L	100.0		96	40-140			
Hexachlorobutadiene	89.0	10.0	ug/L	100.0		89	40-140			
Hexachloroethane	63.4	5.0	ug/L	100.0		63	40-140			
Indeno(1,2,3-cd)Pyrene	94.2	10.0	ug/L	100.0		94	40-140			
Isophorone	70.8	10.0	ug/L	100.0		71	40-140			
Naphthalene	89.2	10.0	ug/L	100.0		89	40-140			
Nitrobenzene	88.7	10.0	ug/L	100.0		89	40-140			
N-Nitrosodimethylamine	65.9	10.0	ug/L	100.0		66	40-140			
Pentachlorophenol	103	50.0	ug/L	100.0		103	30-130			
Phenanthrene	96.8	10.0	ug/L	100.0		97	40-140			
Phenol	75.4	10.0	ug/L	100.0		75	30-130			
Pyrene	95.9	10.0	ug/L	100.0		96	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*76.4*		ug/L	*100.0*		*76*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*148*		ug/L	*150.0*		*99*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*108*		ug/L	*150.0*		*72*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*84.8*		ug/L	*100.0*		*85*	*30-130*			
Surrogate: 2-Fluorophenol	*86.9*		ug/L	*150.0*		*58*	*15-110*			
Surrogate: Nitrobenzene-d5	*89.4*		ug/L	*100.0*		*89*	*30-130*			
Surrogate: Phenol-d6	*116*		ug/L	*150.0*		*77*	*15-110*			
Surrogate: p-Terphenyl-d14	*92.4*		ug/L	*100.0*		*92*	*30-130*			
LCS Dup										
1,2,4-Trichlorobenzene	82.2	10.0	ug/L	100.0		82	40-140	7	20	
1,2-Dichlorobenzene	65.5	10.0	ug/L	100.0		66	40-140	15	20	
1,3-Dichlorobenzene	60.2	10.0	ug/L	100.0		60	40-140	18	20	
1,4-Dichlorobenzene	60.8	10.0	ug/L	100.0		61	40-140	18	20	
2,4,5-Trichlorophenol	90.3	10.0	ug/L	100.0		90	30-130	1	20	
2,4,6-Trichlorophenol	91.6	10.0	ug/L	100.0		92	30-130	2	20	
2,4-Dichlorophenol	87.4	10.0	ug/L	100.0		87	30-130	6	20	
2,4-Dimethylphenol	87.9	50.0	ug/L	100.0		88	30-130	5	20	
2,4-Dinitrophenol	95.9	50.0	ug/L	100.0		96	30-130	3	20	
2,4-Dinitrotoluene	101	10.0	ug/L	100.0		101	40-140	2	20	
2,6-Dinitrotoluene	99.2	10.0	ug/L	100.0		99	40-140	1	20	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
2-Chloronaphthalene	80.4	10.0	ug/L	100.0		80	40-140	0.4	20	
2-Chlorophenol	73.6	10.0	ug/L	100.0		74	30-130	2	20	
2-Methylnaphthalene	90.2	10.0	ug/L	100.0		90	40-140	3	20	
2-Methylphenol	80.3	10.0	ug/L	100.0		80	30-130	4	20	
2-Nitrophenol	85.2	10.0	ug/L	100.0		85	30-130	4	20	
3,3´-Dichlorobenzidine	87.9	20.0	ug/L	100.0		88	40-140	4	20	
3+4-Methylphenol	167	20.0	ug/L	200.0		83	30-130	7	20	
4-Bromophenyl-phenylether	96.3	10.0	ug/L	100.0		96	40-140	0.4	20	
4-Chloroaniline	79.2	20.0	ug/L	100.0		79	40-140	2	20	
4-Nitrophenol	84.4	50.0	ug/L	100.0		84	30-130	0.3	20	
Acenaphthene	95.5	10.0	ug/L	100.0		96	40-140	1	20	
Acenaphthylene	89.0	10.0	ug/L	100.0		89	40-140	1	20	
Acetophenone	86.7	10.0	ug/L	100.0		87	40-140	3	20	
Aniline	71.8	10.0	ug/L	100.0		72	40-140	1	20	
Anthracene	92.7	10.0	ug/L	100.0		93	40-140	4	20	
Azobenzene	82.6	20.0	ug/L	100.0		83	40-140	1	20	
Benzo(a)anthracene	106	10.0	ug/L	100.0		106	40-140	4	20	
Benzo(a)pyrene	104	10.0	ug/L	100.0		104	40-140	5	20	
Benzo(b)fluoranthene	118	10.0	ug/L	100.0		118	40-140	9	20	
Benzo(g,h,i)perylene	92.8	10.0	ug/L	100.0		93	40-140	2	20	
Benzo(k)fluoranthene	90.3	10.0	ug/L	100.0		90	40-140	24	20	D+
bis(2-Chloroethoxy)methane	84.8	10.0	ug/L	100.0		85	40-140	4	20	
bis(2-Chloroethyl)ether	82.0	10.0	ug/L	100.0		82	40-140	3	20	
bis(2-chloroisopropyl)Ether	80.0	10.0	ug/L	100.0		80	40-140	7	20	
bis(2-Ethylhexyl)phthalate	97.0	6.0	ug/L	100.0		97	40-140	4	20	
Butylbenzylphthalate	96.8	10.0	ug/L	100.0		97	40-140	3	20	
Chrysene	106	10.0	ug/L	100.0		106	40-140	4	20	
Dibenzo(a,h)Anthracene	93.8	10.0	ug/L	100.0		94	40-140	0.6	20	
Dibenzofuran	92.4	10.0	ug/L	100.0		92	40-140	0.9	20	
Diethylphthalate	97.4	10.0	ug/L	100.0		97	40-140	0.6	20	
Dimethylphthalate	96.6	10.0	ug/L	100.0		97	40-140	0.7	20	
Di-n-butylphthalate	93.3	10.0	ug/L	100.0		93	40-140	0.4	20	
Di-n-octylphthalate	104	10.0	ug/L	100.0		104	40-140	7	20	
Fluoranthene	105	10.0	ug/L	100.0		105	40-140	0.2	20	
Fluorene	101	10.0	ug/L	100.0		101	40-140	2	20	
Hexachlorobenzene	95.4	10.0	ug/L	100.0		95	40-140	1	20	
Hexachlorobutadiene	81.5	10.0	ug/L	100.0		82	40-140	9	20	
Hexachloroethane	52.3	5.0	ug/L	100.0		52	40-140	19	20	
Indeno(1,2,3-cd)Pyrene	96.7	10.0	ug/L	100.0		97	40-140	3	20	
Isophorone	68.7	10.0	ug/L	100.0		69	40-140	3	20	
Naphthalene	83.6	10.0	ug/L	100.0		84	40-140	6	20	
Nitrobenzene	83.4	10.0	ug/L	100.0		83	40-140	6	20	
N-Nitrosodimethylamine	50.4	10.0	ug/L	100.0		50	40-140	27	20	D+
Pentachlorophenol	101	50.0	ug/L	100.0		101	30-130	2	20	
Phenanthrene	96.3	10.0	ug/L	100.0		96	40-140	0.5	20	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
Phenol	72.8	10.0	ug/L	100.0		73	30-130	4	20	
Pyrene	100	10.0	ug/L	100.0		100	40-140	4	20	
Surrogate: 1,2-Dichlorobenzene-d4	*72.0*		ug/L	*100.0*		*72*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*151*		ug/L	*150.0*		*100*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*108*		ug/L	*150.0*		*72*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*85.8*		ug/L	*100.0*		*86*	*30-130*			
Surrogate: 2-Fluorophenol	*88.5*		ug/L	*150.0*		*59*	*15-110*			
Surrogate: Nitrobenzene-d5	*86.8*		ug/L	*100.0*		*87*	*30-130*			
Surrogate: Phenol-d6	*115*		ug/L	*150.0*		*76*	*15-110*			
Surrogate: p-Terphenyl-d14	*97.8*		ug/L	*100.0*		*98*	*30-130*			
Classical Chemistry										
Batch CK01603 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	32		mg/L	30.70		104	80-120			
Duplicate **Source: 1011222-02**										
Total Suspended Solids	5	5	mg/L		5			0	20	
Batch CK01630 - General Preparation										
Blank										
Total Residual Chlorine	ND	0.02	mg/L							
LCS										
Total Residual Chlorine	2.00		mg/L	2.090		96	85-115			
Duplicate **Source: 1011222-02**										
Total Residual Chlorine	ND	0.02	mg/L		ND				20	
Batch CK01824 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	20	5	mg/L	19.22		107	66-114			
Batch CK02206 - TCN Prep										
Blank										
Total Cyanide (LL)	ND	0.0050	mg/L							
LCS										
Total Cyanide (LL)	0.0214	0.0050	mg/L	0.02006		106	90-110			
LCS										
Total Cyanide (LL)	0.151	0.0050	mg/L	0.1504		100	90-110			
LCS Dup										
Total Cyanide (LL)	0.151	0.0050	mg/L	0.1504		101	90-110	0.6	20	
Duplicate **Source: 1011222-01**										

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch CK02206 - TCN Prep										
Total Cyanide (LL)	0.0064	0.0050	mg/L		0.0061			5	20	
Matrix Spike **Source: 1011222-01**										
Total Cyanide (LL)	0.0908	0.0050	mg/L	0.1003	0.0061	84	75-125			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Notes and Definitions

U	Analyte included in the analysis, but not detected
SD	Surrogate recovery(ies) diluted below the MRL (SD).
Q	Calibration required quadratic regression (Q).
PT	Pentachlorophenol tailing factor > 2.
ICV	Initial Calibration Verification recovery is outside of control limit (ICV).
HT	The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.
EL	Elevated Method Reporting Limits due to sample matrix (EL).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
C+	Continuing Calibration recovery is above upper control limit (C+).
BT	Benzidine tailing factor >2.
ND	Analyte NOT DETECTED above the detection limit (LOD for DoD Reports)
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
LOD	Limit of Detection
[CALC]	Calculated Analyte
LOQ	Limit of Quantitation
DL	Detection Limit

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/labs/waterlabs-instate.php

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/out_state.pdf

Maine Potable and Non Potable Water: RI0002
http://www.maine.gov/dep/blwq/topic/vessel/lab_list.pdf

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/labcert/labcert.aspx

New Hampshire (NELAP accredited) Potable and Non PotableWater, Solid and Hazardous Waste: 2424
http://www4.egov.nh.gov/des/nhelap/namesearch.asp

New York (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301
http://www.mde.state.md.us/assets/document/WSP_labs-2009apr20.pdf

South Carolina Volatile Organic Compounds in Potable Water: 78003

New Jersey Potable (VOA) and Non Potable Water (RCRA), Solids and Hazardous Waste: RI002
http://www.nj.gov/dep/oqa/certlabs.htm

Pensylvania Potable and Non Potable Water, Solid and Hazardous Waste: 68-01752
http://files.dep.state.pa.us/RegionalResources/Labs/LabsPortalFiles/2009-0911_accredited_laboratories.pdf

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: GZA GeoEnvironmental, Inc.
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 10110222
Date Project Due: 11/22/10
Days For Project: 4 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present? *** No**
   Air No.:
2. Were Custody Seals Present? **No**
3. Were Custody Seals Intact? **N/A**
4. Is Radiation count < 100 CPM? **Yes**
5. Is a cooler present? **Yes**
   Cooler Temp: **5.4**
   Iced With: **Icepacks**
6. Was COC included with samples? **Yes**
7. Was COC signed and dated by client? **Yes**
8. Does the COC match the sample **Yes**
9. Is COC complete and correct? **Yes**
10. Are the samples properly preserved? **Yes**
11. Proper sample containers used? **Yes**
12. Any air bubbles in the VOA vials? **N/A**
13. Holding times exceeded? **No**
14. Sufficient sample volumes? **Yes**
15. Any Subcontracting needed? **No**
16. Are ESS labels on correct containers? **Yes** / No
17. Were samples received intact? **Yes** / No
    ESS Sample IDs: _____
    Sub Lab: _____
    Analysis: _____
    TAT: _____
18. Was there need to call project manager to discuss status? If yes, please explain.

_____

_____

_____

Who was called?: _____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	1 L Glass	2	HCL
1	Yes	1 L Glass	4	NP
1	Yes	1 L Plastic	1	NP
1	Yes	250 ml Plastic	1	HNO3
1	Yes	250 ml Plastic	1	NP
2	Yes	1 L Glass	2	HCL
2	Yes	1 L Glass	4	NP
2	Yes	1 L Plastic	1	NP
2	Yes	250 ml Plastic	1	HNO3
2	Yes	250 ml Plastic	1	NP

Completed By: MK Date/Time: 11/16/10
Reviewed By: ED Date/Time: 11/16/10

1011222

W.O. # 1011-00115
(for lab use only)

ESS LABS

CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUIRED

Sample I.D.	Date/Time Sampled	Matrix A=Air S=Soil GW=Ground W. SW=Surface W. WW=Waste W. DW=Drinking W. P=Product Other (specify)	☐ pH	GC Methane, Ethane, Ethene	EPA 8260	EPA 8260- 8010 List	EPA 8021- Full List	EPA 8021- 8010 List (Chlor.)	EPA 8021- 8020 List (BTEX)	EPA 524.2 DW VOCs	EPA 624 WW VOCs	☐ 601 ☐ 602 WW VOCs	EPA 8270 SVOCs	EPA 8270 ☐ PAH ☐ A ☐ BN	EPA 625 WW SVOCs	EPA 8082-PCBs	EPA 8081-Pest	TPH-GC (Mod. 8100)	TPH-GC w/FING.	EPH (MA DEP)	VPH (MA DEP)	Metals ☐ PPM-13 ☐ R-8	MCP 14 Metals (MA)	Metals (List Below)	TCLP - Specify Below	SPLP - Specify Below	EPA 300 ☐ Cl ☐ NO3 ☐ SO4	TSS	TRC	TPH-1664	PCB-608	CYANIDE	Total No. of Cont.	Note #
1 RGP Recert 111610	11/16/10 @ 0925	GW											X															X	X	X	X	X	9	
2 SYS EFF 111610	10/16/10 @ 0905	GW											X															X	X	X	X		8	
PRESERVATIVE (Cl-HCl, M-Methanol, N-HNO3, S-H2SO4, Na-NaOH, O-Other) *													-															-	-	CL	-	Na		
CONTAINER TYPE (P-Plastic, G-Glass, V-Vial, T-Teflon, O-Other)*													G															P	P	G	G	P		

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
[illegible signature]	11/16/10 1430	[illegible signature]
[illegible signature]	11/16/10 17:25	[illegible signature]

NOTES: (Unless otherwise noted, all samples have been refrigerated to 4 +/- 2°C)
*Specify "Other" preservatives and container types in this space.

Report Method Blank and Laboratory Control Sample Results

MA-MCPs
1. 8270 via 3520
2. TSS via SM2540D
3. TRC via SM4500CLD
4. TPH-1664
5. PCB-608
6. CYANIDE via SM4500 CN CE

LAB USE: Temp Blank ______ Cooler Air ______

TURNAROUND TIME: ~~Standard~~ ~~Rush~~ Days Approved by: D. Falcone TEMP. OF COOLER ______ °C

Project Manager: Michelle Mirenda

GZA GEOENVIRONMENTAL, INC.

