89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

August 22, 2018

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP RGP Applications Coordinator
5 Post Office Square, Suite 100 (OEP06-4)
Boston, Massachusetts 02109-3912

Reference: **Notice of Intent (NOI) - Remediation General Permit (RGP)**
Salem Power Plant
25 Derby Street
Salem, Massachusetts

Dear Sir/Madam:

On behalf of United Civil, Inc. (United Civil), Lockwood Remediation Technologies, LLC (LRT) has prepared this Notice of Intent (NOI) requesting a determination of coverage under the United States Environmental Protection Agency's (EPA's) Remediation General Permit (RGP), pursuant EPA's National Pollutant Discharge Elimination System (NPDES) program. This NOI was prepared in accordance with the general requirements of the NPDES and related guidance documentation provided by EPA. The completed NOI Form is provided in **Appendix A**. The discharge will not exceed 1 million gallons per day (MGD) at any of the three proposed outfall locations (001, 002, 003).

Site Information

This NOI has been prepared for the management of water that will be generated during dewatering activities associated with installation of subsurface utilities at the Salem Power Plant located at 25 Derby Street in Salem, Massachusetts (the Site). This work will take place across several acres of the parcel and is anticipated to be completed within twelve months, thereby precluding the need for Whole Effluent Toxicity (WET) testing unless specifically requested by EPA. The Site is listed as a disposal site with the Massachusetts Department of Environmental Protection (MassDEP) under Release Tracking Number (RTN) RTN# 3-31327. A Site Locus is provided as **Figure 1** and a Site Plan satisfying the requirements of RGP Appendix IV Part I.B and I.D is provided as **Figure 2**.

Work Summary

The project includes the installation of approximately 1,600 feet of drain line and associated drainage structures. To complete portions of the excavations in the dry, dewatering is required to lower the groundwater table as the work is being performed. To do this, a series of wellpoints surrounding the perimeter of the work area will be utilized, and the water generated during dewatering (Source water) will be pumped to a treatment system prior to discharge to the Salem Harbor. To characterize groundwater

from the proposed excavation area, LRT collected representative groundwater samples from three onsite monitoring wells (TW-1, TW-2 and TW-3) on August 1, 2018. A sample of the receiving water (Salem Harbor) was collected at the same time. The samples were analyzed for various parameters in accordance with the NPDES RGP Activity Category III-G. The location of receiving water and monitoring wells is depicted on Figures 1 and 2, respectively.

Discharge and Receiving Surface Water Information

A summary of the analytical results is provided in **Tables 1 and 2** included within **Appendix A**, and copies of the laboratory data reports are provided in **Appendix B**. The "Report Only" compounds ammonia and chloride were detected in each of the samples. Concentrations of volatile organic compounds (VOCs), semi-VOCs, total petroleum hydrocarbons (TPH), total residual chlorine (TRC), total suspended solids (TSS), and various metals were detected in groundwater at concentrations above the respective NPDES RGP Effluent Limitations. To meet these standards, Source Water will undergo treatment that includes pH adjustment, chemical-aided settling, bag filtration, zeolite filtration, carbon filtration and ion exchange prior to discharge. Details of the water treatment system are provided below.

Water Treatment System

A water treatment system schematic is provided as **Figure 3**. Cutsheets of the system components, product information and Safety Data Sheets (SDS) are included in **Appendix C**.

Source water will be pumped to two similar treatment systems (Water Treatment System #1 and #2), each comprised of two parallel treatment trains with a design flow of up to 1,000 gallons per minute (gpm); the average effluent flow of each system is estimated to be 500 gpm, and the maximum flow will not exceed 690 gpm. Source water will enter two 18,000-gallon weir tanks at head of the system and each of these tanks will have pH adjustment and chemical-aided settling systems to maintain optimal pH and enhance settling of TSS and metals. Either sulfuric acid or sodium hydroxide will be used to lower or raise the pH as necessary, and dosing within the tanks will be automatically controlled using meter pumps and pH probes. The pH adjustment chemicals will be stored in 55-gallon drums within secondary containment. The anticipated pH of discharge water is within the RGP Effluent limitation for saltwater discharges in Massachusetts; 6.5 to 8.3 SU.

The chemical-aided settling system will utilize LRT-E-50 coagulant and LRT-823 series flocculant. The coagulant will be injected into the influent stream prior to entering the weir tanks for rapid mixing while the flocculant will be injected directly into the tanks. The system includes two chemical feed metering pumps, an in-line mixer, and two 55-gallon drums and/or totes within secondary containment.

From each weir tank, the water will be pumped to a multi-bag filter skid (with two multi bag filters) followed by two zeolite vessels, two carbon vessels and one ion exchange vessel plumbed in series. The zeolite vessels will be each bedded with 20,000 pounds of zeolite, each carbon vessel will contain 10,000 pounds of reactivated liquid-phase carbon and the ion exchange vessel will contain 200 cubic feet of anion resin. Discharge from the anion exchange vessels will pass through a flow/totalizer meter prior to direct discharge into Salem Harbor. The discharge will be at three locations (Outfalls 001, 002, 003) as

depicted on **Figure 2**. Effluent sampling will correspond with the appropriate discharge location (the one being utilized at the time of sampling). With the two parallel treatment trains, each water treatment system will include two multi-bag filter skids, four zeolite vessels, four carbon vessels, two anion exchange vessels and one flow/totalizer meter.

Part F of the RGP NOI requires that chemical additives be identified if applied to the effluent prior to discharge. To satisfy the confirmation requirements of RGP Part 2.5.3.d.ii:

1. The addition of pH conditioners, flocculant and coagulant will not add any pollutants in concentrations which exceed permit effluent limitations;
2. The use of these chemicals will not result in the exceedance of any applicable water quality standard; and
3. These chemicals will not add any pollutants that would justify the application of permit conditions that are different from or absent in this permit.

Consultation with Federal Services

LRT reviewed online electronic data viewers and databases from the Massachusetts Geographical Information System (MassGIS), the Massachusetts Division of Fisheries and Wildlife (MassWildlife; Natural Heritage and Endangered Species Program), and the U.S. National Parks Service Natural Historic Places (NPS). Based on this review, the Site and the point where the proposed discharge reaches the receiving surface water body are not located within an Area of Critical Environmental Concern (ACEC). The Site and the proposed discharge point are not located within Habitats of Rare Wetland Wildlife, Habitats of Rare Species, Estimated Habitats of Rare Wildlife, or listed as a National Historic Place. Documentation is included in **Appendix D**.

No formal or informal consultation with National Marine Fisheries Service (NMFS) has been conducted. However, the Operator (United Civil) certifies eligibility according to the NMFS Criterion as the remediation activity discharges are not likely to adversely affect listed species and will result in either no effect or no adverse modification of critical habitat and also result in no take of a listed species. In support of this certification, the remaining Documentation for Eligibility Determination is provided:

1. The discharge is not in the Connecticut, Merrimack, Taunton or Piscataqua Rivers/watersheds;
2. The discharge is into marine waters of Massachusetts;
3. The species listed under the jurisdiction of NMFS are identical to EPA's species distribution explained in the consultation completed for the RGP.

Coverage under NPDES RGP

It is our opinion that the proposed discharge is eligible for coverage under the NPDES RGP. On behalf of United Civil, we are requesting coverage under the NPDES RGP for the discharge of treated wastewater to Salem Harbor in support of construction dewatering activities that are to take place at the Salem Power Plant.

The enclosed NOI form provides required information on the general site conditions, discharge, treatment system, receiving water, and consultation with federal services. For this project, United Civil is considered the Operator and has operational control over the construction plans and specifications, including the ability to make modifications to those plans and specifications.

Please feel free to contact us at 774-450-7177 if you have any questions or if you require additional information.