106 South Street
Hopkinton, MA 01748
508-435-9244
FAX 508-435-9912

GZA FILE NO: 01.0012820.90 TASK NO: 0003 P.O. NO. 8-34078

PROJECT Duffy's Brothers O&M

LOCATION 411 Waverly Oaks Rd., Waltham, MA

COLLECTOR(S) ______ AM SHEET 1 OF 1

Cooler Temp 5.4°C

C:\Documents and Settings\luis.galindo\Desktop\ESS-Duffys COC.xlsx

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

Laboratory Identification Numbers:
MA and ME: **MA092** NH: **2028**
CT: **PH0579** RI: **LAO00236**
NELAC - NYS DOH: **11063**

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project No.: **01.0012820.90**
Work Order No.: **1011-00115**
Date Received: **11/16/2010**
Date Reported: **11/23/2010**

SAMPLE INFORMATION

Date Sampled	Matrix	Laboratory ID	Sample ID
11/16/2010	Aqueous	1011-00115 001	RGP RECERT 111610
11/16/2010	Aqueous	1011-00115 002	SYS MID 111610
11/16/2010	Aqueous	1011-00115 003	SYS EFF 111610

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

PROJECT NARRATIVE:

1. Sample Receipt

The samples were received on 11/16/10 via _x_GZA courier, __EC, __FEDEX, or ___hand delivered. The temperature of the __temperature blank/_x_cooler air, was 4.6 degrees C. The temperature requirement for most analyses is above freezing to 6 degrees C. The samples were received intact for all requested analyses.

The chain of custody indicates that the samples, when required, were chemically preserved in accordance with the method they reference. Soil samples for high level VOC analysis were received preserved in methanol.

2. Subcontracted Analyses

Analyses for SVOC, TSS, TRC, TPH, PCB, and Cyanide were performed by ESS Laboratory, Cranston, RI.

3. Method SM 18 3500 Cr(D) - Hexavalent Chromium

Attach QC 11/16/10

4. EPA Method 8260 - VOCs

The reporting limit (RL) for 1,4-dioxane is elevated due to the poor analytical sensitivity of this analyte. If 1,4-dioxane is a contaminant of concern, the MA CAM requires special analytical techniques be used.

The elevated reporting limits for samples RGP RECERT 111610 (1011-00115-001) and SYS MID 111610 (1011-00115-002) are due to initial dilution of the sample in order to get target compounds within the calibration range of the instrument. The dilution was based upon screening data for the sample.

The following analyte(s) in the lowest ICAL (Initial Calibration) standard did not meet the minimum RF criteria specified in Table 4 of Method 8260C, but were above 0.050: acetone (0.080).

The following analytes in the CCV did not meet the minimum RF criteria specified in Table 4 of Method 8260C, but were above 0.050: acetone (0.069)

The Continuing Calibration Verification Standard (CCV) (11/18/10 S) had MA MCP 8260 List analytes outside of the 80-120% acceptance criteria. Specific outliers include: bromomethane (79.2%), diethyl ether (79.6%), and carbon disulfide (79.6%). MA CAM permits up to 14 outliers if within 60-140%.

Attach QC 8260 11/18/10 "S" - Aqueous

5. EPA Method 300.0 - Anions

Attach QC 300.0 11/19/10 A - Aqueous

6. EPA Method 6010C/7470A - Metals

All samples were pre-concentrated 5 times in order to reach the required reporting limits for Cu (0.005

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

mg/L).

Attach QC 6010C 11/17/10 - Aqueous
Attach QC 7470A 11/18/10 - Aqueous

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Data Authorized By: _____

Digitally signed by
Andrew Yaroshefski
Date: 2010.11.23
16:44:23 -05'00'

NELAC certification, as indicated by the NELAC Lab ID Number, is per analyte. For a complete list of NELAC validated analytes, please contact the laboratory.

Abbreviations:
% R = % Recovery
DF = Dilution Factor
DFS = Dilution Factor Solids
CF = Calculation Factor
DO = Diluted Out

Method Key:
Method 8260: The current version of the method is 8260B.
Method 8270: The current version of the method is 8270D.
Method 6010: The current version of the method is 6010C.

Please note that the laboratory signed copy of the chain of custody record is an integral part of the data report.

Soil data is reported on a dry weight basis unless otherwise specified.
Matrix Spike / Matrix Spike Duplicate sets are performed as per method and are reported at the end of the analytical report if assigned on the Chain of Custody.

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Sample ID: **RGP RECERT 111610** Sample No.: **001**
Sample Date: **11/16/2010**

Test Performed	Method	Results	Reporting Limit	Units	Tech	Analysis Date
VOLATILE ORGANICS	EPA 8260				MQS	11/18/2010
Dichlorodifluoromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Chloromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Vinyl Chloride	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromomethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Chloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Trichlorofluoromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Diethylether	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Acetone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
1,1-Dichloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Freon 113	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Carbon Disulfide	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Dichloromethane	EPA 8260	<200	200	ug/L	MQS	11/18/2010
tert-Butyl alcohol (TBA)	EPA 8260	<2500	2500	ug/L	MQS	11/18/2010
Methyl-Tert-Butyl-Ether	EPA 8260	<100	100	ug/L	MQS	11/18/2010
trans-1,2-Dichloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1-Dichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Di-isopropyl ether (DIPE)	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Ethyl tert-butyl ether ETBE	EPA 8260	<200	200	ug/L	MQS	11/18/2010
2-Butanone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
2,2-Dichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
cis-1,2-Dichloroethene	EPA 8260	220	100	ug/L	MQS	11/18/2010
Chloroform	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromochloromethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Tetrahydrofuran	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
1,1,1-Trichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1-Dichloropropene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Carbon Tetrachloride	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Benzene	EPA 8260	650	100	ug/L	MQS	11/18/2010
tert-Amyl methyl ether TAME	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Trichloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,4-Dioxane	EPA 8260	<10000	10000	ug/L	MQS	11/18/2010
1,2-Dichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromodichloromethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Sample ID: **RGP RECERT 111610** Sample No.: **001**
Sample Date: **11/16/2010**

Test Performed	Method	Results	Reporting Limit	Units	Tech	Analysis Date
Dibromomethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
4-Methyl-2-Pentanone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
cis-1,3-Dichloropropene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Toluene	EPA 8260	200	100	ug/L	MQS	11/18/2010
trans-1,3-Dichloropropene	EPA 8260	<200	200	ug/L	MQS	11/18/2010
1,1,2-Trichloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
2-Hexanone	EPA 8260	<1000	1000	ug/L	MQS	11/18/2010
1,3-Dichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Tetrachloroethene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Dibromochloromethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dibromoethane (EDB)	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Chlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1,1,2-Tetrachloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Ethylbenzene	EPA 8260	880	100	ug/L	MQS	11/18/2010
m&p-Xylene	EPA 8260	990	200	ug/L	MQS	11/18/2010
o-Xylene	EPA 8260	520	100	ug/L	MQS	11/18/2010
Styrene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromoform	EPA 8260	<200	200	ug/L	MQS	11/18/2010
Isopropylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,1,2,2-Tetrachloroethane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2,3-Trichloropropane	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Bromobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
N-Propylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
2-Chlorotoluene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,3,5-Trimethylbenzene	EPA 8260	120	100	ug/L	MQS	11/18/2010
4-Chlorotoluene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
tert-Butylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2,4-Trimethylbenzene	EPA 8260	430	100	ug/L	MQS	11/18/2010
sec-Butylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
p-Isopropyltoluene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,3-Dichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,4-Dichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
n-Butylbenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
1,2-Dibromo-3-Chloropropane	EPA 8260	<200	200	ug/L	MQS	11/18/2010

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748
(781) 278-4700

ANALYTICAL REPORT

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Russ Parkman

Project Name.: **Duffy Bros.-Waltham, MA**
Project No.: **01.0012820.90**

Date Received: **11/16/2010**
Date Reported: **11/23/2010**
Work Order No.: **1011-00115**

Sample ID: **RGP RECERT 111610** Sample No.: **001**
Sample Date: **11/16/2010**

Test Performed	Method	Results	Reporting Limit	Units	Tech	Analysis Date
1,2,4-Trichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Hexachlorobutadiene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Naphthalene	EPA 8260	5500	200	ug/L	MQS	11/18/2010
1,2,3-Trichlorobenzene	EPA 8260	<100	100	ug/L	MQS	11/18/2010
Surrogates:	EPA 8260					
***Dibromofluoromethane	EPA 8260	102	70-130	% R	MQS	11/18/2010
***1,2-Dichlorobenzene-D4	EPA 8260	108	70-130	% R	MQS	11/18/2010
***4-Bromofluorobenzene	EPA 8260	99.7	70-130	% R	MQS	11/18/2010
Preparation	EPA 5030B	100		CF	MQS	11/18/2010
METALS						
Lead	EPA 6010B	0.097	0.0020	mg/L	LLZ	11/20/2010
Iron	EPA 6010B	29	0.010	mg/L	LLZ	11/20/2010
Antimony	EPA 6010B	<0.0050	0.0050	mg/L	LLZ	11/20/2010
Arsenic	EPA 6010B	0.017	0.0020	mg/L	LLZ	11/20/2010
Cadmium	EPA 6010B	0.0022	0.0010	mg/L	LLZ	11/20/2010
Chromium	EPA 6010B	0.0027	0.0010	mg/L	LLZ	11/20/2010
Copper	EPA 6010B	0.014	0.0050	mg/L	LLZ	11/22/2010
Mercury	EPA 7470A	<0.00020	0.00020	mg/L	GDD	11/19/2010
Nickel	EPA 6010B	0.0060	0.0020	mg/L	LLZ	11/20/2010
Selenium	EPA 6010B	<0.0050	0.0050	mg/L	LLZ	11/20/2010
Silver	EPA 6010B	<0.0010	0.0010	mg/L	LLZ	11/20/2010
Zinc	EPA 6010B	0.034	0.0050	mg/L	LLZ	11/20/2010
Hexavalent Chromium	SM 3500CrD	<0.010	0.010	mg/L	LLZ	11/16/2010
Trivalent Chromium calc.		<0.010	0.010	mg/L	AJY	11/23/2010
ANIONS - ION CHROMATOGRAPHY	EPA 300.0				TAJ	11/19/2010
Chloride	EPA 300.0	390	2.0	mg/L	TAJ	11/19/2010
SUBCONTRACTED ANALYTES						
Total Suspended Solids	SM-2540D	218	5	mg/L	XXX	11/16/2010
PCB	EPA 608				XXX	
TPH via Method 1664	EPA 1664A	219	5	mg/L	XXX	11/18/2010
Total Cyanide	SM-4500CN-C E	0.0061	0.0050	mg/L	XXX	11/22/2010
Residual Chlorine	SM4500-CL D	<0.02	0.02	mg/L	XXX	11/16/2010
GC-MS SEMIVOLATILES					XXX	

GZA GEOENVIRONMENTAL, INC.
ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 7196A/SM 18 3500 CR (d) ANALYSIS
Hexavalent Chromium by Colorometric Method

QUALITY CONTROL - AQUEOUS

Date Prepared: 11/16/10

QC Sample	Method Blank	Lab Control Sample	Lab Control Sample Duplicate	LC/LCD Difference
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	80-120	80-120	20%
Analyte				
Hex Cr (Cr+6)	<0.010	90.0	90.0	0.0

RPD = Relative Percent Difference

GZA GeoEnvironmental, Inc.
106 South Street
Hopkinton, MA 01748

EPA Method 8260 / 524.2 Aqueous Method Blank (MB) and Laboratory Control Sample/Duplicate (LCS/LCSD) Data

Method Blank			Laboratory Control Sample				Laboratory Control Sample Duplicate						
Date Analyzed:	11/18/10		Date Analyzed:	11/18/10			11/18/10						
Volatile Organics	Conc. ug/L	Acceptance Limit	Spike Concentration = 20ug/L	% Recovery	Acceptance Limits	Verdict	% Recovery	Acceptance Limits	Verdict	RPD	Limit	Verdict
dichlorodifluoromethane	< 1.0	< 1.0	dichlorodifluoromethane	95.2	70-130	ok	93.6	70-130	ok	1.73	<25	ok
chloromethane	< 1.0	< 1.0	chloromethane	89.4	70-130	ok	86.6	70-130	ok	3.28	<25	ok
vinyl chloride	< 0.5	< 0.5	vinyl chloride	85.4	80-120	ok	84.7	70-130	ok	0.80	<25	ok
bromomethane	< 1.0	< 1.0	bromomethane	79.2	70-130	ok	77.5	70-130	ok	2.22	<25	ok
chloroethane	< 0.5	< 0.5	chloroethane	81.2	70-130	ok	85.0	70-130	ok	4.51	<25	ok
trichlorofluoromethane	< 1.0	< 1.0	trichlorofluoromethane	91.3	70-130	ok	89.0	70-130	ok	2.52	<25	ok
diethyl ether	< 2.5	< 2.5	diethyl ether	79.6	70-130	ok	74.1	70-130	ok	7.19	<25	ok
acetone	< 10	< 10	acetone	85.7	70-130	ok	89.1	70-130	ok	3.84	<25	ok
1,1-dichloroethene	< 0.5	< 0.5	1,1-dichloroethene	84.5	80-120	ok	85.4	70-130	ok	1.12	<25	ok
carbon disulfide	< 5.0	< 5.0	carbon disulfide	79.6	70-130	ok	80.0	70-130	ok	0.49	<25	ok
dichloromethane	< 1.0	< 1.0	dichloromethane	85.2	70-130	ok	84.2	70-130	ok	1.22	<25	ok
methyl-tert-butyl-ether	< 0.5	< 0.5	methyl-tert-butyl-ether	88.2	70-130	ok	88.0	70-130	ok	0.24	<25	ok
trans-1,2-dichloroethene	< 0.5	< 0.5	trans-1,2-dichloroethene	91.9	70-130	ok	88.4	70-130	ok	3.83	<25	ok
1,1-dichloroethane	< 0.5	< 0.5	1,1-dichloroethane	91.5	70-130	ok	88.5	70-130	ok	3.32	<25	ok
di-isopropyl ether (DIPE)	< 1.0	< 1.0	di-isopropyl ether (DIPE)	90.5	70-130	ok	88.0	70-130	ok	2.82	<25	ok
ethyl tert-butyl ether (EtBE)	< 1.0	< 1.0	ethyl tert-butyl ether (EtBE)	88.1	70-130	ok	87.6	70-130	ok	0.54	<25	ok
2-butanone	< 10	< 10	2-butanone	89.5	70-130	ok	88.3	70-130	ok	1.33	<25	ok
2,2-dichloropropane	< 0.5	< 0.5	2,2-dichloropropane	94.7	70-130	ok	90.4	70-130	ok	4.74	<25	ok
cis-1,2-dichloroethene	< 0.5	< 0.5	cis-1,2-dichloroethene	91.5	70-130	ok	89.9	70-130	ok	1.75	<25	ok
chloroform	< 0.5	< 0.5	chloroform	90.2	80-120	ok	89.7	70-130	ok	0.53	<25	ok
bromochloromethane	< 0.5	< 0.5	bromochloromethane	93.8	70-130	ok	95.8	70-130	ok	2.05	<25	ok
tetrahydrofuran	< 5.0	< 5.0	tetrahydrofuran	94.6	70-130	ok	101	70-130	ok	6.37	<25	ok
1,1,1-trichloroethane	< 0.5	< 0.5	1,1,1-trichloroethane	92.3	70-130	ok	90.1	70-130	ok	2.48	<25	ok
1,1-dichloropropene	< 0.5	< 0.5	1,1-dichloropropene	91.1	70-130	ok	88.5	70-130	ok	2.80	<25	ok
carbon tetrachloride	< 0.5	< 0.5	carbon tetrachloride	96.0	70-130	ok	94.7	70-130	ok	1.31	<25	ok
1,2-dichloroethane	< 0.5	< 0.5	1,2-dichloroethane	95.7	70-130	ok	92.6	70-130	ok	3.29	<25	ok
benzene	< 0.5	< 0.5	benzene	92.9	70-130	ok	89.9	70-130	ok	3.22	<25	ok
tert-amyl methyl ether (TAME)	< 1.0	< 1.0	tert-amyl methyl ether (TAME)	90.7	70-130	ok	90.4	70-130	ok	0.41	<25	ok
trichloroethene	< 0.5	< 0.5	trichloroethene	95.7	70-130	ok	92.8	70-130	ok	3.10	<25	ok
1,2-dichloropropane	< 0.5	< 0.5	1,2-dichloropropane	90.8	80-120	ok	91.9	70-130	ok	1.27	<25	ok
bromodichloromethane	< 0.5	< 0.5	bromodichloromethane	90.3	70-130	ok	93.0	70-130	ok	2.96	<25	ok
1,4-Dioxane	< 50	< 50	1,4-Dioxane	83.7	70-130	ok	95.1	70-130	ok	12.8	<25	ok
dibromomethane	< 0.5	< 0.5	dibromomethane	92.7	70-130	ok	94.6	70-130	ok	1.96	<25	ok
4-methyl-2-pentanone	< 10	< 10	4-methyl-2-pentanone	90.5	70-130	ok	93.2	70-130	ok	2.99	<25	ok
cis-1,3-dichloropropene	< 0.5	< 0.5	cis-1,3-dichloropropene	93.1	70-130	ok	93.2	70-130	ok	0.11	<25	ok
toluene	< 0.5	< 0.5	toluene	91.4	80-120	ok	92.1	70-130	ok	0.75	<25	ok
trans-1,3-dichloropropene	< 1.0	< 1.0	trans-1,3-dichloropropene	91.4	70-130	ok	90.8	70-130	ok	0.63	<25	ok
1,1,2-trichloroethane	< 0.5	< 0.5	1,1,2-trichloroethane	94.7	70-130	ok	95.7	70-130	ok	1.06	<25	ok
2-hexanone	< 10	< 10	2-hexanone	98.6	70-130	ok	101	70-130	ok	2.00	<25	ok
1,3-dichloropropane	< 0.5	< 0.5	1,3-dichloropropane	94.3	70-130	ok	95.2	70-130	ok	0.94	<25	ok
tetrachloroethene	< 0.5	< 0.5	tetrachloroethene	95.4	70-130	ok	97.8	70-130	ok	2.50	<25	ok
dibromochloromethane	< 0.5	< 0.5	dibromochloromethane	98.0	70-130	ok	99.3	70-130	ok	1.32	<25	ok
1,2-dibromoethane (EDB)	< 1.0	< 1.0	1,2-dibromoethane (EDB)	100	70-130	ok	102	70-130	ok	2.14	<25	ok
chlorobenzene	< 0.5	< 0.5	chlorobenzene	99.1	70-130	ok	100	70-130	ok	1.41	<25	ok
1,1,1,2-tetrachloroethane	< 0.5	< 0.5	1,1,1,2-tetrachloroethane	92.1	70-130	ok	94.7	70-130	ok	2.84	<25	ok
ethylbenzene	< 0.5	< 0.5	ethylbenzene	96.3	80-120	ok	97.4	70-130	ok	1.12	<25	ok
1,1,2,2-tetrachloroethane	< 0.5	< 0.5	1,1,2,2-tetrachloroethane	94.0	70-130	ok	98.4	70-130	ok	4.62	<25	ok
m&p-xylene	< 1.0	< 1.0	m&p-xylene	96.0	70-130	ok	95.5	70-130	ok	0.50	<25	ok
o-xylene	< 0.5	< 0.5	o-xylene	89.5	70-130	ok	87.7	70-130	ok	2.00	<25	ok
styrene	< 0.5	< 0.5	styrene	94.9	70-130	ok	92.9	70-130	ok	2.11	<25	ok
bromoform	< 1.0	< 1.0	bromoform	94.0	70-130	ok	93.7	70-130	ok	0.30	<25	ok
isopropylbenzene	< 0.5	< 0.5	isopropylbenzene	92.2	70-130	ok	86.1	70-130	ok	6.85	<25	ok
1,2,3-trichloropropane	< 0.5	< 0.5	1,2,3-trichloropropane	87.5	70-130	ok	88.5	70-130	ok	1.14	<25	ok
bromobenzene	< 0.5	< 0.5	bromobenzene	94.1	70-130	ok	92.6	70-130	ok	1.60	<25	ok
n-propylbenzene	< 0.5	< 0.5	n-propylbenzene	92.6	70-130	ok	89.8	70-130	ok	3.08	<25	ok
2-chlorotoluene	< 0.5	< 0.5	2-chlorotoluene	90.0	70-130	ok	88.8	70-130	ok	1.42	<25	ok
1,3,5-trimethylbenzene	< 0.5	< 0.5	1,3,5-trimethylbenzene	91.2	70-130	ok	89.9	70-130	ok	1.45	<25	ok
4-chlorotoluene	< 0.5	< 0.5	4-chlorotoluene	91.9	70-130	ok	92.2	70-130	ok	0.33	<25	ok
tert-butyl-benzene	< 0.5	< 0.5	tert-butyl-benzene	92.6	70-130	ok	89.2	70-130	ok	3.81	<25	ok
1,2,4-trimethylbenzene	< 0.5	< 0.5	1,2,4-trimethylbenzene	93.2	70-130	ok	90.6	70-130	ok	2.86	<25	ok
sec-butyl-benzene	< 0.5	< 0.5	sec-butyl-benzene	91.6	70-130	ok	88.4	70-130	ok	3.58	<25	ok
p-isopropyltoluene	< 0.5	< 0.5	p-isopropyltoluene	94.2	70-130	ok	90.7	70-130	ok	3.84	<25	ok
1,3-dichlorobenzene	< 0.5	< 0.5	1,3-dichlorobenzene	94.5	70-130	ok	95.4	70-130	ok	0.91	<25	ok
1,4-dichlorobenzene	< 0.5	< 0.5	1,4-dichlorobenzene	97.1	70-130	ok	95.5	70-130	ok	1.73	<25	ok
n-butylbenzene	< 0.5	< 0.5	n-butylbenzene	94.7	70-130	ok	91.2	70-130	ok	3.76	<25	ok
1,2-dichlorobenzene	< 0.5	< 0.5	1,2-dichlorobenzene	95.2	70-130	ok	94.6	70-130	ok	0.60	<25	ok
1,2-dibromo-3-chloropropane	< 2.5	< 2.5	1,2-dibromo-3-chloropropane	92.3	70-130	ok	92.9	70-130	ok	0.68	<25	ok
1,2,4-trichlorobenzene	< 0.5	< 0.5	1,2,4-trichlorobenzene	94.3	70-130	ok	95.6	70-130	ok	1.32	<25	ok
hexachlorobutadiene	< 0.5	< 0.5	hexachlorobutadiene	95.1	70-130	ok	96.9	70-130	ok	1.95	<25	ok
naphthalene	< 1.0	< 1.0	naphthalene	90.3	70-130	ok	93.5	70-130	ok	3.51	<25	ok
1,2,3-trichlorobenzene	< 0.5	< 0.5	1,2,3-trichlorobenzene	89.6	70-130	ok	92.4	70-130	ok	3.02	<25	ok

Surrogates:	Recovery (%)	Acceptance Limits	Surrogates:	Recovery (%)	Acceptance Limits	Verdict	Recovery (%)	Acceptance Limits	Verdict	RPD	Acceptance Limits	Verdict
DIBROMOFLUOROMETHANE	107	70-130	DIBROMOFLUOROMETHANE	105	70-130	ok	105	70-130	ok	0.04	<25	ok
1,2-DICHLOROETHANE-D4	104	70-130	1,2-DICHLOROETHANE-D4	103	70-130	ok	105	70-130	ok	2.07	<25	ok
TOLUENE-D8	109	70-130	TOLUENE-D8	108	70-130	ok	106	70-130	ok	1.57	<25	ok
4-BROMOFLUOROBENZENE	99.7	70-130	4-BROMOFLUOROBENZENE	107	70-130	ok	106	70-130	ok	0.75	<25	ok
1,2-DICHLOROBENZENE-D4	92.9	70-130	1,2-DICHLOROBENZENE-D4	103	70-130	ok	103	70-130	ok	0.11	<25	ok

Instrument: HP GC/MS "S"

ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 300.0 ANALYSIS
Anions by Ion Chromatography

QUALITY CONTROL - AQUEOUS

DATE PREPARED: 11/19/10 A

QC Sample	Method Blank	Lab Control Sample	Lab Control Sample Duplicate	LC/LCD Difference
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	90-110%	90-110%	20%
Analyte				
Fluoride	NA	NA	NA	NA
Chloride	<0.20	103	101	2.36
Nitrite	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA
Phosphate	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA

RPD = Relative Percent Difference

GZA GEOENVIRONMENTAL, INC.
ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 6010C ANALYSIS
Metals by ICP

QUALITY CONTROL - AQUEOUS

DATE PREPARED: 11/17/2010

QC Sample	Method Blank	Lab Control Sample	LC Duplicate	LC/LCD Diff.
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	80-120	80-120	<20
Analyte				
Silver (Ag)	<0.001	97.8	97.4	0.43
Aluminum (Al)	NA	NA	NA	NA
Arsenic (As)	<0.002	103	103	0.20
Boron (B)	NA	NA	NA	NA
Barium (Ba)	NA	NA	NA	NA
Beryllium (Be)	NA	NA	NA	NA
Calcium (Ca)	NA	NA	NA	NA
Cadmium (Cd)	<0.001	102	102	0.35
Cobalt (Co)	NA	NA	NA	NA
Chromium (Cr)	<0.001	102	103	0.95
Copper (Cu)	<0.005	115	114	1.19
Iron (Fe)	<0.010	104	105	0.18
Magnesium (Mg)	NA	NA	NA	NA
Manganese (Mn)	NA	NA	NA	NA
Molybdenum (Mo)	NA	NA	NA	NA
Nickel (Ni)	<0.002	104	105	0.74
Lead (Pb)	<0.002	104	105	1.35
Antimony (Sb)	<0.005	102	102	0.01
Selenium (Se)	<0.005	106	106	0.38
Tin (Sn)	NA	NA	NA	NA
Titanium (Ti)	NA	NA	NA	NA
Thallium (Tl)	NA	NA	NA	NA
Vanadium (V)	NA	NA	NA	NA
Zinc (Zn)	<0.005	106	105	0.71
Zirconium (Zr)	NA	NA	NA	NA

RPD = Relative Percent Difference
NA = Not Applicable
NC = Not Calculated
CRM = Certified Reference Material

GZA GEOENVIRONMENTAL, INC.
ENVIRONMENTAL CHEMISTRY LABORATORY
106 SOUTH ST, HOPKINTON, MA 01748
MASSACHUSETTS LABORATORY I.D. NO. MA092

EPA METHOD 7470A ANALYSIS
Mercury by Cold Vapor Atomic Absorption

QUALITY CONTROL - AQUEOUS

Date Prepared : 11/18/10

QC Sample	Method Blank	Lab Control Sample	Lab Control Sample Duplicate	LC/LCD Difference
Units	mg/L	% Recovery	% Recovery	RPD
Acceptance Limits	Results	80-120	80-120	20%
Analyte				
Mercury (Hg)	<0.00020	98.6	100	1.81

RPD = Relative Percent Difference
LC concentration = 0.005 mg/L

W.O. # 1011-00115
(for lab use only)

CHAIN-OF-CUSTODY RECORD

Sample I.D.	Date/Time Sampled	Matrix (A=Air, S=Soil, GW=Ground W., SW=Surface W., WW=Waste W., DW=Drinking W., P=Product, Other (specify))	ANALYSIS REQUIRED	Total No. of Cont.	Note #
RGPRECERT 111610	11/16/10 0925	GW	EPA 8260 X; EPA 8270 SVOCs X; Metals (List Below) ** (1) (6) X; TSS (2) X; TRC (3) X; TPH (4) X; PCB (5) X	12	
SYS MID 111610	11/16/10 0915	GW	EPA 8260 X	3	
SYS EFF 111610	11/16/10 0905	GW	EPA 8260 X; EPA 8270 SVOCs X; Metals (List Below) ** (1) (6) X; TSS (2) X; TRC (3) X; TPH (4) X; PCB (5) X	12	

PRESERVATIVE (Cl-HCl, M-Methanol, N-HNO3, S-H2SO4, Na-NaOH, O-Other) *: EPA 8260: Cl; Metals (List Below) **: N; TSS: P; TRC: P; TPH: Cl; PCB: G

CONTAINER TYPE (P-Plastic, G-Glass, V-Vial, T-Teflon, O-Other)*: EPA 8260: V; EPA 8270 SVOCs: G; Metals (List Below) **: P; TSS: P; TRC: P; TPH: G; PCB: G

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
A. MOORE (GZA)	11/16/10	[illegible] 11/16/10
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
[illegible]	11/16/10 1225	[illegible] 11/16/10 1330
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:

NOTES: (Unless otherwise noted, all samples have been refrigerated to 4 +/- 2°C)
*Specify "Other" preservatives and container types in this space.