Sincerely,
Lockwood Remediation Technologies, LLC

John Henry

John J. Henry, PE
Senior Project Manager

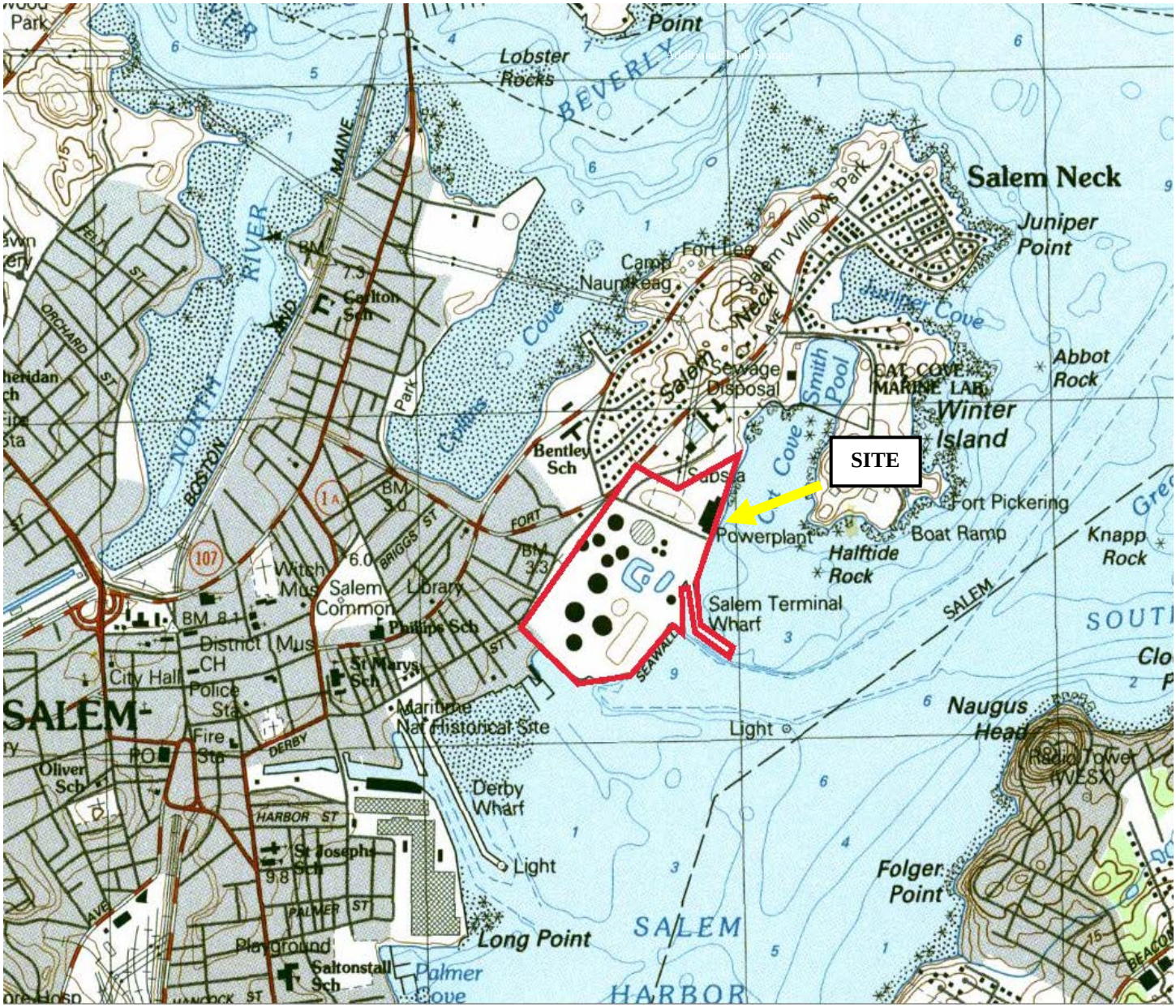
Paul Lockwood

Paul Lockwood
President

Encl: Figure 1 - Locus Plan
Figure 2 - Site Plan
Figure 3 - Water Treatment System Schematic
Appendix A - NOI Form
Appendix B - Laboratory Data
Appendix C - Water Treatment System
Appendix D - Supplemental Information
Appendix E – Public Notification

cc: Jeff Schena and Fred Carriglio – United Civil
Scott Silverstein – Footprint Power

Figures



Source: Base Map Salem, Massachusetts Source, MassGIS.

Notes

1. Figure is not to scale.

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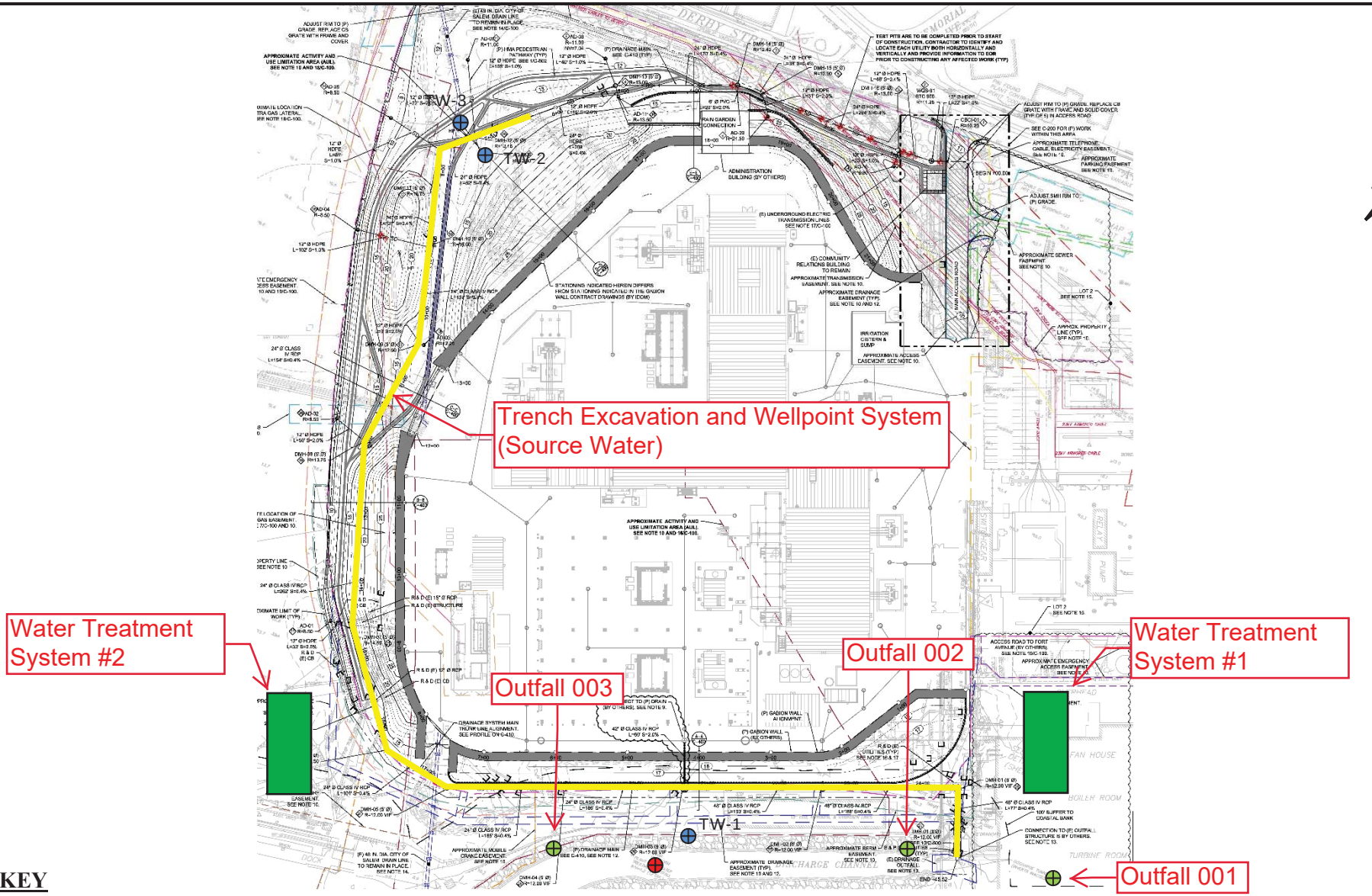
Figure 1 – Locus Plan
25 Derby Street
Salem, Massachusetts



KEY

Receiving water sample location

Discharge Location

Monitoring Well Location

Source: C-110: Overall Grading and Drainage Plan by Simpson Gumpertz and Heger dated June 28, 2017

89 Crawford Street
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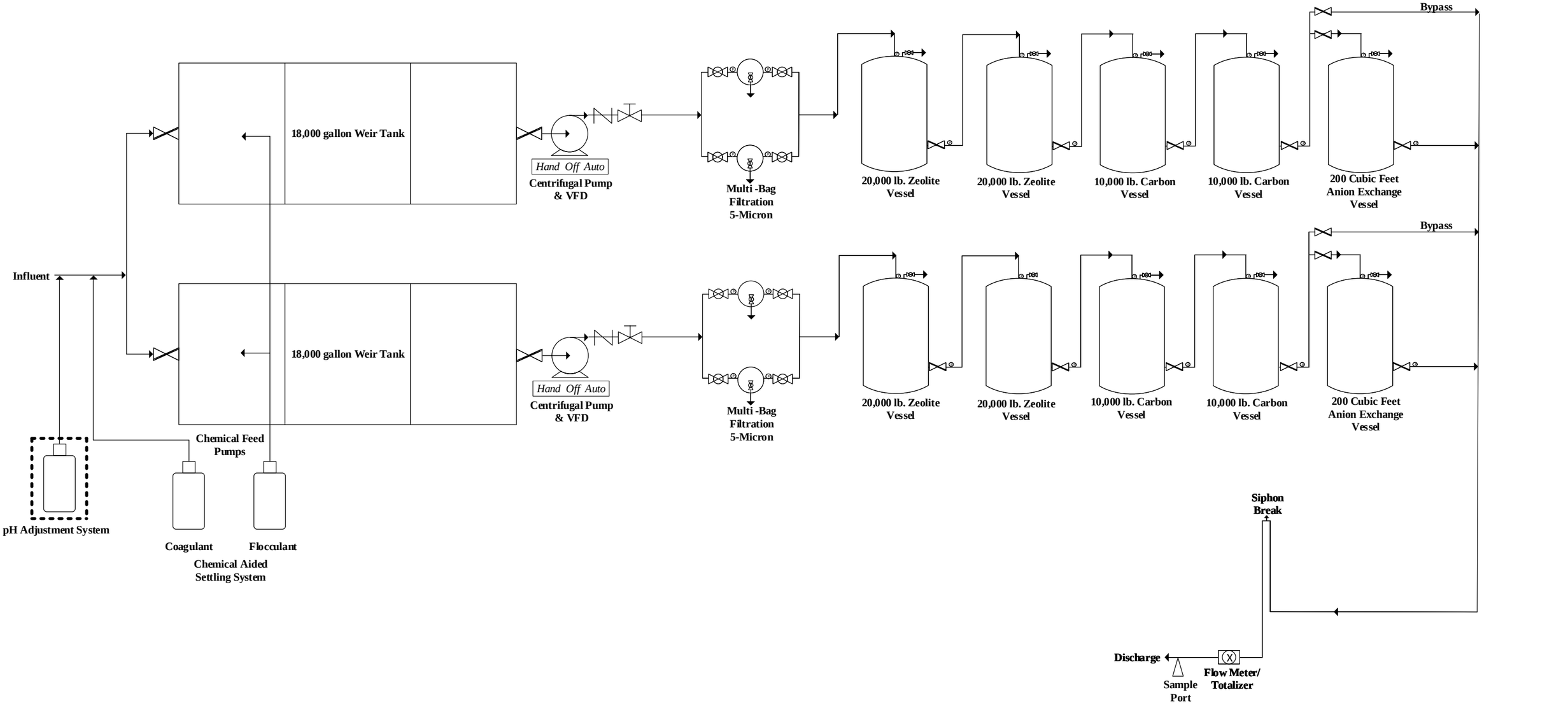
Figure 2 – Site Plan
25 Derby Street
Salem, Massachusetts



Notes:
1. Figure not drawn to scale
2. System rated for 1,000 GPM
3. Sampling ports on all treatment system components

Key:

Piping/Hose	Ball Valve	Check Valve
Containment Area	Butterfly Valve	Y-Strain/Cleanout
	Gate Valve	Siphon Break
	Bleed Valve Assembly	Sample Port
	Pressure Gauge	

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
Office: 774-450-7177

DESIGNED BY: LRT DRAWN BY: KG

DATE: 814/2018 REVISION:

Water Treatment System Schematic

Salem Power Plant
25 Derby Street
Salem, MA

PROJECT No. 2-1725

FIGURE No. 3

Appendix A

NOI Form

II. Suggested Format for the Remediation General Permit Notice of Intent (NOI)

A. General site information:

<table>
<tr><td rowspan="2">1. Name of site:
Salem Harbor Power Station</td><td colspan="3">Site address: 25 Derby Street
Street:</td></tr>
<tr><td>City: Salem</td><td>State: MA</td><td>Zip: 01970</td></tr>
<tr><td rowspan="4">2. Site owner
Footprint Power Salem Harbor Real Estate LP (Footprint)

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: Scott G. Silverstein</td></tr>
<tr><td colspan="2">Telephone: (908) 864-4905</td><td>Email: ssilverstein@footprintpower.com</td></tr>
<tr><td colspan="3">Mailing address: 1140 Route 22 East, Suite 303
Street:</td></tr>
<tr><td>City: Bridgewater</td><td>State: NJ</td><td>Zip: 08807</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
United Civil, Inc.</td><td colspan="3">Contact Person: Fred Carriglio</td></tr>
<tr><td colspan="2">Telephone: 978-304-1597</td><td>Email: fcarriglio@united-civil.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: 30 Log Bridge Road, Building 100</td></tr>
<tr><td>City: Middleton</td><td>State: MA</td><td>Zip: 01949</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s): 3-31327
☐ NH Groundwater Management Permit or Groundwater Release Detection Permit:
☐ CERCLA
☐ UIC Program
☐ POTW Pretreatment
☐ CWA Section 404</td></tr>
</table>

B. Receiving water information:

1. Name of receiving water(s):	Waterbody identification of receiving water(s):	Classification of receiving water(s):
Salem Harbor	MA93-54	SB

Receiving water is (check any that apply): ☐ Outstanding Resource Water ☐ Ocean Sanctuary ☐ territorial sea ☐ Wild and Scenic River

2. Has the operator attached a location map in accordance with the instructions in B, above? (check one): ■ Yes ☐ No

Are sensitive receptors present near the site? (check one): ☐ Yes ■ No
If yes, specify:

3. Indicate if the receiving water(s) is listed in the State's Integrated List of Waters (i.e., CWA Section 303(d)). Include which designated uses are impaired, and any pollutants indicated. Also, indicate if a final TMDL is available for any of the indicated pollutants. For more information, contact the appropriate State as noted in Part 4.6 of the RGP. Salem Harbor is listed in the State Integrated List of Waters. Enterococcus and Fecal Coliform. Final TDML is 50122.

4. Indicate the seven day-ten-year low flow (7Q10) of the receiving water determined in accordance with the instructions in Appendix V for sites located in Massachusetts and Appendix VI for sites located in New Hampshire.	NA (saltwater)
5. Indicate the requested dilution factor for the calculation of water quality-based effluent limitations (WQBELs) determined in accordance with the instructions in Appendix V for sites in Massachusetts and Appendix VI for sites in New Hampshire.	1

6. Has the operator received confirmation from the appropriate State for the 7Q10and dilution factor indicated? (check one): ■ Yes ☐ No
If yes, indicate date confirmation received: Discharge to Saltwater, No Dilution Requested

7. Has the operator attached a summary of receiving water sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ■ Yes ☐ No

C. Source water information:

1. Source water(s) is (check any that apply):

■ Contaminated groundwater Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ■ Yes ☐ No	☐ Contaminated surface water Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ☐ Yes ☐ No	☐ The receiving water ☐ A surface water other than the receiving water; if so, indicate waterbody:	☐ Potable water; if so, indicate municipality or origin: ☐ Other; if so, specify:

2. Source water contaminants: Enterococcus, Fecal Coliform and Estuarine Bioassessments	
a. For source waters that are contaminated groundwater or contaminated surface water, indicate are any contaminants present that are not included in the RGP? (check one): ☐ Yes ■ No If yes, indicate the contaminant(s) and the maximum concentration present in accordance with the instructions in Appendix VIII.	b. For a source water that is a surface water other than the receiving water, potable water or other, indicate any contaminants present at the maximum concentration in accordance with the instructions in Appendix VIII? (check one): ☐ Yes ☐ No
3. Has the source water been previously chlorinated or otherwise contains residual chlorine? (check one): ■ Yes ☐ No	

D. Discharge information

1.The discharge(s) is a(n) (check any that apply): ☐ Existing discharge ■ New discharge ☐ New source	
Outfall(s): Outfall 001 Outfall 002 Outfall 003	Outfall location(s): (Latitude, Longitude) 42.525755, -70.875312 42.525272, -70.876079 42.524137, -70.876689
Discharges enter the receiving water(s) via (check any that apply): ■ Direct discharge to the receiving water ☐ Indirect discharge, if so, specify: ☐ A private storm sewer system ☐ A municipal storm sewer system If the discharge enters the receiving water via a private or municipal storm sewer system: Has notification been provided to the owner of this system? (check one): ☐ Yes ■ No Not Applicable Has the operator has received permission from the owner to use such system for discharges? (check one): ☐ Yes ☐ No, if so, explain, with an estimated timeframe for obtaining permission: Has the operator attached a summary of any additional requirements the owner of this system has specified? (check one): ☐ Yes ■ No	
Provide the expected start and end dates of discharge(s) (month/year): September 2018 - August 2019 Indicate if the discharge is expected to occur over a duration of: ■ less than 12 months ☐ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ■ Yes ☐ No	

<table>
<tr><td>2. Activity Category: (check all that apply)</td><td colspan="2">3. Contamination Type Category: (check all that apply)</td></tr>
<tr><td rowspan="5">☐ I – Petroleum-Related Site Remediation
☐ II – Non-Petroleum-Related Site Remediation
■ III – Contaminated Site Dewatering
☐ IV – Dewatering of Pipelines and Tanks
☐ V – Aquifer Pump Testing
☐ VI – Well Development/Rehabilitation
☐ VII – Collection Structure Dewatering/Remediation
☐ VIII – Dredge-Related Dewatering</td><td colspan="2">a. If Activity Category I or II: (check all that apply)

☐ A. Inorganics
☐ B. Non-Halogenated Volatile Organic Compounds
☐ C. Halogenated Volatile Organic Compounds
☐ D. Non-Halogenated Semi-Volatile Organic Compounds
☐ E. Halogenated Semi-Volatile Organic Compounds
☐ F. Fuels Parameters</td></tr>
<tr><td colspan="2">b. If Activity Category III, IV, V, VI, VII or VIII: (check either G or H)</td></tr>
<tr><td>■ G. Sites with Known Contamination</td><td>☐ H. Sites with Unknown Contamination</td></tr>
<tr><td>c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply)

■ A. Inorganics
■ B. Non-Halogenated Volatile Organic Compounds
☐ C. Halogenated Volatile Organic Compounds
■ D. Non-Halogenated Semi-Volatile Organic Compounds
☐ E. Halogenated Semi-Volatile Organic Compounds
■ F. Fuels Parameters</td><td>d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply</td></tr>
</table>