(1) TEST FOR LEAD & IRON, LEAD RL = 40.1 mg/L VIA 6010B
(2) METHOD SM2540D
(3) METHOD SM4500 ELD
(4) METHOD 1664
(5) METHOD 608
(6) TEST RGPRECERT 111610 FOR METALS LISTED IN APPENDIX III VIA 6010B & 7470 LEAD RL = 40.1 mg/L

Project Manager: RUSS PARKMAN

GZA GEOENVIRONMENTAL, INC.
Laboratory Division

106 South Street
Hopkinton, MA 01748
(781) 278-4700
FAX (508)435-9912

TURNAROUND TIME: (Standard) Rush _____ Days, Approved by: _____

LAB USE: TEMP. OF COOLER 4.6 °C Temp Blank / Cooler Air 10.3

11/16/10 1135 (H)

GZA FILE NO: 01.0012820.90 TASK NO: 0003 P.O. NO. _____

PROJECT DUFFY BROTHERS O&M

LOCATION 411 WAVERLY OAKS RD, WALTHAM, MA 02452

COLLECTOR(S) A. MOORE SHEET 1 OF 2

W.O. # 1011-00115
(for lab use only)

CHAIN-OF-CUSTODY RECORD

Sample I.D.	Date/Time Sampled	Matrix (A=Air, S=Soil, GW=Ground W., SW=Surface W., WW=Waste W, DW=Drinking W., P=Product, Other (specify))	ANALYSIS REQUIRED: ☐ pH ☐ Cond.	GC Methane, Ethane, Ethene	EPA 8260	EPA 8260-8010 List (Chlor.)	EPA 8260-8021 list	EPA 8021-8020 List (BTEX)	EPA 524.2 DW VOCs	EPA 624 WW VOCs	☐ 601 ☐ 602 WW VOCs	EPA 8270 SVOCs	EPA 8270 ☐ PAH ☐ A ☐ BN	EPA 625 WW SVOCs	EPA 8082-PCBs	EPA 8081-Pest	TPH-GC (Mod. 8100)	TPH-GC w/FING	EPH (MA DEP)	VPH (MA DEP)	Metals ☐ PPM-13 ☐ R-8	MCP 14 Metals	Metals (List Below) **	TCLP - Specify Below	SPLP - Specify Below	EPA 300 ☐ Cl ☐ NO3 ☐ SO3	(7) HEX. CHROMIUM	(8) TRI+ CHROMIUM	(9) CYANIDE	(10) CHLORIDE			Total No. of Cont.	Note #
REP RECEIPT 111610	11/16/10 0925	GW																								X	X	X	X				
PRESERVATIVE (Cl-HCl, M-Methanol, N-HNO3, S-H2SO4, Na-NaOH, O-Other) *																											—	Na						
CONTAINER TYPE (P-Plastic, G-Glass, V-Vial, T-Teflon, O-Other)*																										P	—	P	P				

RELINQUISHED BY: A. MOORE (GZA) 11/16/10 — DATE/TIME — RECEIVED BY: [illegible] 11/16/10

RELINQUISHED BY: [illegible] 11/16/10 1235 — DATE/TIME — RECEIVED BY: [illegible] 11/16/10 1330

RELINQUISHED BY: — DATE/TIME — RECEIVED BY:

NOTES: (Unless otherwise noted, all samples have been refrigerated to 4 +/- 2°C)
*Specify "Other" preservatives and container types in this space.
(7) ANALYZE FOR HEXAVALENT
(8) TRIVALENT CHROMIUM VIA CALCULATION
(9) METHOD SM 4500 CN/E
(10) METHOD 300.0

Project Manager: RUSS PARKMAN

GZA GEOENVIRONMENTAL, INC.
Laboratory Division

106 South Street
Hopkinton, MA 01748
(781) 278-4700
FAX (508)435-9912

TURNAROUND TIME: (Standard) Rush ____ Days. Approved by: ____ LAB USE: TEMP. OF COOLER 4.6 °C Temp Blank: Cooler Air 10.3

GZA FILE NO: 01.0012820.90 TASK NO: 0003 P.O. NO. ____

PROJECT DUFFY BROTHERS O&M

LOCATION 411 WAVERLY OAKS RD, WALTHAM, MA 02452

COLLECTOR(S) A. MOORE SHEET 2 OF 2

11/16/10 1235 (GW)

CERTIFICATE OF ANALYSIS

Michelle Mirenda
GZA GeoEnvironmental, Inc. (MA)
106 South Street
Hopkinton, MA 01748

RE: Duffy Brothers (01.0012820.90)
ESS Laboratory Work Order Number: 1011222

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Digitally signed by Laurel Stoddard
Date: 2010.11.22 17:16:45 -05'00'

Laurel Stoddard
Laboratory Director

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

ESS Laboratory certifies that the test results meet the requirements of NELAC and A2LA, except where noted within this project narrative.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

SAMPLE RECEIPT

The following samples were received on November 16, 2010 for the analyses specified on the enclosed Chain of Custody Record.

The samples and analyses listed below were analyzed in accordance with the Guidelines Establishing Test Procedures for the Analysis of Pollutants, 40 CFR Part 136, as amended.

Sodium Hydroxide preserved sample was not received for Total Cyanide. Analysis was performed on the unpreserved sample.

Lab Number	SampleName	Matrix	Analysis
1011222-01	RGP Recert 111610	Ground Water	1664A, 2540D, 4500 CN CE, 4500Cl D, 608, 8270D
1011222-02	SYS EFF 111610	Ground Water	1664A, 2540D, 4500Cl D, 608, 8270D

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

PROJECT NARRATIVE

8270D Semi-Volatile Organic Compounds

1011222-01	**Elevated Method Reporting Limits due to sample matrix (EL).**
1011222-01	**Surrogate recovery(ies) diluted below the MRL (SD).** 1,2-Dichlorobenzene-d4 (% @ 30-130%), 2,4,6-Tribromophenol (% @ 15-110%), 2-Chlorophenol-d4 (% @ 15-110%), 2-Fluorobiphenyl (% @ 30-130%), 2-Fluorophenol (% @ 15-110%), Nitrobenzene-d5 (% @ 30-130%), Phenol-d6 (% @ 15-110%), p-Terphenyl-d14 (% @ 30-130%)
CK01623-BSD1	**Relative percent difference for duplicate is outside of criteria (D+).** Benzo(k)fluoranthene (24%), N-Nitrosodimethylamine (27%)
CTK0134-CCV1	**Benzidine tailing factor >2.**
CTK0134-CCV1	**Calibration required quadratic regression (Q).** 2,4-Dinitrophenol (125% @ 80-120%)
CTK0134-CCV1	**Continuing Calibration recovery is above upper control limit (C+).** 2,4-Dinitrophenol (125% @ 80-120%)
CTK0134-CCV1	**Initial Calibration Verification recovery is outside of control limit (ICV).** 3+4-Methylphenol
CTK0134-CCV1	**Pentachlorophenol tailing factor > 2.**
CTK0165-CCV1	**Benzidine tailing factor >2.**
CTK0165-CCV1	**Calibration required quadratic regression (Q).** 2,4-Dinitrophenol (94% @ 80-120%)
CTK0165-CCV1	**Initial Calibration Verification recovery is outside of control limit (ICV).** 3+4-Methylphenol
CTK0165-CCV1	**Pentachlorophenol tailing factor > 2.**

Classical Chemistry

1011222-01	**The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**
1011222-02	**The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**

No other observations noted.

End of Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

DATA USABILITY LINKS

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 5
Extraction Method: 3510C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: ML
Prepared: 11/18/10 10:40

All methods used are in accordance with 40 CFR 136.

608 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1221	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1232	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1242	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1248	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1254	**6.55** (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1260	**4.29** (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1262	ND (0.50)		1	11/19/10 2:21		CK01808
Aroclor 1268	ND (0.50)		1	11/19/10 2:21		CK01808

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*87 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*57 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*51 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*30 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 11/17/10 19:00

All methods used are in accordance with 40 CFR 136.

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	Limit	DF	Analyzed	Sequence	Batch
1,2,4-Trichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
1,2-Dichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
1,3-Dichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
1,4-Dichlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4,5-Trichlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4,6-Trichlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dichlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dimethylphenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dinitrophenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
2,4-Dinitrotoluene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2,6-Dinitrotoluene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Chloronaphthalene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Chlorophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Methylnaphthalene	**11100** (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Methylphenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
2-Nitrophenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
3,3'-Dichlorobenzidine	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
3+4-Methylphenol	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
4-Bromophenyl-phenylether	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
4-Chloroaniline	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
4-Nitrophenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
Acenaphthene	**3060** (935)		100	11/20/10 0:08	CTK0165	CK01623
Acenaphthylene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Acetophenone	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Aniline	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Anthracene	**1360** (935)		100	11/20/10 0:08	CTK0165	CK01623
Azobenzene	ND (1870)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(a)anthracene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(a)pyrene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(b)fluoranthene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Benzo(g,h,i)perylene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 11/17/10 19:00

All methods used are in accordance with 40 CFR 136.

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)	Limit	DF	Analyzed	Sequence	Batch
Benzo(k)fluoranthene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-Chloroethoxy)methane	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-Chloroethyl)ether	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-chloroisopropyl)Ether	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
bis(2-Ethylhexyl)phthalate	ND (561)		100	11/20/10 0:08	CTK0165	CK01623
Butylbenzylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Chrysene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Dibenzo(a,h)Anthracene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Dibenzofuran	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Diethylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Dimethylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Di-n-butylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Di-n-octylphthalate	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Fluoranthene	**1020** (935)		100	11/20/10 0:08	CTK0165	CK01623
Fluorene	**2050** (935)		100	11/20/10 0:08	CTK0165	CK01623
Hexachlorobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Hexachlorobutadiene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Hexachloroethane	ND (467)		100	11/20/10 0:08	CTK0165	CK01623
Indeno(1,2,3-cd)Pyrene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Isophorone	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Naphthalene	**11500** (935)		100	11/20/10 0:08	CTK0165	CK01623
Nitrobenzene	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
N-Nitrosodimethylamine	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Pentachlorophenol	ND (4670)		100	11/20/10 0:08	CTK0165	CK01623
Phenanthrene	**4990** (935)		100	11/20/10 0:08	CTK0165	CK01623
Phenol	ND (935)		100	11/20/10 0:08	CTK0165	CK01623
Pyrene	**1710** (935)		100	11/20/10 0:08	CTK0165	CK01623

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	%	SD	30-130
Surrogate: 2,4,6-Tribromophenol	%	SD	15-110
Surrogate: 2-Chlorophenol-d4	%	SD	15-110
Surrogate: 2-Fluorobiphenyl	%	SD	30-130

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3520C

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 11/17/10 19:00

All methods used are in accordance with 40 CFR 136.

8270D Semi-Volatile Organic Compounds

Analyte	Results (MRL)			Limit	DF	Analyzed	Sequence	Batch
Surrogate: 2-Fluorophenol		%	SD	15-110				
Surrogate: Nitrobenzene-d5		%	SD	30-130				
Surrogate: Phenol-d6		%	SD	15-110				
Surrogate: p-Terphenyl-d14		%	SD	30-130				

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers
Client Sample ID: RGP Recert 111610
Date Sampled: 11/16/10 09:25
Percent Solids: N/A

ESS Laboratory Work Order: 1011222
ESS Laboratory Sample ID: 1011222-01
Sample Matrix: Ground Water

All methods used are in accordance with 40 CFR 136.

Classical Chemistry

Analyte	Results (MRL)	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Total Cyanide (LL)	**0.0061** (0.0050)	4500 CN CE		1	EEM	11/22/10 11:50	mg/L	CK02206
Total Petroleum Hydrocarbon	**219** (5)	1664A		1	LRF	11/18/10 13:30	mg/L	CK01824
Total Residual Chlorine	ND (0.02)	4500Cl D		1	KJK	11/16/10 19:43	mg/L	CK01630
Total Suspended Solids	**218** (5)	2540D		1	EEM	11/16/10 20:00	mg/L	CK01603