4. Influent and Effluent Characteristics

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
A. Inorganics									
Ammonia		✓	3	SM19-22 +	0.075	22,500	1,633	Report mg/L	---
Chloride		✓	3	SM21-22 +	100,000	22,300,000	8,877,000	Report µg/l	---
Total Residual Chlorine		✓	3	SM21-22 +	20	49	16.3	0.2 mg/L	7.5 ug/L
Total Suspended Solids		✓	3	SM21-22 +	1,200	210,000	116,333	30 mg/L	---
Antimony		✓	3	EPA 200.8	1.0	1.4	0.47	206 µg/L	
Arsenic		✓	3	EPA 200.8	1.0	46	19.7	104 µg/L	36 ug/L
Cadmium	✓		3	EPA 200.8	0.2	< 1.0	< 0.46	10.2 µg/L	
Chromium III	✓		3	Tri +	NA	0.0	0.0	323 µg/L	
Chromium VI	✓		3	SM21-22 +	4.0	< 4.0	< 4.0	323 µg/L	
Copper		✓	3	EPA 200.8	1.0	260	106	242 µg/L	3.7 ug/L
Iron		✓	3	EPA 200.7	250	86,000	32,133	5,000 µg/L	
Lead		✓	3	EPA 200.8	0.5	17	9.3	160 µg/L	8.5 ug/L
Mercury	✓		3	EPA 245.1	0.10	< 0.1	< 0.1	0.739 µg/L	
Nickel		✓	3	EPA 200.8	5.0	190	74.3	1,450 µg/L	
Selenium		✓	3	EPA 200.8	5.0	130	50.3	235.8 µg/L	71 ug/L
Silver	✓		3	EPA 200.8	0.2	< 1.0	< 0.47	35.1 µg/L	
Zinc		✓	3	EPA 200.8	20	30	10	420 µg/L	
Cyanide		✓	3	SM21-22 +	5	2	0.67	178 mg/L	1.0 ug/L
B. Non-Halogenated VOCs									
Total BTEX		✓	3	EPA 624.1	8.0	5.2	1.97	100 µg/L	---
Benzene		✓	3	EPA 624.1	1.0	< 1.0	< 1.0	5.0 µg/L	---
1,4 Dioxane	✓		3	EPA 624.1	50	< 100	< 83	200 µg/L	---
Acetone		✓	3	EPA 624.1	50	13	7.43	7.97 mg/L	---
Phenol	✓		3	EPA 625.1	9.7	< 10	9.83	1,080 µg/L	

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	4.4 µg/L	
1,2 Dichlorobenzene	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	600 µg/L	---
1,3 Dichlorobenzene	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	320 µg/L	---
1,4 Dichlorobenzene	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	5.0 µg/L	---
Total dichlorobenzene	✓		3	EPA 624.1	6.0	< 6.0	< 6.0	763 µg/L in NH	---
1,1 Dichloroethane	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	70 µg/L	---
1,2 Dichloroethane	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	5.0 µg/L	---
1,1 Dichloroethylene	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	3.2 µg/L	---
Ethylene Dibromide	✓		3	NA	NA	NA	NA	0.05 µg/L	---
Methylene Chloride	✓		3	EPA 624.1	0.42	< 5.0	< 5.0	4.6 µg/L	---
1,1,1 Trichloroethane	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	200 µg/L	---
1,1,2 Trichloroethane	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	5.0 µg/L	---
Trichloroethylene	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	5.0 µg/L	---
Tetrachloroethylene	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	5.0 µg/L	
cis-1,2 Dichloroethylene	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	70 µg/L	---
Vinyl Chloride	✓		3	EPA 624.1	2.0	< 2.0	< 2.0	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✓		3	EPA 625.1	59.8	< 61	< 59.8	190 µg/L	
Diethylhexyl phthalate	✓		3	EPA 625.1	0.98	< 10	<6.89	101 µg/L	
Total Group I PAHs		✓	3	EPA 625	0.996	0.128	0.042	1.0 µg/L	---
Benzo(a)anthracene	✓		3	EPA 625	0.048	< 0.05	< 0.049	As Total PAHs	
Benzo(a)pyrene	✓		3	EPA 625	0.097	< 0.10	< 0.098		
Benzo(b)fluoranthene		✓	3	EPA 625	0.048	0.038	0.024		0.0038 ug/L
Benzo(k)fluoranthene	✓		3	EPA 625	0.19	< 0.20	< 0.20		
Chrysene		✓	3	EPA 625	0.03	0.09	0.03		0.0038 ug/L
Dibenzo(a,h)anthracene	✓		3	EPA 625	0.19	< 0.20	< 0.20		
Indeno(1,2,3-cd)pyrene	✓		3	EPA 625	0.19	< 0.20	< 0.20		

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
Total Group II PAHs		✓	3	EPA 625.1	< 100	40.1	13.4	100 µg/L	---
Naphthalene		✓	3	EPA 625.1	4.8	25	8.3	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✓		3	EPA 608.3	0.097	< 0.1	< 0.097	0.000064 µg/L	---
Pentachlorophenol	✓		3	EPA 625	0.097	< 1.0	< 0.097	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons		✓	3	EPA	1.4	13,000	5,867	5.0 mg/L	---
Ethanol	✓		3	EPA 624.1	50	< 50	< 50	Report mg/L	---
Methyl-tert-Butyl Ether	✓		3	EPA 624.1	2	< 2.0	< 2.0	70 µg/L	
tert-Butyl Alcohol	✓		3	EPA 624.1	20	< 20	< 20	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✓		3	EPA 624.1	0.5	< 0.5	< 0.5	90 µg/L in MA 140 µg/L in NH	---
Other (i.e., pH, temperature, hardness, salinity, LC_{50}, additional pollutants present); if so, specify:									
pH	✓		3	Field	NA	6.9	6.7		
Hardness	✓		3	EPA 200.7	NA	5,400	2,533		

E. Treatment system information

1. Indicate the type(s) of treatment that will be applied to effluent prior to discharge: (check all that apply)

☐ Adsorption/Absorption ☐ Advanced Oxidation Processes ☐ Air Stripping ■ Granulated Activated Carbon ("GAC")/Liquid Phase Carbon Adsorption

■ Ion Exchange ■ Precipitation/Coagulation/Flocculation ■ Separation/Filtration ■ Other; if so, specify:

pH Adjustment system , zeolite

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.

Collected water will be pumped into two similar water treatment systems. Each system includes two (2) weir tanks with a pH adjustment and chemical aided setting system. Water will then be pumped through two (2) multi-bag filter skids and then through four (4) vessels each containing 20,000 pounds of zeolite, four (4) vessels each containing 10,000 pounds of reactivated liquid phase carbon and two (2) ion exchange vessels each containing 200 cubic feet of ion exchange media. The multi bag filters and media vessels will be plumbed in series and in parallel. Water will then flow through one (1) flow meter/totalizer prior to discharge. The design flow capacity of each system is 1,000 gallons per minute (gpm).

Identify each major treatment component (check any that apply):

☐ Fractionation tanks☐ Equalization tank ☐ Oil/water separator ☐ Mechanical filter ■ Media filter

■ Chemical feed tank ■ Air stripping unit ■ Bag filter ■ Other; if so, specify: Weir Tanks, pH Adjustment System, Chemical Aided Settling System, Zeolite Treatment, Carbon Treatment and Ion Exchange

Indicate if either of the following will occur (check any that apply):

☐ Chlorination ☐ De-chlorination

3. Provide the **design flow capacity** in gallons per minute (gpm) of the most limiting component. Indicate the most limiting component: Carbon Vessels Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	2,000
Provide the proposed maximum effluent flow in gpm.	1,380
Provide the average effluent flow in gpm.	1,000
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	

4. Has the operator attached a schematic of flow in accordance with the instructions in E, above? (check one): ■ Yes ☐ No

F. Chemical and additive information

1. Indicate the type(s) of chemical or additive that will be applied to effluent prior to discharge or that may otherwise be present in the discharge(s): (check all that apply)

☐ Algaecides/biocides ☐ Antifoams ■ Coagulants ☐ Corrosion/scale inhibitors ☐ Disinfectants ■ Flocculants ☐ Neutralizing agents ☐ Oxidants ☐ Oxygen ☐ scavengers ■ pH conditioners ☐ Bioremedial agents, including microbes ☐ Chlorine or chemicals containing chlorine ☐ Other; if so, specify:

2. Provide the following information for each chemical/additive, using attachments, if necessary:
See attached cover letter
a. Product name, chemical formula, and manufacturer of the chemical/additive;
b. Purpose or use of the chemical/additive or remedial agent;
c. Material Safety Data Sheet (MSDS) and Chemical Abstracts Service (CAS) Registry number for each chemical/additive;
d. The frequency (hourly, daily, etc.), duration (hours, days), quantity (maximum and average), and method of application for the chemical/additive;
e. Any material compatibility risks for storage and/or use including the control measures used to minimize such risks; and
f. If available, the vendor's reported aquatic toxicity (NOAEL and/or LC50 in percent for aquatic organism(s)).

3. Has the operator attached an explanation which demonstrates that the addition of such chemicals/additives may be authorized under this general permit in accordance with the instructions in F, above? (check one): ■ Yes ☐ No; if no, has the operator attached data that demonstrates each of the 126 priority pollutants in CWA Section 307(a) and 40 CFR Part 423.15(j)(1) are non-detect in discharges with the addition of the proposed chemical/additive?
(check one): ☐ Yes ☐ No

G. Endangered Species Act eligibility determination

1. Indicate under which criterion the discharge(s) is eligible for coverage under this general permit:

☐ **FWS Criterion A**: No endangered or threatened species or critical habitat are in proximity to the discharges or related activities or come in contact with the "action area".

☐ **FWS Criterion B**: Formal or informal consultation with the FWS under section 7 of the ESA resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by FWS on a finding that the discharges and related activities are "not likely to adversely affect" listed species or critical habitat (informal consultation). Has the operator completed consultation with FWS? (check one): ☐ Yes ☐ No; if no, is consultation underway? (check one): ☐ Yes ☐ No

■ **FWS Criterion C**: Using the best scientific and commercial data available, the effect of the discharges and related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the operator and affirmed by EPA, that the discharges and related activities will have "no effect" on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the FWS. This determination was made by: (check one) ■ the operator ☐ EPA ☐ Other; if so, specify:

■ **NMFS Criterion**: A determination made by EPA is affirmed by the operator that the discharges and related activities will have "no effect" or are "not likely to adversely affect" any federally threatened or endangered listed species or critical habitat under the jurisdiction of NMFS and will not result in any take of listed species. Has the operator previously completed consultation with NMFS? (check one): ☐ Yes ■ No

2. Has the operator attached supporting documentation of ESA eligibility in accordance with the instructions in Appendix I, and G, above? (check one): ■ Yes ☐ No

Please also note the following: 1) Not discharging to any of the restricted Four Rivers. 2) The discharge is to a marine environment. 3) The species listed under the jurisdiction of NMFS are identical to EPA's species distribution explained in the consultation completed for the RGP. 4) Have not had any direct consultation with NMFS.