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
608 Polychlorinated Biphenyls (PCB)										
Batch CK01808 - 3510C										
Blank										
Aroclor 1016	ND	0.50	ug/L							
Aroclor 1221	ND	0.50	ug/L							
Aroclor 1232	ND	0.50	ug/L							
Aroclor 1242	ND	0.50	ug/L							
Aroclor 1248	ND	0.50	ug/L							
Aroclor 1254	ND	0.50	ug/L							
Aroclor 1260	ND	0.50	ug/L							
Aroclor 1262	ND	0.50	ug/L							
Aroclor 1268	ND	0.50	ug/L							
Surrogate: Decachlorobiphenyl	*0.218*		ug/L	*0.2500*		*87*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.238*		ug/L	*0.2500*		*95*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.224*		ug/L	*0.2500*		*90*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.224*		ug/L	*0.2500*		*89*	*30-150*			
LCS										
Aroclor 1016	4.76	0.50	ug/L	5.000		95	40-140			
Aroclor 1260	4.63	0.50	ug/L	5.000		93	40-140			
Surrogate: Decachlorobiphenyl	*0.229*		ug/L	*0.2500*		*92*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.258*		ug/L	*0.2500*		*103*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.243*		ug/L	*0.2500*		*97*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.231*		ug/L	*0.2500*		*93*	*30-150*			
LCS Dup										
Aroclor 1016	5.03	0.50	ug/L	5.000		101	40-140	6	50	
Aroclor 1260	4.88	0.50	ug/L	5.000		98	40-140	5	50	
Surrogate: Decachlorobiphenyl	*0.236*		ug/L	*0.2500*		*94*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.264*		ug/L	*0.2500*		*106*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.249*		ug/L	*0.2500*		*100*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.241*		ug/L	*0.2500*		*96*	*30-150*			
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
Blank										
1,2,4-Trichlorobenzene	ND	10.0	ug/L							
1,2-Dichlorobenzene	ND	10.0	ug/L							
1,3-Dichlorobenzene	ND	10.0	ug/L							
1,4-Dichlorobenzene	ND	10.0	ug/L							
2,4,5-Trichlorophenol	ND	10.0	ug/L							
2,4,6-Trichlorophenol	ND	10.0	ug/L							
2,4-Dichlorophenol	ND	10.0	ug/L							
2,4-Dimethylphenol	ND	50.0	ug/L							
2,4-Dinitrophenol	ND	50.0	ug/L							
2,4-Dinitrotoluene	ND	10.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
2,6-Dinitrotoluene	ND	10.0	ug/L							
2-Chloronaphthalene	ND	10.0	ug/L							
2-Chlorophenol	ND	10.0	ug/L							
2-Methylnaphthalene	ND	10.0	ug/L							
2-Methylphenol	ND	10.0	ug/L							
2-Nitrophenol	ND	10.0	ug/L							
3,3´-Dichlorobenzidine	ND	20.0	ug/L							
3+4-Methylphenol	ND	20.0	ug/L							
4-Bromophenyl-phenylether	ND	10.0	ug/L							
4-Chloroaniline	ND	20.0	ug/L							
4-Nitrophenol	ND	50.0	ug/L							
Acenaphthene	ND	10.0	ug/L							
Acenaphthylene	ND	10.0	ug/L							
Acetophenone	ND	10.0	ug/L							
Aniline	ND	10.0	ug/L							
Anthracene	ND	10.0	ug/L							
Azobenzene	ND	20.0	ug/L							
Benzo(a)anthracene	ND	10.0	ug/L							
Benzo(a)pyrene	ND	10.0	ug/L							
Benzo(b)fluoranthene	ND	10.0	ug/L							
Benzo(g,h,i)perylene	ND	10.0	ug/L							
Benzo(k)fluoranthene	ND	10.0	ug/L							
bis(2-Chloroethoxy)methane	ND	10.0	ug/L							
bis(2-Chloroethyl)ether	ND	10.0	ug/L							
bis(2-chloroisopropyl)Ether	ND	10.0	ug/L							
bis(2-Ethylhexyl)phthalate	ND	6.0	ug/L							
Butylbenzylphthalate	ND	10.0	ug/L							
Chrysene	ND	10.0	ug/L							
Dibenzo(a,h)Anthracene	ND	10.0	ug/L							
Dibenzofuran	ND	10.0	ug/L							
Diethylphthalate	ND	10.0	ug/L							
Dimethylphthalate	ND	10.0	ug/L							
Di-n-butylphthalate	ND	10.0	ug/L							
Di-n-octylphthalate	ND	10.0	ug/L							
Fluoranthene	ND	10.0	ug/L							
Fluorene	ND	10.0	ug/L							
Hexachlorobenzene	ND	10.0	ug/L							
Hexachlorobutadiene	ND	10.0	ug/L							
Hexachloroethane	ND	5.0	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	10.0	ug/L							
Isophorone	ND	10.0	ug/L							
Naphthalene	ND	10.0	ug/L							
Nitrobenzene	ND	10.0	ug/L							
N-Nitrosodimethylamine	ND	10.0	ug/L							
Pentachlorophenol	ND	50.0	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
Phenanthrene	ND	10.0	ug/L							
Phenol	ND	10.0	ug/L							
Pyrene	ND	10.0	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*53.1*		ug/L	*100.0*		*53*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*122*		ug/L	*150.0*		*81*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*59.0*		ug/L	*150.0*		*39*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*62.9*		ug/L	*100.0*		*63*	*30-130*			
Surrogate: 2-Fluorophenol	*33.6*		ug/L	*150.0*		*22*	*15-110*			
Surrogate: Nitrobenzene-d5	*69.9*		ug/L	*100.0*		*70*	*30-130*			
Surrogate: Phenol-d6	*67.7*		ug/L	*150.0*		*45*	*15-110*			
Surrogate: p-Terphenyl-d14	*89.1*		ug/L	*100.0*		*89*	*30-130*			
LCS										
1,2,4-Trichlorobenzene	88.1	10.0	ug/L	100.0		88	40-140			
1,2-Dichlorobenzene	75.9	10.0	ug/L	100.0		76	40-140			
1,3-Dichlorobenzene	72.0	10.0	ug/L	100.0		72	40-140			
1,4-Dichlorobenzene	72.6	10.0	ug/L	100.0		73	40-140			
2,4,5-Trichlorophenol	91.4	10.0	ug/L	100.0		91	30-130			
2,4,6-Trichlorophenol	93.5	10.0	ug/L	100.0		94	30-130			
2,4-Dichlorophenol	92.8	10.0	ug/L	100.0		93	30-130			
2,4-Dimethylphenol	92.6	50.0	ug/L	100.0		93	30-130			
2,4-Dinitrophenol	99.1	50.0	ug/L	100.0		99	30-130			
2,4-Dinitrotoluene	103	10.0	ug/L	100.0		103	40-140			
2,6-Dinitrotoluene	100	10.0	ug/L	100.0		100	40-140			
2-Chloronaphthalene	80.7	10.0	ug/L	100.0		81	40-140			
2-Chlorophenol	75.4	10.0	ug/L	100.0		75	30-130			
2-Methylnaphthalene	93.3	10.0	ug/L	100.0		93	40-140			
2-Methylphenol	84.0	10.0	ug/L	100.0		84	30-130			
2-Nitrophenol	88.4	10.0	ug/L	100.0		88	30-130			
3,3'-Dichlorobenzidine	84.6	20.0	ug/L	100.0		85	40-140			
3+4-Methylphenol	179	20.0	ug/L	200.0		89	30-130			
4-Bromophenyl-phenylether	96.7	10.0	ug/L	100.0		97	40-140			
4-Chloroaniline	80.8	20.0	ug/L	100.0		81	40-140			
4-Nitrophenol	84.2	50.0	ug/L	100.0		84	30-130			
Acenaphthene	96.7	10.0	ug/L	100.0		97	40-140			
Acenaphthylene	90.2	10.0	ug/L	100.0		90	40-140			
Acetophenone	89.4	10.0	ug/L	100.0		89	40-140			
Aniline	72.6	10.0	ug/L	100.0		73	40-140			
Anthracene	96.8	10.0	ug/L	100.0		97	40-140			
Azobenzene	83.9	20.0	ug/L	100.0		84	40-140			
Benzo(a)anthracene	102	10.0	ug/L	100.0		102	40-140			
Benzo(a)pyrene	98.6	10.0	ug/L	100.0		99	40-140			
Benzo(b)fluoranthene	107	10.0	ug/L	100.0		107	40-140			
Benzo(g,h,i)perylene	95.1	10.0	ug/L	100.0		95	40-140			
Benzo(k)fluoranthene	70.7	10.0	ug/L	100.0		71	40-140			
bis(2-Chloroethoxy)methane	88.0	10.0	ug/L	100.0		88	40-140			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
bis(2-Chloroethyl)ether	84.9	10.0	ug/L	100.0		85	40-140			
bis(2-chloroisopropyl)Ether	85.9	10.0	ug/L	100.0		86	40-140			
bis(2-Ethylhexyl)phthalate	92.8	6.0	ug/L	100.0		93	40-140			
Butylbenzylphthalate	93.5	10.0	ug/L	100.0		93	40-140			
Chrysene	102	10.0	ug/L	100.0		102	40-140			
Dibenzo(a,h)Anthracene	94.4	10.0	ug/L	100.0		94	40-140			
Dibenzofuran	93.3	10.0	ug/L	100.0		93	40-140			
Diethylphthalate	97.9	10.0	ug/L	100.0		98	40-140			
Dimethylphthalate	97.2	10.0	ug/L	100.0		97	40-140			
Di-n-butylphthalate	93.7	10.0	ug/L	100.0		94	40-140			
Di-n-octylphthalate	97.0	10.0	ug/L	100.0		97	40-140			
Fluoranthene	105	10.0	ug/L	100.0		105	40-140			
Fluorene	103	10.0	ug/L	100.0		103	40-140			
Hexachlorobenzene	96.4	10.0	ug/L	100.0		96	40-140			
Hexachlorobutadiene	89.0	10.0	ug/L	100.0		89	40-140			
Hexachloroethane	63.4	5.0	ug/L	100.0		63	40-140			
Indeno(1,2,3-cd)Pyrene	94.2	10.0	ug/L	100.0		94	40-140			
Isophorone	70.8	10.0	ug/L	100.0		71	40-140			
Naphthalene	89.2	10.0	ug/L	100.0		89	40-140			
Nitrobenzene	88.7	10.0	ug/L	100.0		89	40-140			
N-Nitrosodimethylamine	65.9	10.0	ug/L	100.0		66	40-140			
Pentachlorophenol	103	50.0	ug/L	100.0		103	30-130			
Phenanthrene	96.8	10.0	ug/L	100.0		97	40-140			
Phenol	75.4	10.0	ug/L	100.0		75	30-130			
Pyrene	95.9	10.0	ug/L	100.0		96	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*76.4*		ug/L	*100.0*		*76*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*148*		ug/L	*150.0*		*99*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*108*		ug/L	*150.0*		*72*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*84.8*		ug/L	*100.0*		*85*	*30-130*			
Surrogate: 2-Fluorophenol	*86.9*		ug/L	*150.0*		*58*	*15-110*			
Surrogate: Nitrobenzene-d5	*89.4*		ug/L	*100.0*		*89*	*30-130*			
Surrogate: Phenol-d6	*116*		ug/L	*150.0*		*77*	*15-110*			
Surrogate: p-Terphenyl-d14	*92.4*		ug/L	*100.0*		*92*	*30-130*			
LCS Dup										
1,2,4-Trichlorobenzene	82.2	10.0	ug/L	100.0		82	40-140	7	20	
1,2-Dichlorobenzene	65.5	10.0	ug/L	100.0		66	40-140	15	20	
1,3-Dichlorobenzene	60.2	10.0	ug/L	100.0		60	40-140	18	20	
1,4-Dichlorobenzene	60.8	10.0	ug/L	100.0		61	40-140	18	20	
2,4,5-Trichlorophenol	90.3	10.0	ug/L	100.0		90	30-130	1	20	
2,4,6-Trichlorophenol	91.6	10.0	ug/L	100.0		92	30-130	2	20	
2,4-Dichlorophenol	87.4	10.0	ug/L	100.0		87	30-130	6	20	
2,4-Dimethylphenol	87.9	50.0	ug/L	100.0		88	30-130	5	20	
2,4-Dinitrophenol	95.9	50.0	ug/L	100.0		96	30-130	3	20	
2,4-Dinitrotoluene	101	10.0	ug/L	100.0		101	40-140	2	20	
2,6-Dinitrotoluene	99.2	10.0	ug/L	100.0		99	40-140	1	20	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
2-Chloronaphthalene	80.4	10.0	ug/L	100.0		80	40-140	0.4	20	
2-Chlorophenol	73.6	10.0	ug/L	100.0		74	30-130	2	20	
2-Methylnaphthalene	90.2	10.0	ug/L	100.0		90	40-140	3	20	
2-Methylphenol	80.3	10.0	ug/L	100.0		80	30-130	4	20	
2-Nitrophenol	85.2	10.0	ug/L	100.0		85	30-130	4	20	
3,3´-Dichlorobenzidine	87.9	20.0	ug/L	100.0		88	40-140	4	20	
3+4-Methylphenol	167	20.0	ug/L	200.0		83	30-130	7	20	
4-Bromophenyl-phenylether	96.3	10.0	ug/L	100.0		96	40-140	0.4	20	
4-Chloroaniline	79.2	20.0	ug/L	100.0		79	40-140	2	20	
4-Nitrophenol	84.4	50.0	ug/L	100.0		84	30-130	0.3	20	
Acenaphthene	95.5	10.0	ug/L	100.0		96	40-140	1	20	
Acenaphthylene	89.0	10.0	ug/L	100.0		89	40-140	1	20	
Acetophenone	86.7	10.0	ug/L	100.0		87	40-140	3	20	
Aniline	71.8	10.0	ug/L	100.0		72	40-140	1	20	
Anthracene	92.7	10.0	ug/L	100.0		93	40-140	4	20	
Azobenzene	82.6	20.0	ug/L	100.0		83	40-140	1	20	
Benzo(a)anthracene	106	10.0	ug/L	100.0		106	40-140	4	20	
Benzo(a)pyrene	104	10.0	ug/L	100.0		104	40-140	5	20	
Benzo(b)fluoranthene	118	10.0	ug/L	100.0		118	40-140	9	20	
Benzo(g,h,i)perylene	92.8	10.0	ug/L	100.0		93	40-140	2	20	
Benzo(k)fluoranthene	90.3	10.0	ug/L	100.0		90	40-140	24	20	D+
bis(2-Chloroethoxy)methane	84.8	10.0	ug/L	100.0		85	40-140	4	20	
bis(2-Chloroethyl)ether	82.0	10.0	ug/L	100.0		82	40-140	3	20	
bis(2-chloroisopropyl)Ether	80.0	10.0	ug/L	100.0		80	40-140	7	20	
bis(2-Ethylhexyl)phthalate	97.0	6.0	ug/L	100.0		97	40-140	4	20	
Butylbenzylphthalate	96.8	10.0	ug/L	100.0		97	40-140	3	20	
Chrysene	106	10.0	ug/L	100.0		106	40-140	4	20	
Dibenzo(a,h)Anthracene	93.8	10.0	ug/L	100.0		94	40-140	0.6	20	
Dibenzofuran	92.4	10.0	ug/L	100.0		92	40-140	0.9	20	
Diethylphthalate	97.4	10.0	ug/L	100.0		97	40-140	0.6	20	
Dimethylphthalate	96.6	10.0	ug/L	100.0		97	40-140	0.7	20	
Di-n-butylphthalate	93.3	10.0	ug/L	100.0		93	40-140	0.4	20	
Di-n-octylphthalate	104	10.0	ug/L	100.0		104	40-140	7	20	
Fluoranthene	105	10.0	ug/L	100.0		105	40-140	0.2	20	
Fluorene	101	10.0	ug/L	100.0		101	40-140	2	20	
Hexachlorobenzene	95.4	10.0	ug/L	100.0		95	40-140	1	20	
Hexachlorobutadiene	81.5	10.0	ug/L	100.0		82	40-140	9	20	
Hexachloroethane	52.3	5.0	ug/L	100.0		52	40-140	19	20	
Indeno(1,2,3-cd)Pyrene	96.7	10.0	ug/L	100.0		97	40-140	3	20	
Isophorone	68.7	10.0	ug/L	100.0		69	40-140	3	20	
Naphthalene	83.6	10.0	ug/L	100.0		84	40-140	6	20	
Nitrobenzene	83.4	10.0	ug/L	100.0		83	40-140	6	20	
N-Nitrosodimethylamine	50.4	10.0	ug/L	100.0		50	40-140	27	20	D+
Pentachlorophenol	101	50.0	ug/L	100.0		101	30-130	2	20	
Phenanthrene	96.3	10.0	ug/L	100.0		96	40-140	0.5	20	

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D Semi-Volatile Organic Compounds										
Batch CK01623 - 3520C										
Phenol	72.8	10.0	ug/L	100.0		73	30-130	4	20	
Pyrene	100	10.0	ug/L	100.0		100	40-140	4	20	
Surrogate: 1,2-Dichlorobenzene-d4	*72.0*		ug/L	*100.0*		*72*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*151*		ug/L	*150.0*		*100*	*15-110*			
Surrogate: 2-Chlorophenol-d4	*108*		ug/L	*150.0*		*72*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*85.8*		ug/L	*100.0*		*86*	*30-130*			
Surrogate: 2-Fluorophenol	*88.5*		ug/L	*150.0*		*59*	*15-110*			
Surrogate: Nitrobenzene-d5	*86.8*		ug/L	*100.0*		*87*	*30-130*			
Surrogate: Phenol-d6	*115*		ug/L	*150.0*		*76*	*15-110*			
Surrogate: p-Terphenyl-d14	*97.8*		ug/L	*100.0*		*98*	*30-130*			
Classical Chemistry										
Batch CK01603 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	32		mg/L	30.70		104	80-120			
Duplicate **Source: 1011222-02**										
Total Suspended Solids	5	5	mg/L		5			0	20	
Batch CK01630 - General Preparation										
Blank										
Total Residual Chlorine	ND	0.02	mg/L							
LCS										
Total Residual Chlorine	2.00		mg/L	2.090		96	85-115			
Duplicate **Source: 1011222-02**										
Total Residual Chlorine	ND	0.02	mg/L		ND				20	
Batch CK01824 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	20	5	mg/L	19.22		107	66-114			
Batch CK02206 - TCN Prep										
Blank										
Total Cyanide (LL)	ND	0.0050	mg/L							
LCS										
Total Cyanide (LL)	0.0214	0.0050	mg/L	0.02006		106	90-110			
LCS										
Total Cyanide (LL)	0.151	0.0050	mg/L	0.1504		100	90-110			
LCS Dup										
Total Cyanide (LL)	0.151	0.0050	mg/L	0.1504		101	90-110	0.6	20	
Duplicate **Source: 1011222-01**										

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch CK02206 - TCN Prep										
Total Cyanide (LL)	0.0064	0.0050	mg/L		0.0061			5	20	
Matrix Spike **Source: 1011222-01**										
Total Cyanide (LL)	0.0908	0.0050	mg/L	0.1003	0.0061	84	75-125			

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

Notes and Definitions

U	Analyte included in the analysis, but not detected
SD	Surrogate recovery(ies) diluted below the MRL (SD).
Q	Calibration required quadratic regression (Q).
PT	Pentachlorophenol tailing factor > 2.
ICV	Initial Calibration Verification recovery is outside of control limit (ICV).
HT	The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.
EL	Elevated Method Reporting Limits due to sample matrix (EL).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
C+	Continuing Calibration recovery is above upper control limit (C+).
BT	Benzidine tailing factor >2.
ND	Analyte NOT DETECTED above the detection limit (LOD for DoD Reports)
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
LOD	Limit of Detection
[CALC]	Calculated Analyte
LOQ	Limit of Quantitation
DL	Detection Limit

CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. (MA)
Client Project ID: Duffy Brothers

ESS Laboratory Work Order: 1011222

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)
A2LA Accredited: Testing Cert# 2864.01
http://www.a2la.org/scopepdf/2864-01.pdf

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/labs/waterlabs-instate.php

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/out_state.pdf

Maine Potable and Non Potable Water: RI0002
http://www.maine.gov/dep/blwq/topic/vessel/lab_list.pdf

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/labcert/labcert.aspx

New Hampshire (NELAP accredited) Potable and Non PotableWater, Solid and Hazardous Waste: 2424
http://www4.egov.nh.gov/des/nhelap/namesearch.asp

New York (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301
http://www.mde.state.md.us/assets/document/WSP_labs-2009apr20.pdf

South Carolina Volatile Organic Compounds in Potable Water: 78003

New Jersey Potable (VOA) and Non Potable Water (RCRA), Solids and Hazardous Waste: RI002
http://www.nj.gov/dep/oqa/certlabs.htm

Pensylvania Potable and Non Potable Water, Solid and Hazardous Waste: 68-01752
http://files.dep.state.pa.us/RegionalResources/Labs/LabsPortalFiles/2009-0911_accredited_laboratories.pdf

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01
Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)
http://www.A2LA.org/dirsearchnew/newsearch.cfm

CPSC ID# 1141
Lead Paint, Lead in Children's Metals Jewelry
http://www.cpsc.gov/cgi-bin/labapplist.aspx

Sample and Cooler Receipt Checklist

Client: GZA GeoEnvironmental, Inc.
Client Project ID: _____
Shipped/Delivered Via: ESS Courier

ESS Project ID: 10110222
Date Project Due: 11/22/10
Days For Project: 4 Day

Items to be checked upon receipt:

1. Air Bill Manifest Present? *** No**
   Air No.:
2. Were Custody Seals Present? **No**
3. Were Custody Seals Intact? **N/A**
4. Is Radiation count < 100 CPM? **Yes**
5. Is a cooler present? **Yes**
   Cooler Temp: **5.4**
   Iced With: **Icepacks**
6. Was COC included with samples? **Yes**
7. Was COC signed and dated by client? **Yes**
8. Does the COC match the sample **Yes**
9. Is COC complete and correct? **Yes**
10. Are the samples properly preserved? **Yes**
11. Proper sample containers used? **Yes**
12. Any air bubbles in the VOA vials? **N/A**
13. Holding times exceeded? **No**
14. Sufficient sample volumes? **Yes**
15. Any Subcontracting needed? **No**
16. Are ESS labels on correct containers? **Yes** / No
17. Were samples received intact? **Yes** / No
    ESS Sample IDs: _____
    Sub Lab: _____
    Analysis: _____
    TAT: _____
18. Was there need to call project manager to discuss status? If yes, please explain.

_____

_____

_____

Who was called?: _____ By whom? _____

Sample Number	Properly Preserved	Container Type	# of Containers	Preservative
1	Yes	1 L Glass	2	HCL
1	Yes	1 L Glass	4	NP
1	Yes	1 L Plastic	1	NP
1	Yes	250 ml Plastic	1	HNO3
1	Yes	250 ml Plastic	1	NP
2	Yes	1 L Glass	2	HCL
2	Yes	1 L Glass	4	NP
2	Yes	1 L Plastic	1	NP
2	Yes	250 ml Plastic	1	HNO3
2	Yes	250 ml Plastic	1	NP

Completed By: MK Date/Time: 11/16/10
Reviewed By: ED Date/Time: 11/16/10

1011222

ESS LABS

W.O. # 1011-00115
(for lab use only)

CHAIN-OF-CUSTODY RECORD

ANALYSIS REQUIRED

Sample I.D.	Date/Time Sampled	Matrix (A=Air, S=Soil, GW=Ground W., SW=Surface W., WW=Waste W., DW=Drinking W., P=Product, Other (specify))	☐ pH	GC Methane, Ethane, Ethene	EPA 8260	EPA 8260- 8010 List	EPA 8021- Full List	EPA 8021- 8010 List (Chlor.)	EPA 8021- 8020 List (BTEX)	EPA 524.2 DW VOCs	EPA 624 WW VOCs	☐ 601 ☐ 602 WW VOCs	EPA 8270 SVOCs	EPA 8270 ☐ PAH ☐ A ☐ BN	EPA 625 WW SVOCs	EPA 8082-PCBs	EPA 8081-Pest	TPH-GC (Mod. 8100)	TPH-GC w/FING.	EPH (MA DEP)	VPH (MA DEP)	Metals ☐ PPM-13 ☐ R-8	MCP 14 Metals (MA)	Metals (List Below)	TCLP - Specify Below	SPLP - Specify Below	EPA 300 ☐ Cl ☐ NO3 ☐ SO4	TSS	TRC	TPH-1664	PCB-608	CYANIDE	Total No. of Cont.	Note #
RGP Recert 111610	11/16/10 @ 0925	GW											X															X	X	X	X	X	9	
SYS EFF 111610	10/16/10 @ 0905	GW											X															X	X	X	X		8	
PRESERVATIVE (Cl-HCl, M-Methanol, N-HNO3, S-H2SO4, Na-NaOH, O-Other) *													-															-	-	CL	-	Na		
CONTAINER TYPE (P-Plastic, G-Glass, V-Vial, T-Teflon, O-Other)*													G															P	P	G	G	P		

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
[signature]	11/16/10 1430	[signature]
[signature]	11/16/10 17:25	[signature]

NOTES: (Unless otherwise noted, all samples have been refrigerated to 4 +/- 2°C)
*Specify "Other" preservatives and container types in this space.

Report Method Blank and Laboratory Control Sample Results

MA-MCPs
1. 8270 via 3520
2. TSS via SM2540D
3. TRC via SM4500CLD
4. TPH-1664
5. PCB-608
6. CYANIDE via SM4500 CN CE

Project Manager: Michelle Mirenda

GZA GEOENVIRONMENTAL, INC.
106 South Street
Hopkinton, MA 01748
508-435-9244
FAX 508-435-9912

LAB USE: Temp Blank ______ Cooler Air ______

TURNAROUND TIME: ~~Standard~~ ~~Rush~~ 5 Days Approved by: D. Falcone TEMP. OF COOLER ______ °C

GZA FILE NO: 01.0012820.90 TASK NO: 0003 P.O. NO. 8-34078

PROJECT Duffy's Brothers O&M

LOCATION 411 Waverly Oaks Rd., Waltham, MA

COLLECTOR(S) ______ AM SHEET 1 OF 1

Cooler Temp 5.4°C

C:\Documents and Settings\luis.galindo\Desktop\ESS-Duffys COC.xlsx

ATTACHMENT 8

SUPPLEMENTAL INFORMATION – 7Q10 DATA FOR WATERSHED

USGS Massachusetts StreamStats

Streamstats Ungaged Site Report

Date: Mon Dec 6 2010 08:59:13 Mountain Standard Time
Site Location: Massachusetts
NAD27 Latitude: 42.3853 (42 23 07)
NAD27 Longitude: -71.2010 (-71 12 04)
NAD83 Latitude: 42.3854 (42 23 07)
NAD83 Longitude: -71.2005 (-71 12 02)
ReachCode: 01090001022626
Measure: 9.71
Drainage Area: 5.05 mi2

Low Flows Basin Characteristics

100% Statewide Low Flow (5.05 mi2)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	5.05	1.61	149
Mean Basin Slope from 250K DEM (percent)	2.33	0.32	24.6
Stratified Drift per Stream Length (square mile per mile)	0.11	0	1.29
Massachusetts Region (dimensionless)	0	0	1

Probability of Perennial Flow Basin Characteristics

100% Perennial Flow Probability (5.05 mi2)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	5.05 (above max value 1.99)	0.01	1.99
Percent Underlain By Sand And Gravel (percent)	24.56	0	100
Percent Forest (percent)	24.20	0	100
Massachusetts Region (dimensionless)	0	0	1

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Low Flows Streamflow Statistics

Statistic	Flow (ft^3/s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
D50	4.98	18		2.47	9.98
D60	3.45	20		1.8	6.57
D70	1.97	24		0.93	4.13
D75	1.49	26		0.7	3.14
D80	1.12	28		0.52	2.39
D85	0.81	32		0.36	1.82
D90	0.57	37		0.24	1.34
D95	0.32	46		0.12	0.84
D98	0.21	60		0.0663	0.6
D99	0.15	65		0.0454	0.46
M7D2Y	0.36	50		0.13	0.95
AUGD50	0.87	33		0.38	1.96
M7D10Y	0.13	71		0.0365	0.43

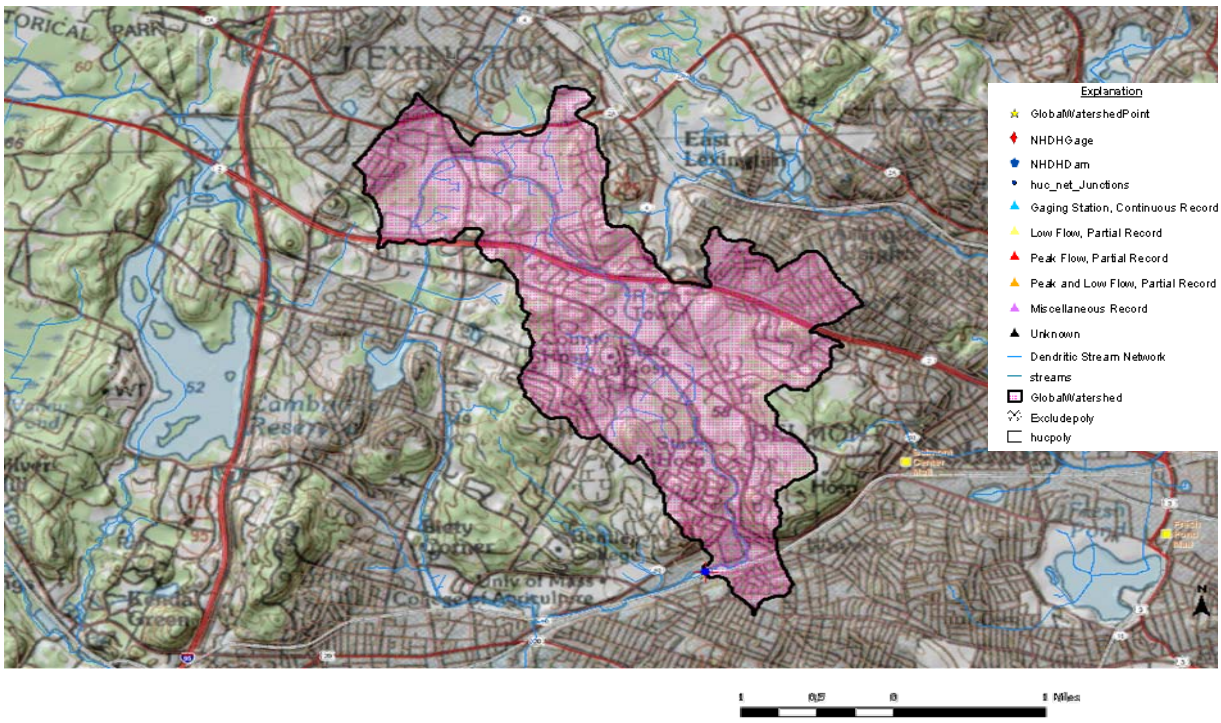
The equation for estimating the probability of perennial flow is applicable for most areas of Massachusetts except eastern Buzzards Bay, Cape Cod, and the Island regions. The estimate obtained from the equation assumes natural flow conditions at the site. The equation also is best used for sites with drainage areas between 0.01 to 1.99 mi2, as errors beyond for basins beyond these bounds are unknown.

Probability of Perennial Flow Statistics

Statistic	Value	Standard Error (percent)
PROBPEREN	0.98	

USGS Massachusetts StreamStats

StreamStats Print Page



12/6/2010 8:57:30 AM

File No. 12820.90
December 8, 2010

DILUTION FACTOR CALCULATIONS
NOTICE OF INTENT FOR THE REMEDIATION GENERAL PERMIT
411 Waverly Oaks Road, Waltham, Massachusetts

$$DF = \frac{Q_d + Q_s}{Q_d}$$

Where,

DF = Dilution Factor

Q_d = Maximum Flow Rate of the Discharge in cubic feet per second (cfs) (1.0 gpm = 0.00223 cfs)

Q_s = Receiving Water 7Q10 Flow (cfs) where,

7Q10 = Minimum Flow (cfs) for 7 Consecutive Days with a Recurrence Interval of 10 Years.

Q_d = 100 gpm = 0.223 cfs

Q_s = 0.13 cfs (M7D10Y on attached USGS Streamstats Site Report)

$$\therefore DF = \frac{Q_d + Q_s}{Q_d} = \frac{0.223 + 0.13}{0.223} = 1.6$$

Z:\11,000-12,999\12820\12820-90.PFS\NPDES\RGP NOI 2010\DF Calculations.docx

ATTACHMENT 9

MSDS SHEETS

REDUX TECHNOLOGY®

Division of Azure Water Services, LLC

Material Safety Data Sheet

Product Name: Redux 340 **Effective date: 12/15/2007**
MSDS #: 34 **Page** 1 of 6

SECTION 1 -- CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

IDENTIFICATION

Product Name Redux 340
Chemical Name Aqueous Blended Deposit Control Agent
Chemical Family
Formula
Synonym

COMPANY IDENTIFICATION

Redux Technology
Division of Azure Water Services, LCC
550 VT Rte. 30, P.O. Box 331
Newfane, VT 05345
Phone: 802-365-7200
Fax: 802-365-4652
Email: info@reduxtech.com

EMERGENCY TELEPHONE NUMBER

24 hours a day: CHEMTREC 1-800-424-9300.
Number for non-emergency questions concerning MSDS: (802) 365-7200

SECTION 2 -- COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS #	Amount (%W/W)
Water	7732-18-5	~76%
Dispersing Copolymer	Not Hazardous	~3%
Organic Phosphorous Compound	Proprietary	~11%
Other Ingredients	Proprietary	~10%

SECTION 3 -- HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW	**Eye and skin irritant. Material may cause burns on exposed tissues. Eye contact may cause corneal injury, which may result in permanent impairment of vision, or even blindness. Prolonged or repeated skin may cause irritation or even a burn.**

POTENTIAL HEALTH EFFECTS	
INGESTION.....	Corrosive and causes severe and permanent damages to mouth throat and stomach. May be fatal if swallowed.
INHALATION.....	Damages airways and lungs, depending upon amount and duration of exposure. Effects can vary from irritation to bronchitis or pneumonia.
EYE CONTACT.....	Severely corrosive to the eyes, and may cause permanent damage, including blindness.
SKIN CONTACT.....	Corrosive; causes severe skin burns. Harmful contact may not cause immediate pain.