Does the supporting documentation include any written concurrence or finding provided by the Services? (check one): ■ Yes ☐ No; if yes, attach.

H. National Historic Preservation Act eligibility determination

1. Indicate under which criterion the discharge(s) is eligible for coverage under this general permit:

■ **Criterion A**: No historic properties are present. The discharges and discharge-related activities (e.g., BMPs) do not have the potential to cause effects on historic properties.

☐ **Criterion B**: Historic properties are present. Discharges and discharge related activities do not have the potential to cause effects on historic properties.

☐ **Criterion C**: Historic properties are present. The discharges and discharge-related activities have the potential to have an effect or will have an adverse effect on historic properties.

2. Has the operator attached supporting documentation of NHPA eligibility in accordance with the instructions in H, above? (check one): ■ Yes ☐ No

Does the supporting documentation include any written agreement with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (TPHO), or other tribal representative that outlines measures the operator will carry out to mitigate or prevent any adverse effects on historic properties? (check one): ☐ Yes ■ No

I. Supplemental information

Describe any supplemental information being provided with the NOI. Include attachments if required or otherwise necessary.

Refer to attached cover letter detailing current site conditions and sampling considerations.

Has the operator attached data, including any laboratory case narrative and chain of custody used to support the application? (check one): ■ Yes ☐ No

Has the operator attached the certification requirement for the Best Management Practices Plan (BMPP)? (check one): ■ Yes ☐ No

J. Certification requirement

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 gathered and evaluated 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, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

BMPP certification statement: A BMPP Meeting the general requirements of this permit will be implemented at the site.	
Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ■ No ☐
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.	Check one: Yes ■ No ☐
Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested.	Check one: Yes ☐ No ☐ NA ■
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.	Check one: Yes ☐ No ☐ NA ■
Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:	Check one: Yes ☐ No ☐ NA ■
Signature: Fred C	Date: 8/17/18
Print Name and Title: FRED CARRIGLIO PROJECT MANAGER	

TABLE I

SUMMARY OF GROUNDWATER QUALITY DATA

SALEM POWER PLANT

SALEM, MA

SAMPLE ID	2017 NPDES RGP Criteria	TW-1	TW-2	TW-3
SAMPLING DATE		8/1/2018	8/1/2018	8/1/2018
Volatile Organic Compounds (ug/L)				
Total BTEX	100	< 8.0	5.2	0.71
Benzene	5.0	< 1.0	< 1.0	< 1.0
1,4-Dioxane	200	< 100	< 50	< 100
Acetone	7,970	< 50	13	9.3
Phenol	1,080	< 9.7	< 10	< 9.8
Carbon Tetrachloride	4.4	< 2.0	< 2.0	< 2.0
1,2 Dichlorobenzene	600	< 2.0	< 2.0	< 2.0
1,3 Dichlorobenzene	320	< 2.0	< 2.0	< 2.0
1,4 Dichlorobenzene	5.0	< 2.0	< 2.0	< 2.0
Total dichlorobenzene	---	< 6.0	< 6.0	< 6.0
1,1 Dichloroethane	70	< 2.0	< 2.0	< 2.0
1,2 Dichloroethane	5.0	< 2.0	< 2.0	< 2.0
1,1 Dichloroethylene	3.2	< 2.0	< 2.0	< 2.0
Ethylene Dibromide	0.05	NA	NA	NA
Methylene Chloride	4.6	< 5.0	< 5.0	< 5.0
1,1,1 Trichloroethane	200	< 2.0	< 2.0	< 2.0
1,1,2 Trichloroethane	5.0	< 2.0	< 2.0	< 2.0
Trichloroethylene	5.0	< 2.0	< 2.0	< 2.0
Tetrachloroethylene	5.0	< 2.0	< 2.0	< 2.0
cis-1,2 Dichloroethylene	70	< 2.0	< 2.0	< 2.0
Vinyl Chloride	2.0	< 2.0	< 2.0	< 2.0
Semi-Volatile Organic Compounds (ug/L)				
Total Phthalates	190	< 59.2	< 61	< 59.8
Diethylhexyl phthalate	101	< 9.7	< 10	< 0.98
Total Group I PAHs	1.0	< 0.939	0.128	< 0.996
Benzo(a)anthracene	1.0	< 0.048	< 0.050	< 0.049
Benzo(a)pyrene	1.0	< 0.097	< 0.10	< 0.098
Benzo(b)fluoranthene	0.0038	0.034	0.038	< 0.049
Benzo(k)fluoranthene	1.0	< 0.19	< 0.20	< 0.20
Chrysene	0.0038	< 0.19	0.09	< 0.20
Dibenzo(a,h)anthracene	1.0	< 0.19	< 0.20	< 0.20
Indeno(1,2,3-cd)pyrene	1.0	< 0.19	< 0.20	< 0.20
Total Group II PAHs	100	< 38.4	40.1	< 39.2
Naphthalene	20	< 4.8	25	< 4.9
Pentachlorophenol	1.0	< 0.97	< 1.0	< 0.98
PCBs (ug/L)				
Total PCBs	0.000064	---	---	---
Aroclor 1016	---	< 0.10	< 0.097	< 0.11
Aroclor 1221	---	< 0.10	< 0.097	< 0.11
Aroclor 1232	---	< 0.10	< 0.097	< 0.11
Aroclor 1242	---	< 0.10	< 0.097	< 0.11
Aroclor 1248	---	< 0.10	< 0.097	< 0.11
Aroclor 1254	---	< 0.10	< 0.097	< 0.11
Aroclor 1260	---	< 0.10	< 0.097	< 0.11

SAMPLE ID	2017 NPDES RGP	TW-1	TW-2	TW-3
SAMPLING DATE	Criteria	8/1/2018	8/1/2018	8/1/2018
Fuels Parameters (ug/L)				
TPH	5,000	4,600	13,000	<1,800
Ethanol	Report mg/L	< 50	< 50	< 50
Methy-tert butyl ether (MTBE)	70	< 2.0	< 2.0	< 2.0
Tert-Butyl Alcohol (TBA)	120	< 20	< 20	< 20
tert-Amyl Methyl Ether (TAME)	90	< 0.50	< 0.50	< 0.50
Inorganics (ug/L)				
Ammonia	Report mg/L	< 50	2,500	2,350
Chloride (mg/L)	Report ug/L	22,300	2,630	1,700
Total Residual Chlorine (TRC)	7.5	49	< 20	< 20
Total Suspended Solids (TSS)	30,000	120,000	210,000	19,000
Antimony	206	< 5.0	1.4	< 1.0
Arsenic	36	46	13	< 1.0
Cadmium	10.2	< 1.0	< 0.20	< 0.20
Trivalent Chromium	323	0.0	0.0	0
Hexavalent Chromium	323	< 4.0	< 4.0	< 4.0
Copper	3.7	260	45	13
Iron	5,000	4,200	86,000	6,200
Lead	8.5	17	9.4	1.6
Mercury	0.739	0.1	0.1	< 0.1
Nickel	1,450	190	24	9
Selenium	71	130	21	< 5.0
Silver	35.1	< 1.0	< 0.20	< 0.20
Zinc	420	< 100	30	< 20
Cyanide	1.0	< 5	2	< 5
Other				
Salinity (ug/L)	---	NA	NA	NA
Hardness (mg/L)	---	5,400	1,300	900
pH (SU)	---	6.7	6.3	6.9

Notes:

1. ug/L is micrograms per liter or parts per billion.
2. mg/L is milligrams per liter or parts per million.
3. NA is not analyzed.

TABLE 2

SUMMARY OF RECEIVING WATER QUALITY DATA

SALEM POWER PLANT

SALEM, MA

LOCATION	**SALEM HARBOR**
SAMPLING DATE	8/1/2018
SAMPLE ID	Receiving Water
Total Metals (ug/L)	
Antimony	< 5.0
Arsenic	45
Cadmium	< 1.0
Total Chromium	< 50
Trivalent Chromium	0.0
Hexavalent Chromium	< 4.0
Copper	130
Iron	<250
Lead	< 5.0
Mercury	< 0.10
Nickel	< 25
Selenium	140
Silver	< 1.0
Zinc	< 100
Other	
Salinity (ppt)	31.4
Ammonia Nitrogen (ug/L)	73
pH (SU)	NM

Notes & Abbreviations:

1. ug/L is micrograms per liter or parts per billion.
2. ppt is parts per trillion.
3. NM is not measured

Enter number values in green boxes below

Enter values in the units specified

↓

0	Q_R = Enter upstream flow in **MGD**	Freshwater: Q_R equal to the 7Q10; enter alternate Q_R if approved by the State; enter 0 if no dilution factor approved
0.994	Q_P = Enter discharge flow in **MGD**	Saltwater (estuarine and marine): enter Q_R if approved by the State; enter 0 if no entry
0	Downstream 7Q10	Discharge flow is equal to the design flow or 1 MGD, whichever is less
		Only if approved by State as the entry for Q_R; leave 0 if no entry

Enter a dilution factor, if other than zero

↓

0	Saltwater (estuarine and marine): only if approved by the State
	Leave 0 if no entry

Enter values in the units specified

↓

0	C_d = Enter influent hardness in **mg/L** $CaCO_3$	Freshwater only
0	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$	

Enter **receiving water** concentrations in the units specified

↓

6.9	pH in **Standard Units**	pH, temperature, and ammonia required for all discharges
23.2	Temperature in **°C**	Hardness required for freshwater
0.073	Ammonia in **mg/L**	Salinity required for saltwater (estuarine and marine)
0	Hardness in **mg/L** $CaCO_3$	Metals required for all discharges if present and if dilution factor is > 1
31.4	Salinity in **ppt**	Enter 0 if non-detect or testing not required
0	Antimony in **µg/L**	
45	Arsenic in **µg/L**	
0	Cadmium in **µg/L**	
0	Chromium III in **µg/L**	
0	Chromium VI in **µg/L**	
130	Copper in **µg/L**	
0	Iron in **µg/L**	
0	Lead in **µg/L**	
0	Mercury in **µg/L**	
0	Nickel in **µg/L**	
140	Selenium in **µg/L**	
0	Silver in **µg/L**	
0	Zinc in **µg/L**	

Enter **influent** concentrations in the units specified

↓

49	TRC in **µg/L**	if >1 sample, enter maximum
2.5	Ammonia in **mg/L**	if >10 samples, may enter 95th percentile
1.4	Antimony in **µg/L**	Enter 0 if non-detect or testing not required
46	Arsenic in **µg/L**	
0	Cadmium in **µg/L**	
0	Chromium III in **µg/L**	
0	Chromium VI in **µg/L**	
260	Copper in **µg/L**	
86000	Iron in **µg/L**	
17	Lead in **µg/L**	
0.1	Mercury in **µg/L**	
0.9	Nickel in **µg/L**	
130	Selenium in **µg/L**	
0	Silver in **µg/L**	
30	Zinc in **µg/L**	
2	Cyanide in **µg/L**	
0	Phenol in **µg/L**	
0	Carbon Tetrachloride in **µg/L**	
0	Tetrachloroethylene in **µg/L**	
0	Total Phthalates in **µg/L**	
0	Diethylhexylphthalate in **µg/L**	
0	Benzo(a)anthracene in **µg/L**	
0	Benzo(a)pyrene in **µg/L**	
0.038	Benzo(b)fluoranthene in **µg/L**	
0	Benzo(k)fluoranthene in **µg/L**	
0.09	Chrysene in **µg/L**	
0	Dibenzo(a,h)anthracene in **µg/L**	
0	Indeno(1,2,3-cd)pyrene in **µg/L**	
0	Methyl-tert butyl ether in **µg/L**	

Notes:

Dilution Factor	0.0					
A. Inorganics	TBEL applies if bolded		WQBEL applies if bolded		Compliance Level applies if shown	
Ammonia	**Report**	mg/L	---			
Chloride	**Report**	µg/L	---			
Total Residual Chlorine	0.2	mg/L	**7.5**	µg/L	50	µg/L
Total Suspended Solids	**30**	mg/L	---			
Antimony	**206**	µg/L	640	µg/L		
Arsenic	104	µg/L	**36**	µg/L		
Cadmium	**10.2**	µg/L	8.9	µg/L		
Chromium III	**323**	µg/L	100.0	µg/L		
Chromium VI	**323**	µg/L	50	µg/L		
Copper	242	µg/L	**3.7**	µg/L		
Iron	**5000**	µg/L	---	µg/L		
Lead	160	µg/L	**8.5**	µg/L		
Mercury	**0.739**	µg/L	1.11	µg/L		
Nickel	**1450**	µg/L	8.3	µg/L		
Selenium	235.8	µg/L	**71**	µg/L		
Silver	**35.1**	µg/L	2.2	µg/L		
Zinc	**420**	µg/L	86	µg/L		
Cyanide	178	mg/L	**1.0**	µg/L	5	µg/L
B. Non-Halogenated VOCs						
Total BTEX	**100**	µg/L	---			
Benzene	**5.0**	µg/L	---			
1,4 Dioxane	**200**	µg/L	---			
Acetone	**7.97**	mg/L	---			
Phenol	**1,080**	µg/L	300	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	**4.4**		1.6	µg/L		
1,2 Dichlorobenzene	**600**	µg/L	---			
1,3 Dichlorobenzene	**320**	µg/L	---			
1,4 Dichlorobenzene	**5.0**	µg/L	---			
Total dichlorobenzene	**---**	µg/L	---			
1,1 Dichloroethane	**70**	µg/L	---			
1,2 Dichloroethane	**5.0**	µg/L	---			
1,1 Dichloroethylene	**3.2**	µg/L	---			
Ethylene Dibromide	**0.05**	µg/L	---			
Methylene Chloride	**4.6**	µg/L	---			
1,1,1 Trichloroethane	**200**	µg/L	---			
1,1,2 Trichloroethane	**5.0**	µg/L	---			
Trichloroethylene	**5.0**	µg/L	---			
Tetrachloroethylene	**5.0**	µg/L	3.3	µg/L		
cis-1,2 Dichloroethylene	**70**	µg/L	---			
Vinyl Chloride	**2.0**	µg/L	---			

D. Non-Halogenated SVOCs						
Total Phthalates	**190**	µg/L	---	µg/L		
Diethylhexyl phthalate	**101**	µg/L	2.2	µg/L		
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---			
Benzo(a)anthracene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Benzo(a)pyrene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Benzo(b)fluoranthene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Benzo(k)fluoranthene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Chrysene	1.0	µg/L	**0.0038**	µg/L	0.1	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Indeno(1,2,3-cd)pyrene	**1.0**	µg/L	0.0038	µg/L	---	µg/L
Total Group II Polycyclic Aromatic Hydrocarbons	**100**	µg/L	---			
Naphthalene	**20**	µg/L	---			
E. Halogenated SVOCs						
Total Polychlorinated Biphenyls	**0.000064**	µg/L	---		0.5	µg/L
Pentachlorophenol	**1.0**	µg/L	---			
F. Fuels Parameters						
Total Petroleum Hydrocarbons	**5.0**	mg/L	---			
Ethanol	**Report**	mg/L	---			
Methyl-tert-Butyl Ether	**70**	µg/L	20	µg/L		
tert-Butyl Alcohol	**120**	µg/L	---			
tert-Amyl Methyl Ether	**90**	µg/L	---			

Appendix B

Laboratory Data

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

August 10, 2018

John Henry
Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453

Project Location: Salem, MA
Client Job Number:
Project Number: 2-1725
Laboratory Work Order Number: 18H0124

Enclosed are results of analyses for samples received by the laboratory on August 2, 2018. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kerry K. McGee
Project Manager

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con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
ATTN: John Henry

REPORT DATE: 8/10/2018

PURCHASE ORDER NUMBER: 2-1725

PROJECT NUMBER: 2-1725

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 18H0124

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Salem, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
TW-1	18H0124-01	Ground Water		EPA 1664B	
				EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				EPA 300.0	NY11393/MA-MAI138/MA1110
				EPA 608.3	
				EPA 624.1	
				EPA 625	
				EPA 625.1	
				SM19-22 4500 NH3 C	MA M-MA-086/CT PH-0574/NY11148
				SM21-22 2540D	
				SM21-22 3500 Cr B	
				SM21-22 4500 CL G	
				SM21-22 4500 CN E	MA M-MA-086/CT PH-0574/NY11148
				Tri Chrome Calc.	
TW-2	18H0124-02	Ground Water		EPA 1664B	
				EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				EPA 300.0	NY11393/MA-MAI138/MA1110
				EPA 608.3	
				EPA 624.1	
				EPA 625	
				EPA 625.1	
				SM19-22 4500 NH3 C	MA M-MA-086/CT PH-0574/NY11148
				SM21-22 2540D	
				SM21-22 3500 Cr B	
				SM21-22 4500 CL G	
				SM21-22 4500 CN E	MA M-MA-086/CT PH-0574/NY11148
				Tri Chrome Calc.	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
ATTN: John Henry

REPORT DATE: 8/10/2018

PURCHASE ORDER NUMBER: 2-1725

PROJECT NUMBER: 2-1725

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 18H0124

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Salem, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
TW-3	18H0124-03	Ground Water		EPA 1664B	
				EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				EPA 300.0	NY11393/MA-MAI138/MA1110
				EPA 608.3	
				EPA 624.1	
				EPA 625	
				EPA 625.1	
				SM19-22 4500 NH3 C	MA M-MA-086/CT PH-0574/NY11148
				SM21-22 2540D	
				SM21-22 3500 Cr B	
				SM21-22 4500 CL G	
				SM21-22 4500 CN E	MA M-MA-086/CT PH-0574/NY11148
				Tri Chrome Calc.	

con-test® ANALYTICAL LABORATORY

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

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EPA 200.7

Qualifications:

DL-03

Elevated reporting limit due to matrix.

Analyte & Samples(s) Qualified:

Iron
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3]

EPA 200.8

Qualifications:

DL-15

Sample required a dilution due to low internal standard recovery of the lesser diluted digestion, reporting limit is elevated.