SECTION 4 -- FIRST AID MEASURES

INGESTION	If swallowed, DO NOT induce vomiting. Immediately drink a large quantity of water. If available, give large quantities of milk. Never give anything by mouth to an unconscious person. **Get medical attention immediately.** If vomiting occurs spontaneously, keep airway clear.
INHALATION	Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. **Get medical attention immediately.**
EYE CONTACT	Immediately flush eye with plenty of cool, running water. Remove contact lenses if applicable and continue flushing for at least 15 minutes, holding eyelids apart to ensure thorough rinsing of the entire eye. **Get medical attention immediately.**
SKIN CONTACT	Immediately flush skin with plenty of cool running water for at least 15 minutes. Wash with soap and water. If irritation develops or persists, get medical attention. Remove contaminated clothing and shoes; wash before reuse.
NOTE TO PHYSICIAN	Information pertaining to ingestion toxicology, therapy, symptomatology and treatment can be found in Clinical Toxicology of Commercial Products, authored by Gosselin, Smith and Hodge and published by Williams & Wilkins, Baltimore, Maryland.

SECTION 5 -- FIRE FIGHTING MEASURES

FLASH POINT / METHOD	None / N.A.	FLAMMABLE LIMITS	Not flammable or combustible
EXTINGUISHING MEDIA	Use extinguishing media appropriate for surrounding fire.		
SPECIAL FIRE FIGHTING PROCEDURES	Pressure demand self-contained respiratory protection and protective clothing should be worn by fire fighters.		
FIRE AND EXPLOSION HAZARDS	Not a fire or explosion hazard		

SECTION 6 -- ACCIDENTAL RELEASE MEASURES

RESPONSE TO SPILLS	Absorb with inert material such as vermiculite, shovel into closeable container for disposal. Thoroughly flush residual with water.

SECTION 7 -- HANDLING AND STORAGE

HANDLING PRECAUTIONS	Wear proper safety equipment. Mix only with water. Follow appropriate tank entry procedures (ANSI Z117) and OSHA Confined Space Regulations.
STORAGE PRECAUTIONS	Store in a cool, dry and well-ventilated place. Keep from freezing. Keep container tightly closed when not in use.

SECTION 8 -- EXPOSURE CONTROLS / PERSONAL PROTECTION

HYGIENIC PRACTICES	Observe label precautions; use personal protective equipment. Avoid breathing mists or vapors of this product.
ENGINEERING CONTROLS	**Facilities using this product must be equipped with an eyewash station.** Local Exhaust: None

PERSONAL PROTECTIVE EQUIPMENT

X	**RESPIRATOR**	NIOSH/MSHA approved respirator where mists or sprays may be generated.
X	**GOGGLES / FACE SHIELD**	Chemical splash goggles required; also use face shield if exposure is severe
X	**APRON**	Required; PVC, Neoprene or Vinyl acceptable
X	**GLOVES**	Required; use PVC, Neoprene or Nitrile with long gauntlet or protective cuff
X	**BOOTS**	Rubber

SECTION 9 -- PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	Clear pale yellow liquid	BOILING POINT	> 212^{o} F
ODOR	Slight Odor	FREEZING POINT	< 32^{o} F
pH	Approx. 1.9	VAPOR PRESSURE	Similar to water
SPECIFIC GRAVITY	1.1	VAPOR DENSITY	Similar to water
SOLUBILITY IN WATER	Complete	EVAPORATION RATE	Similar to water

SECTION 10 -- STABILITY AND REACTIVITY

CHEMICAL STABILITY		**STABLE**	X		**UNSTABLE**	
CONDITIONS TO AVOID	Do not mix with anything but water.					
INCOMPATIBILITY	Do not mix with quaternay amines, acids, sulfides and strong oxidizers.					
HAZARDOUS PRODUCTS OF DECOMPOSITION	Carbon dioxide and carbon monoxide.					
POLYMERIZATION		**WILL NOT OCCUR**	X		**MAY OCCUR**	
CONDITIONS TO AVOID	Not applicable					

SECTION 11 -- TOXICOLOGICAL INFORMATION

Oral:	Rat LD50 = ~13,400 mg/kg
Dermal:	Rabbit LD50 = >43,000 mg/kg
Eye Irritation:	Corrosive
Skin irritation	Mild Irritant

CARCINOGENICITY

	THIS PRODUCT CONTAINS A KNOWN OR SUSPECTED CARCINOGEN
X	**THIS PRODUCT DOES NOT CONTAIN ANY KNOWN OR ANTICIPATED CARCINOGENS ACCORDING TO THE CRITERIA OF THE NTP ANNUAL REPORT ON CARCINOGENS AND OSHA 29 CFR 1910, Z**

OTHER EFFECTS

ACUTE	May be corrosive to all body tissues which it comes in contact.
CHRONIC	The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness.

SECTION 12 -- ECOLOGICAL INFORMATION

BIODEGRADABILITY		**CONSIDERED BIODEGRADABLE**	X		**NOT BIODEGRADABLE**	
BOD / COD VALUE	Not established					
ECOTOXICITY	Ceriodaphnia (ceriodaphnia dubia): 48 hr LD50 = 3100 mg/l NOAEL = 1600 mg/l Fathead Minnow (pimephales promelas): 96 hr LD50 = 3100 mg/l NOAEL = 1600 mg/l					

REDUX TECHNOLOGY

Material Safety Data Sheet

Product Name: Redux 340 **Effective date: 12/15/2007**
MSDS #: 34 **Page** 6 of 6

SECTION 13 -- DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD	Product that cannot be used according to the label must be disposed of as a hazardous waste at an approved hazardous waste management facility. Empty containers may be triple rinsed, then offered for recycling or reconditioning; or puncture and dispose of in a sanitary landfill.								
RCRA CLASSIFICATION	Hazardous, corrosive D002								
RECYCLE CONTAINER		**YES**	X		**CODE**	2 - HDPE		**NO**	

SECTION 14 -- TRANSPORT INFORMATION

DOT CLASSIFICATION		**HAZARDOUS**	x		**NOT HAZARDOUS**	
DESCRIPTION	Corrosive					

SECTION 15 -- REGULATORY INFORMATION

REGULATORY STATUS

	EPA REGISTERED (UNDER FIFRA)	
	FDA REGULATED	
	KOSHER	
	SARA TITLE III MATERIAL	
	USDA AUTHORIZED	
	NSF APPROVAL	

SECTION 16 -- OTHER INFORMATION

NFPA CLASSIFICATION

2	**BLUE**	HEALTH HAZARD
0	**RED**	FLAMMABILITY
1	**YELLOW**	REACTIVITY
C	**WHITE**	SPECIAL HAZARD

Material Safety Data Sheet

May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910, 1200. Standard must be
consulted for specific requirements

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072 HMIS 3H/OF/OR

IDENTITY (As used on Label and List)	Note: Blank spaces are not permitted, if any item is not applicable, or no information is available, the space must be marked to indicate that.
SODIUM ALUMINATE SOLUTION	

Section I

Manufacturer's Name HOLLAND COMPANY, INC.	Emergency Telephone Number 413-743-1292
Address (Number, Street, City, State and Zip Code) 153 HOWLAND AVENUE	Telephone Number for Information 413-743-1292
ADAMS, MASSACHUSETTS 01220	Date Prepared MARCH 2006
	Signature of Preparer (optional)

Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity: Common Names(s)

	OSHA PEL	ACGIH TLV
ALO_2NA		$2mg(AL)/m^3$
NA2AL204 in water solution	NA2AL204	
CAS NO. 11138-49-1		
RTECS Skin 50 mg/24 SED		
Eye MKV 1% 24H SEV		
DOT classification: Corrosive material, Packing Group II		
DOT ID No. UN 1819 Sodium Aluminate Solution		

Section III - Physical/Chemical Characteristics

Boiling Point	240^oF	Specific Gravity (H_2O=1)	1.51± .02
Vapor Pressure (mm Hg.)	N/A	Melting Point	5^oF
Vapor Density (AIR -1)	N/A	Evaporation Rate (Butyl Acetate - 1)	N/A H_2O

Solubility in Water: 100 %

Appearance and Odor: Light Amber Liquid, No Odor.

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Non Flammable	N/A	N/A	N/A

Extinguishing Media
N/A

Special Fire Fighting Procedures
N/A

Unusual Fire and Explosion Hazards
N/A

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	N/A

Incompatibility (Materials to Avoid)
Reacts with Acids, Corrosive to Nonferrous Metals

Hazardous Decomposition or Byproducts
None

Hazardous Polymerization	May Occur		Conditions to Avoid N/A
	Will Not Occur	X	

Section VI - Health Hazard Data

Route(s) of Entry: Inhalation Skin - Eyes Ingestion
Skin irritation with possible severe burns; Eye damage with possible

Health Hazards (Acute and Chronic)
blinding; Inhalation of mists can damage upper respiratory tract ranging from irritation to pneumonitis.

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated?
No Yes

Signs and Symptoms of Exposure: Irritation

Medical Conditions Generally Aggravated by Exposure: Ingestion - do not induce vomiting, get medical attention: Skin - Flush with water, remove and wash clothes; do not move individual until skin is thoroughly washed.

Emergency and First Aid Procedures:
Eyes – Flush continuously for at least 15 minutes – get prompt medical attention.

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled
Wear Protective gloves and eye protection. Collect for disposal or flush with water to chemical treatment. Neutralize with dilute acid.

Waste Disposal Method
Neutralize then conform to local, state and federal regulations.

Precautions to Be Taken in Handling and Storing:
Rubber or plastic gloves Eye protection

Other Precautions
Recommended maximum use for potable water of 40 mg/liter.
Do not breathe mists: causes skin irritation and serious eye injury.

Section VIII - Control Measures

Respiratory Protection (Specify Type): OSHA approved mist respirator when needed.

Ventilation	Local Exhaust: None	Special:
None	Mechanical (General):	Other:

Protective Gloves Rubber / Plastic	Eye Protection Yes, Full Face Shield

Other Protective Clothing or Equipment: Rubber/Plastic coat and pants

Work/Hygienic Practices: Avoid direct contact with skin or eyes

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCLEAR® 7763

EMERGENCY TELEPHONE NUMBER
(800)462-5378 (24 Hours) (800) I-M-ALERT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :	**NALCLEAR® 7763**
APPLICATION :	FLOCCULANT
CHEMICAL DESCRIPTION :	Polymer, Surfactant(s), Water, Hydrocarbon solvent
COMPANY IDENTIFICATION :	Nalco Chemical Company One Nalco Center Naperville, Illinois 60563-1198
EMERGENCY TELEPHONE NUMBER :	(800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING
HEALTH : 1 / 2 FLAMMABILITY : 1 / 1 REACTIVITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact. Toxic to aquatic organisms.
Do not get in eyes, on skin, on clothing. Do not take internally. Wear suitable protective clothing. Keep container tightly closed. Water in contact with the product will cause slippery floor conditions. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water. Protect product from freezing. SHAKE BEFORE USING.
Wear suitable protective clothing and gloves.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. Repeated or prolonged exposure may irritate the respiratory tract.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Remove contaminated clothing. Wash off affected area immediately with soap and plenty of water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT :	> 200 °F / > 93 °C (PMCC)
LOWER EXPLOSION LIMIT :	Not flammable
UPPER EXPLOSION LIMIT :	Not flammable

EXTINGUISHING MEDIA :
Foam, Dry powder, Carbon dioxide, Other extinguishing agent suitable for Class B fires

UNSUITABLE EXTINGUISHING MEDIA :
Do not use water unless flooding amounts are available.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Notify appropriate government, occupational health and safety and environmental authorities. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by dyking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product is toxic to fish. It should not be directly discharged into lakes, ponds, streams, waterways or public water supplies.

7. HANDLING AND STORAGE

HANDLING :
Do not take internally. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Avoid eye and skin contact.

STORAGE CONDITIONS :
Store separately from oxidizers. Store the containers tightly closed. SHAKE BEFORE USING.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Due to its low volatility and toxicity, the hazard potential associated with this material is relatively low. Respiratory protection is not normally needed.

HAND PROTECTION :
Nitrile gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Off-white Opaque
ODOR	Mild, Pungent

SPECIFIC GRAVITY	1.03 - 1.08
DENSITY	8.6 - 8.9 lb/gal
SOLUBILITY IN WATER	Emulsifiable
VISCOSITY	400 cps @ 75 °F / 24 °C
FREEZING POINT	< -50 °F / < -45.6 °C
POUR POINT	-36 °F / -37.8 °C

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures

MATERIALS TO AVOID :
Addition of water results in gelling. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Moderate

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product and a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Tested Substance
Rainbow Trout	96 hrs	8,800 mg/l	1% Aqueous Solution of Product
Sheepshead Minnow	96 hrs	> 1,000 mg/l	1% Aqueous Solution of a Similar Product

Rating : Essentially non-toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Tested Substance
Daphnia magna	48 hrs	190 mg/l		1% Aqueous Solution of Product
Mysid Shrimp (M. bahia)	96 hrs	400 mg/l		1% Aqueous Solution of a Similar Product

Rating : Essentially non-toxic

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 64,810 mg/l

Chemical Oxygen Demand (COD) : 97,310 mg/l

Biological Oxygen Demand (5 Day BOD) : 32,320 mg/l

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

Proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The chemical substances in this product are on the TSCA 8(b) Inventory (40 CFR 710).

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Water	7732-18-5
Hydrotreated Light Distillate	64742-47-8
ETHOXYLATED C10-16 ALCOHOLS	68002-97-1
Acrylic Polymer	20507700000-5027P
Fatty Acid Ester	20507700000-5042P

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
All substances in this product are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

F102331

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, Co.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO

Prepared By : Product Safety Department
Date issued : 02/28/2000
Replaces : 02/23/1999

MATERIAL SAFETY DATA SHEET

Sodium Hydroxide 50% Solution

MSDS Ref. No.: 1310-73-2-3
Date Approved: 01/26/2004
Revision No.: 4

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Sodium Hydroxide 50% Solution

SYNONYMS: Caustic Soda Solution; Lye Solution; Sodium Hydrate Solution, White Caustic Solution

GENERAL USE: pH Control

This chemical is certified to ANSI/NSF Standard 60, Drinking Water Chemicals-Health Effects (as packaged in the original, unopened container). The maximum dosage level for this chemical is 200 mg/L

MANUFACTURER

FMC Wyoming Corporation
Alkali Chemicals Division
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 424-9300 (CHEMTREC - U.S.)
(303) 595-9048 (Medical - Call Collect)

(307) 872-2452 (Plant - Green River, WY)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Water white liquid with no appreciable odor.
- Solution is corrosive to body tissues and metallic materials.
- Product may react violently with acids.

POTENTIAL HEALTH EFFECTS: Solution is corrosive and severely irritating to the eyes and skin.