Analyte & Samples(s) Qualified:

Antimony
18H0124-01[TW-1]

Arsenic
18H0124-01[TW-1]

Cadmium
18H0124-01[TW-1]

Chromium
18H0124-01[TW-1]

Copper
18H0124-01[TW-1]

Lead
18H0124-01[TW-1]

Nickel
18H0124-01[TW-1]

Selenium
18H0124-01[TW-1]

Silver
18H0124-01[TW-1]

Zinc
18H0124-01[TW-1]

EPA 624.1

Qualifications:

L-01

Laboratory fortified blank /laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.

Analyte & Samples(s) Qualified:

1,4-Dioxane
B209464-BS1

EPA 625

Qualifications:

S-07

One associated surrogate standard recovery is outside of control limits but the other(s) is/are within limits. All recoveries are > 10%.

Analyte & Samples(s) Qualified:

2,4,6-Tribromophenol
18H0124-01[TW-1]

V-04

Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.

Analyte & Samples(s) Qualified:

2,4,6-Tribromophenol
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209588-BLK1, B209588-BS1, B209588-BSD1, B209588-MS1, B209588-MSD1, S025948-CCV1

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V-05

Continuing calibration did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Pentachlorophenol (SIM)
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209588-BLK1, B209588-BS1, B209588-BSD1, B209588-MS1, B209588-MSD1, S025948-CCV1

EPA 625.1

Qualifications:

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Benzidine
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209506-BLK1, B209506-BS1, B209506-BSD1

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

2-Chloronaphthalene
B209506-BS1

V-04

Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209506-BLK1, B209506-BS1, B209506-BSD1

V-05

Continuing calibration did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209506-BLK1, B209506-BS1, B209506-BSD1

Benzo(g,h,i)perylene
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209506-BLK1, B209506-BS1, B209506-BSD1

Hexachlorocyclopentadiene
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209506-BLK1, B209506-BS1, B209506-BSD1

SM21-22 3500 Cr B

Qualifications:

H-03

Sample received after recommended holding time was exceeded.

Analyte & Samples(s) Qualified:

Hexavalent Chromium
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209424-DUP1

SM21-22 4500 CL G

Qualifications:

H-03

Sample received after recommended holding time was exceeded.

Analyte & Samples(s) Qualified:

Chlorine, Residual
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3], B209525-DUP1

wc-Chloride-300.0

Qualifications:

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D

[Undefined]

Analyte & Samples(s) Qualified:

Chloride
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3]

GS1

Sample dilution required for high concentration of target analytes to be within the instrument calibration range.

Analyte & Samples(s) Qualified:

Chloride
18H0124-01[TW-1], 18H0124-02[TW-2], 18H0124-03[TW-3]

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	50	1.7	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.28	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Benzene	ND	1.0	0.34	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Bromodichloromethane	ND	2.0	0.48	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Bromoform	ND	2.0	0.28	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Bromomethane	ND	2.0	0.44	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
tert-Butyl Alcohol (TBA)	ND	20	2.9	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Carbon Tetrachloride	ND	2.0	0.39	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Chlorobenzene	ND	2.0	0.30	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Chlorodibromomethane	ND	2.0	0.27	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Chloroethane	ND	2.0	0.38	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Chloroform	ND	2.0	0.33	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Chloromethane	ND	2.0	0.30	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,2-Dichlorobenzene	ND	2.0	0.31	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,3-Dichlorobenzene	ND	2.0	0.33	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,4-Dichlorobenzene	ND	2.0	0.39	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,2-Dichloroethane	ND	2.0	0.28	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,1-Dichloroethane	ND	2.0	0.33	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,1-Dichloroethylene	ND	2.0	0.25	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
trans-1,2-Dichloroethylene	ND	2.0	0.40	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,2-Dichloropropane	ND	2.0	0.31	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
cis-1,3-Dichloropropene	ND	2.0	0.47	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,4-Dioxane	ND	100	26	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
trans-1,3-Dichloropropene	ND	2.0	0.37	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Ethanol	ND	50	28	µg/L	1		EPA 624.1	8/8/18	8/9/18 1:48	BRF
Ethylbenzene	ND	2.0	0.37	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Methyl tert-Butyl Ether (MTBE)	ND	2.0	0.24	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Methylene Chloride	ND	5.0	0.42	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,1,2,2-Tetrachloroethane	ND	2.0	0.27	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Tetrachloroethylene	ND	2.0	0.32	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Toluene	ND	1.0	0.35	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,1,1-Trichloroethane	ND	2.0	0.25	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
1,1,2-Trichloroethane	ND	2.0	0.22	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Trichloroethylene	ND	2.0	0.41	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.27	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
Vinyl Chloride	ND	2.0	0.30	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
m+p Xylene	ND	2.0	0.65	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD
o-Xylene	ND	2.0	0.35	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:01	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	96.8	70-130		8/3/18 11:01
1,2-Dichloroethane-d4	93.0	70-130		8/9/18 1:48
Toluene-d8	95.4	70-130		8/3/18 11:01
Toluene-d8	97.7	70-130		8/9/18 1:48
4-Bromofluorobenzene	96.2	70-130		8/3/18 11:01
4-Bromofluorobenzene	98.0	70-130		8/9/18 1:48

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Project Location: Salem, MA
Sample Description:
Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1
Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Surrogates		**% Recovery**		**Recovery Limits**		**Flag/Qual**				

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Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Benzo(a)anthracene (SIM)	ND	0.048	0.048	µg/L	1		EPA 625	8/3/18	8/7/18 2:38	IMR
Benzo(a)pyrene (SIM)	ND	0.097	0.039	µg/L	1		EPA 625	8/3/18	8/7/18 2:38	IMR
Benzo(b)fluoranthene (SIM)	0.034	0.048	0.019	µg/L	1	J	EPA 625	8/3/18	8/7/18 2:38	IMR
Benzo(k)fluoranthene (SIM)	ND	0.19	0.097	µg/L	1		EPA 625	8/3/18	8/7/18 2:38	IMR
Bis(2-ethylhexyl)phthalate (SIM)	ND	0.97	0.97	µg/L	1		EPA 625	8/3/18	8/7/18 2:38	IMR
Chrysene (SIM)	ND	0.19	0.029	µg/L	1		EPA 625	8/3/18	8/7/18 2:38	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.19	0.039	µg/L	1		EPA 625	8/3/18	8/7/18 2:38	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.19	0.077	µg/L	1		EPA 625	8/3/18	8/7/18 2:38	IMR
Pentachlorophenol (SIM)	ND	0.97	0.97	µg/L	1	V-05	EPA 625	8/3/18	8/7/18 2:38	IMR

Surrogates	% Recovery		Recovery Limits	Flag/Qual		
2-Fluorophenol	65.9		15-110		8/7/18 2:38	
Phenol-d6	47.1		15-110		8/7/18 2:38	
Nitrobenzene-d5	94.3		30-130		8/7/18 2:38	
2-Fluorobiphenyl	87.3		30-130		8/7/18 2:38	
2,4,6-Tribromophenol	**113**	*	15-110	S-07, V-04	8/7/18 2:38	
p-Terphenyl-d14	92.4		30-130		8/7/18 2:38	

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Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Acenaphthylene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Anthracene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Benzidine	ND	19	µg/L	1	V-04, V-05, L-04	EPA 625.1	8/3/18	8/8/18 3:11	CDT
Benzo(g,h,i)perylene	ND	4.8	µg/L	1	V-05	EPA 625.1	8/3/18	8/8/18 3:11	CDT
4-Bromophenylphenylether	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Butylbenzylphthalate	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
4-Chloro-3-methylphenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Bis(2-chloroethyl)ether	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Bis(2-chloroisopropyl)ether	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2-Chloronaphthalene	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2-Chlorophenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
4-Chlorophenylphenylether	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Di-n-butylphthalate	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
1,3-Dichlorobenzene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
1,4-Dichlorobenzene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
1,2-Dichlorobenzene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
3,3-Dichlorobenzidine	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2,4-Dichlorophenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Diethylphthalate	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2,4-Dimethylphenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Dimethylphthalate	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
4,6-Dinitro-2-methylphenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2,4-Dinitrophenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2,4-Dinitrotoluene	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2,6-Dinitrotoluene	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Di-n-octylphthalate	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
1,2-Diphenylhydrazine (as Azobenzene)	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Bis(2-Ethylhexyl)phthalate	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Fluoranthene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Fluorene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Hexachlorobenzene	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Hexachlorobutadiene	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Hexachlorocyclopentadiene	ND	9.7	µg/L	1	V-05	EPA 625.1	8/3/18	8/8/18 3:11	CDT
Hexachloroethane	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Isophorone	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Naphthalene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Nitrobenzene	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2-Nitrophenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
4-Nitrophenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
N-Nitrosodimethylamine	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
N-Nitrosodiphenylamine	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
N-Nitrosodi-n-propylamine	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2-Methylnaphthalene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT

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Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Phenanthrene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2-Methylphenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Phenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
3/4-Methylphenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
Pyrene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
1,2,4-Trichlorobenzene	ND	4.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT
2,4,6-Trichlorophenol	ND	9.7	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:11	CDT

Surrogates	% Recovery	Recovery Limits	Flag/Qual			
2-Fluorophenol	56.1	15-110				8/8/18 3:11
Phenol-d6	43.5	15-110				8/8/18 3:11
Nitrobenzene-d5	74.0	30-130				8/8/18 3:11
2-Fluorobiphenyl	80.8	30-130				8/8/18 3:11
2,4,6-Tribromophenol	78.2	15-110				8/8/18 3:11
p-Terphenyl-d14	93.4	30-130				8/8/18 3:11