MEDICAL CONDITIONS AGGRAVATED: Skin and lung disorders may be affected adversely by this material; an individual's specific medical condition and circumstances of exposure determine the likelihood of an adverse effect.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Sodium Hydroxide	1310-73-2	50	215-185-5	C R35 /34; Xi R36/38
Water	7732-18-5	50	231-791-2	Not classified as hazardous

4. FIRST AID MEASURES

EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

SKIN: Immediately flush with plenty of water while removing contaminated clothing and/or shoes, and thoroughly wash with soap and water. See a medical doctor immediately.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: Sodium hydroxide at this concentration is corrosive. Major burns to all surfaces may result. Prolonged dilution with water is required. Neutralization of eye burns is absolutely contraindicated; for skin, 2% acetic acid has been recommended, but washing with water is effective. Ingestion requires milk or water dilution, consideration of esphagoscopy and management for possible esophageal stricture.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Not applicable

FIRE / EXPLOSION HAZARDS: Non-combustible

FIRE FIGHTING PROCEDURES: Not applicable

FLAMMABLE LIMITS: Not applicable

HAZARDOUS COMBUSTION PRODUCTS: None

SENSITIVITY TO IMPACT: Not Sensitive

SENSITIVITY TO STATIC DISCHARGE: Not Sensitive

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Wear personal protective equipment as recommended in Section 8, "Exposure Controls/Personal Protection" below.

Contain spill using absorbent material and place in an approved container.

Dispose of according to the method outlined in Section 13, "Disposal Considerations" below.

7. HANDLING AND STORAGE

HANDLING: During handling of liquid, prevent contact with skin and eyes by using adequate personal protective equipment (see Section 8, "Exposure Controls/Personal Protection" below). If the release of airborne material is likely, exhaust ventilation and/or respiratory protection may also be necessary.

STORAGE: Store in closed containers away from sources of heat.

COMMENTS: Use only in systems, processes and procedures in which effective ventilation has been provided to meet established exposure limits.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Sodium Hydroxide	2 mg/m^3 (STEL) (Ceiling)	2 mg/m^3 (TWA) 2 mg/m^3 (PEL) (ceiling)	

ENGINEERING CONTROLS: Adequate engineering controls and/or personal protective equipment must be used to prevent contact with skin and eyes. Engineering controls and/or respirators may be necessary when the generation of airborne mists or fogs are possible.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Chemical goggles (and face shield if necessary) should be worn to prevent contact.

RESPIRATORY: When exposure above the established standard is likely, a respiratory protection program that complies with OSHA General Industry Standard 1910.134 should be implemented. Wear full face-piece respirators approved by MSHA / NIOSH if mists are expected.

PROTECTIVE CLOTHING: Rubber or vinyl apron. Rubber boots or rubber overshoes.

GLOVES: Impervious rubber or vinyl gloves with gauntlets. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

COMMENTS:

The information noted above provides general guidance for handling this product. Specific work environments and material handling practices will dictate the selection and use of personal protection equipment (PPE).

---

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	No appreciable odor
APPEARANCE:	Water white liquid
AUTOIGNITION TEMPERATURE:	Not applicable
BOILING POINT:	145 °C (293 °F)
COEFFICIENT OF OIL / WATER:	Not applicable
EVAPORATION RATE:	(butyl acetate = 1) Not available
FLASH POINT:	Non-combustible
FREEZING POINT:	4.4°C (40°F)
ODOR THRESHOLD:	Not applicable
OXIDIZING PROPERTIES:	Not available
PERCENT VOLATILE:	Not applicable
pH:	(as is) 13.7
SOLUBILITY IN WATER:	Infinite
SPECIFIC GRAVITY:	1.53 @ 15.5°C (60°F) (water = 1)
VAPOR DENSITY:	Not applicable
VAPOR PRESSURE:	6.33 mm Hg @ 40 °C (104 °F)

COMMENTS:

pH (1% solution): 13.0

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Contact with acids, flammable liquids, organic halogen compounds, nitro compounds, and amphoteric metals, such as aluminum, magnesium and zinc.
STABILITY:	Slightly reactive
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Acids, flammable liquids, organic halogen compounds, nitro compounds, and amphoteric metals, such as aluminum, magnesium and zinc.
HAZARDOUS DECOMPOSITION PRODUCTS:	None

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Severely irritating, corrosive (rabbit) [RTECS 1986, NIOSH 1975]

SKIN EFFECTS: Severely irritating, corrosive (rabbit) [RTECS 1986, PB 234-899 1974]

DERMAL LD_{50}: Corrosive

ORAL LD_{50}: 400 mg/kg (rabbit) LDLo [PB 234-899 1974]

INHALATION LC_{50}: Corrosive

TARGET ORGANS: Skin, eyes, mucous membranes

ACUTE EFFECTS FROM OVEREXPOSURE: Sodium hydroxide is corrosive and may produce severe eye, skin and respiratory tract irritation and upper gastrointestinal tract damage. Ingestion of concentrated solutions has caused death in animals and humans. [Gosselin, Smith & Hodge, 1984; PB 234-899 1974]

CHRONIC EFFECTS FROM OVEREXPOSURE: Sodium hydroxide may produce inflammation of the eyes, skin, and mucous membranes. Esophageal carcinoma at the site of a chronic lye stricture has been reported. [Gosselin , Smith & Hodge 1984]

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	Not Listed (ACGIH)

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: Bluegill sunfish: 48-hour LC_{50} = 99 mg/L
Mosquito fish: 96-hour LC_{50} = 125 mg/L
Brown shrimp (Crangon crangon): 48-hour LC_{50} = 30 - 100 mg/L

The damaging effects are mostly a consequence of the increase in pH. The upper pH limit tolerated by most freshwater fish is 8.4; the pH must generally be greater than 9 before the aqueous environment becomes lethal for fully developed fish. Freshwater algae are destroyed above pH 8.5. Concentrations of 20 to 100 mg/L have been reported to kill salmon, trout, carp and crayfish. [Ref. , Environment Canada, Environmental Protection Service, Sodium Hydroxide Environmental and Technical Information for Problem Spills. June 1984]

CHEMICAL FATE INFORMATION: The pH effect of sodium hydroxide in water is naturally reduced by the absorption of atmospheric carbon dioxide. This reduction is also effected by dilution with water and by the natural acidity of a given water body. There is no degradation of sodium hydroxide in waters, only loss by absorption or through chemical neutralization.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of in accordance with all local, state and federal environmental rules and regulations. Check the pH of the waste to be disposed, if it is greater than 12.5 it must be handled as a RCRA hazardous waste.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Sodium Hydroxide Solution
PRIMARY HAZARD CLASS / DIVISION:	8 (Corrosive)
UN/NA NUMBER:	UN 1824
PACKING GROUP:	II

LABEL(S):	Corrosive
PLACARD(S):	Corrosive
MARKING(S):	Sodium Hydroxide Solution
ADDITIONAL INFORMATION:	Hazardous Substance/RQ = 1000 lbs. (454 kg) 49 STCC Number: 4935240

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME:	Sodium Hydroxide Solution

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME:	Sodium Hydroxide Solution

OTHER INFORMATION:

Cool containers with water if exposed to fire or excessive heat conditions.

---

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Listed

Chemical Name	RQ	
Sodium Hydroxide	1,000 lb	Category C

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
Listed

U.S. STATES

U.S. State Regulation:
New Jersey - Special Health Hazard
Massachusetts - Substance List

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number:	Not available
Hazard Classification / Division:	Class D, Div. 2, Subdiv. B (Toxic), E (Corrosive)
Ingredient Disclosure List:	Listed

EU EINECS NUMBERS:

sodium hydroxide 011-002-00-6

---

16. OTHER INFORMATION

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

Sodium hydroxide:

EC Symbols:	C	(Corrosive)
	Xi	(Irritant)
EC Risk Phrases:	R35/34	(Causes severe burns / causes burns)
	R36/38	(Irritating to eyes and skin.)
EC Safety Phrases:	S1/2	(Keep locked up and out of reach of children.)
	S26	(In case of contact with eyes, rinse immediately with plenty of water and seek medical advice)
	S37	(Wear suitable gloves.)
	S39	(Wear eye/face protection.)
	S45	(In case of accident or if you feel unwell, seek medical advice immediately - show the label where possible.)

HMIS

Health	3
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	J

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	3
Flammability	0
Reactivity	1
Special	None

No special requirements

NFPA = National Fire Protection Association

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
New Format, as well as text changes and/or updates to one or more Sections of this MSDS.

FMC Logo - FMC Corporation Trademark

FMC Corporation believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable where such product is used in combination with any other materials or in any process. It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Further, since the conditions and methods of use are beyond the control of FMC Corporation, FMC Corporation expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

MATERIAL SAFETY
DATA SHEET

F2 Industries LLC.
5543 Edmondson Pike #156
Nashville,Tn. 37211
615-828-1652

EMERGENCY TELEPHONE: CHEMTREC 1-800-424-9300

****

DATE ISSUED: 12/04

SECTION 1 - CHEMICAL PRODUCT IDENTIFICATION

PRODUCT NAME: ***Sodium Permanganate Solution**
DESCRIPTION: *40% minimum as NaMnO4

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME	%	TLV	CAS No.
* Sodium Permanganate * * *	40-42	.2mg Mn per cubic meter of air	*10101-50-5

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: *

EFFECTS OF OVEREXPOSURE - ACUTE

EYES: *Sodium Permanganate is damaging to eye tissue on contact. It may cause burns that result in damage to the eye.

SKIN: *Momentary contact of solution at room temp may be irritating to the skin,leaving brown stains.

INGESTION: *If swallowed,may cause burns to mucous membranes of the mouth,throat,esophagus, and stomach

INHALATION: *May cause irritation to the respiratory tract

EFFECTS OF OVEREXPOSURE - CHRONIC
*

PRIMARY ROUTE OF ENTRY: *

SECTION 4 - FIRST AID MEASURES

EYES: *Flush immediately with large amounts of water for at least 15 minutes. Seek medical attention immediately.

SKIN: *Wash contaminated area with water. Seek medical attention if irritation persists.

INGESTION: *If person is conscious, give large amounts of water or milk. Seek medical attention.

INHALATION: *Remove person from contaminated area to fresh air. Seek medical attention.

*PHYSICIANS NOTE: *Decomposition products are alkaline.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASHPOINT: *None
FLAMMABILITY: *Nonflammable
AUTOFLAMMABILITY: *None
EXPLOSIVE LIMITS:
LOWER: n/a UPPER:n/a

EXPLOSION HAZARD: *Explosive in contact with sulfuric acid or peroxides,or readily oxidizable substances

EXTINGUISHING MEDIA: Use large amounts of water. Dike to contain.

EXTINGUISHING MEDIA WHICH MUST NOT BE USED: dry chemicals, Foams

****

SPECIAL EXPOSURE HAZARDS IN FIRE: Keep containers cool by spraying with water if exposed to fire.
SPECIAL PROTECTIVE EQUIPMENT FOR A FIRE: Self-contained breathing apparatus should be worn.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

ENVIRONMENTAL PRECAUTIONS: *Contain spill by collecting the liquid in a pit or holding behind a dam. Dilute to approx 6% solution with water and then reduce with sodium thiosulfate,a bisulfite or ferrous salt solution.
METHODS FOR CLEANUP: *Flush with abundant water into the sewer, if permitted by federal,state, and local authorities. If not,collect and treat as above.

SECTION 7 - HANDLING AND STORAGE

HANDLING: *Wash hands thoroughly with soap and water after handling.
STORAGE: *Store in a cool, well-ventilated area. Segregate from acids,peroxides, Formaldehyde,and all combustible,organic or easily oxidized materials.

SECTION 8 - EXPOSURE CONTROL / PERSONAL PROTECTION

ENGINEERING CONTROLS: General ventilation is recommended. Eyewash and safety shower stations must be located in the immediate area.
EXPOSURE GUIDELINES: not established

PERSONAL PROTECTION EQUIPMENT:

RESPIRATORY:NIOSH-approved self-contained breathing apparatus for exposure to levels above limits.
HAND: Rubber gloves and boots.
EYE: Chemical goggles which are splash and dust proof or face shield.
SKIN: If clothing is contaminated, wash skin and launder clothing.

NOTE: BEFORE EATING, DRINKING OR SMOKING, WASH FACE AND HANDS THOROUGHLY WITH SOAP AND WATER.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE, COLOR AND ODOR: *Purple Solution
PH as is: *5-7
BOILING POINT: *105 degrees C
FLASH POINT: *
VAPOR PRESSURE: *760 mm Hg @ 105 degrees C
SPECIFIC GRAVITY: *1.36-1.39
SOLUBILITY IN WATER: *Miscible in all proportions
VISCOSITY: *

SECTION 10 - STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION: *material is not known to polymerize
CHEMICAL STABILITY: *Stable under normal conditions
CONDITIONS TO AVOID: *contact with incompatible materials or heat(275* F)
MATERIALS TO AVOID: *Acids,peroxides,formaldehyde,antifreeze,hydraulic fluids,and all combustible organic or readily oxidizable materials
HAZARDOUS DECOMPOSITION PRODUCTS: *may form corrosive fumes in a fire

****

SECTION 11 - TOXICOLOGICAL INFORMATION

ACUTE TOXICITY: irritating to body tissue with which it comes into contact
IRRITANCY: *
SENSITIZATION: *
SUB-ACUTE, SUB-CHRONIC AND PROLONGED TOXICITY:No known cases of chronic poisoning due to permanganates have been reported.
EMPIRICAL DATA ON EFFECTS ON HUMANS: has not been classified as a carcinogen by OSHA,NTP,IARC

SECTION 12 - ECOLOGICAL INFORMATION

PERSISTENCE IN THE ENVIRONMENT:Permanganate has a low estimated lifetime in the enviroment
BIOLOGICAL OXYGEN DEMAND:In non-reducing and non-acidic environments MnO2 is insoluble
CHEMICAL OXYGEN DEMAND:
AQUATIC TOXICITY: No data
Daphnia magna
Fathead minnow
OTHER INFORMATION: * Discharge of this product must be in accordance with all federal, state, local or other applicable laws and regulations.

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: *Is considered a D001 hazardous (ignitable) waste.For disposal, see section 6

SECTION 14 - TRANSPORTATION INFORMATION

DOT SHIPPING NAME: Permanganates,inorganic,aqueous solution,n.o.s.
UN Number: UN3214
DOT HAZARD CLASS: Oxidizer 5.1
PACKING GROUP: II

SECTION 15 - REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA): All components of this product are listed in the Toxic Substances Control Act inventory.
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA): Not Listed
SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA Title III) - Section 311 Hazard Categories:302/303 not listed 311/312 hazard Catagories: Fire,acute and chronic

toxicity Section 313 contains 20% manganese compounds as part of the chemical structure and is subject to the reporting requirements section313 of title III

Acute Health:	Yes
Chronic Health:	No
Fire:	No
Sudden Release of Pressure:	No
Reactive:	No

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA Title III) - Section 311:
Components of this product subject to reporting: none

*
****

SECTION 16 - OTHER INFORMATION

HMIS RATINGS
HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0 SPECIAL HAZARD: Oxidizer