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.10	0.092	µg/L	1		EPA 608.3	8/7/18	8/8/18 15:19	KAL
Aroclor-1221 [1]	ND	0.10	0.080	µg/L	1		EPA 608.3	8/7/18	8/8/18 15:19	KAL
Aroclor-1232 [1]	ND	0.10	0.10	µg/L	1		EPA 608.3	8/7/18	8/8/18 15:19	KAL
Aroclor-1242 [1]	ND	0.10	0.086	µg/L	1		EPA 608.3	8/7/18	8/8/18 15:19	KAL
Aroclor-1248 [1]	ND	0.10	0.095	µg/L	1		EPA 608.3	8/7/18	8/8/18 15:19	KAL
Aroclor-1254 [1]	ND	0.10	0.052	µg/L	1		EPA 608.3	8/7/18	8/8/18 15:19	KAL
Aroclor-1260 [1]	ND	0.10	0.098	µg/L	1		EPA 608.3	8/7/18	8/8/18 15:19	KAL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	100	30-150		8/8/18 15:19
Decachlorobiphenyl [2]	103	30-150		8/8/18 15:19
Tetrachloro-m-xylene [1]	95.6	30-150		8/8/18 15:19
Tetrachloro-m-xylene [2]	96.9	30-150		8/8/18 15:19

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	5.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Arsenic	46	5.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Cadmium	ND	1.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Chromium	ND	50		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Chromium, Trivalent	0.0			mg/L	1		Tri Chrome Calc.	8/3/18	8/7/18 5:52	MJH
Copper	260	5.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Iron	4.2	0.25		mg/L	5	DL-03	EPA 200.7	8/3/18	8/7/18 9:46	QNW
Lead	17	5.0		µg/L	10	DL-15	EPA 200.8	8/3/18	8/6/18 13:45	MJH
Mercury	ND	0.00010		mg/L	1		EPA 245.1	8/7/18	8/7/18 14:51	EDF
Nickel	190	25		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Selenium	130	25	11	µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Silver	ND	1.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Zinc	ND	100		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:49	MJH
Hardness	5400			mg/L	100		EPA 200.7	8/3/18	8/7/18 11:22	QNW

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chlorine, Residual	0.049	0.020		mg/L	1	H-03	SM21-22 4500 CL G	8/3/18	8/3/18 17:30	LED
Hexavalent Chromium	ND	0.0040		mg/L	1	H-03	SM21-22 3500 Cr B	8/2/18	8/2/18 19:38	LED
Total Suspended Solids	120	1.2		mg/L	1		SM21-22 2540D	8/6/18	8/6/18 12:45	LL
Silica Gel Treated HEM (SGT-HEM)	4.6	1.8		mg/L	1		EPA 1664B	8/7/18	8/7/18 11:30	LL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1 | Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ammonia as N	0.05	0.075	0.024	mg/L	1		SM19-22 4500 NH3 C		8/7/18 20:51	AAL
Cyanide	ND	0.005	0.001	mg/L	1		SM21-22 4500 CN E		8/8/18 11:12	AAL

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA
Sample Description:
Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-1
Sampled: 8/1/2018 11:00

Sample ID: 18H0124-01

Sample Matrix: Ground Water

EPA 300.0

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	22300	600	mg/l	600	GS1, D	wc-Chloride-300.0	8/7/18	8/8/18 11:43	ESA

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2 | Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	13	50	1.7	µg/L	1	J	EPA 624.1	8/8/18	8/9/18 2:50	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.28	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Benzene	ND	1.0	0.34	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Bromodichloromethane	ND	2.0	0.48	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Bromoform	ND	2.0	0.28	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Bromomethane	ND	2.0	0.44	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
tert-Butyl Alcohol (TBA)	ND	20	2.9	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Carbon Tetrachloride	ND	2.0	0.39	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Chlorobenzene	ND	2.0	0.30	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Chlorodibromomethane	ND	2.0	0.27	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Chloroethane	ND	2.0	0.38	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Chloroform	ND	2.0	0.33	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Chloromethane	ND	2.0	0.30	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,2-Dichlorobenzene	ND	2.0	0.31	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,3-Dichlorobenzene	ND	2.0	0.33	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,4-Dichlorobenzene	ND	2.0	0.39	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,2-Dichloroethane	ND	2.0	0.28	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,1-Dichloroethane	ND	2.0	0.33	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,1-Dichloroethylene	ND	2.0	0.25	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
trans-1,2-Dichloroethylene	ND	2.0	0.40	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,2-Dichloropropane	ND	2.0	0.31	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
cis-1,3-Dichloropropene	ND	2.0	0.47	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,4-Dioxane	ND	50	26	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
trans-1,3-Dichloropropene	ND	2.0	0.37	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Ethanol	ND	50	28	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Ethylbenzene	1.4	2.0	0.37	µg/L	1	J	EPA 624.1	8/8/18	8/9/18 2:50	LBD
Methyl tert-Butyl Ether (MTBE)	ND	2.0	0.24	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Methylene Chloride	ND	5.0	0.42	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,1,2,2-Tetrachloroethane	ND	2.0	0.27	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Tetrachloroethylene	ND	2.0	0.32	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Toluene	ND	1.0	0.35	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,1,1-Trichloroethane	ND	2.0	0.25	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
1,1,2-Trichloroethane	ND	2.0	0.22	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Trichloroethylene	ND	2.0	0.41	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.27	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
Vinyl Chloride	ND	2.0	0.30	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:50	LBD
m+p Xylene	1.8	2.0	0.65	µg/L	1	J	EPA 624.1	8/8/18	8/9/18 2:50	LBD
o-Xylene	2.0	2.0	0.35	µg/L	1	J	EPA 624.1	8/8/18	8/9/18 2:50	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	90.8	70-130		8/9/18 2:50
Toluene-d8	96.8	70-130		8/9/18 2:50
4-Bromofluorobenzene	98.1	70-130		8/9/18 2:50

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2 | Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Benzo(a)anthracene (SIM)	ND	0.050	0.050	µg/L	1		EPA 625	8/3/18	8/7/18 3:06	IMR
Benzo(a)pyrene (SIM)	ND	0.10	0.040	µg/L	1		EPA 625	8/3/18	8/7/18 3:06	IMR
Benzo(b)fluoranthene (SIM)	0.038	0.050	0.020	µg/L	1	J	EPA 625	8/3/18	8/7/18 3:06	IMR
Benzo(k)fluoranthene (SIM)	ND	0.20	0.10	µg/L	1		EPA 625	8/3/18	8/7/18 3:06	IMR
Bis(2-ethylhexyl)phthalate (SIM)	ND	1.0	1.0	µg/L	1		EPA 625	8/3/18	8/7/18 3:06	IMR
Chrysene (SIM)	0.090	0.20	0.030	µg/L	1	J	EPA 625	8/3/18	8/7/18 3:06	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.20	0.040	µg/L	1		EPA 625	8/3/18	8/7/18 3:06	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.20	0.080	µg/L	1		EPA 625	8/3/18	8/7/18 3:06	IMR
Pentachlorophenol (SIM)	ND	1.0	1.0	µg/L	1	V-05	EPA 625	8/3/18	8/7/18 3:06	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2-Fluorophenol	31.6	15-110		8/7/18 3:06	
Phenol-d6	20.2	15-110		8/7/18 3:06	
Nitrobenzene-d5	61.7	30-130		8/7/18 3:06	
2-Fluorobiphenyl	35.2	30-130		8/7/18 3:06	
2,4,6-Tribromophenol	42.4	15-110	V-04	8/7/18 3:06	
p-Terphenyl-d14	65.3	30-130		8/7/18 3:06	

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2 | Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	6.1	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Acenaphthylene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Anthracene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Benzidine	ND	20	µg/L	1	V-04, V-05, L-04	EPA 625.1	8/3/18	8/8/18 3:34	CDT
Benzo(g,h,i)perylene	ND	5.0	µg/L	1	V-05	EPA 625.1	8/3/18	8/8/18 3:34	CDT
4-Bromophenylphenylether	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Butylbenzylphthalate	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
4-Chloro-3-methylphenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Bis(2-chloroethyl)ether	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Bis(2-chloroisopropyl)ether	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2-Chloronaphthalene	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2-Chlorophenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
4-Chlorophenylphenylether	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Di-n-butylphthalate	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
1,3-Dichlorobenzene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
1,4-Dichlorobenzene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
1,2-Dichlorobenzene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
3,3-Dichlorobenzidine	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2,4-Dichlorophenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Diethylphthalate	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2,4-Dimethylphenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Dimethylphthalate	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
4,6-Dinitro-2-methylphenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2,4-Dinitrophenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2,4-Dinitrotoluene	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2,6-Dinitrotoluene	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Di-n-octylphthalate	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
1,2-Diphenylhydrazine (as Azobenzene)	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Fluoranthene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Fluorene	14	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Hexachlorobenzene	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Hexachlorobutadiene	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Hexachlorocyclopentadiene	ND	10	µg/L	1	V-05	EPA 625.1	8/3/18	8/8/18 3:34	CDT
Hexachloroethane	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Isophorone	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Naphthalene	25	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Nitrobenzene	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2-Nitrophenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
4-Nitrophenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
N-Nitrosodimethylamine	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
N-Nitrosodiphenylamine	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
N-Nitrosodi-n-propylamine	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2-Methylnaphthalene	130	10	µg/L	2		EPA 625.1	8/3/18	8/8/18 3:56	CDT

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2 | Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Phenanthrene	20	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2-Methylphenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Phenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
3/4-Methylphenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
Pyrene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
1,2,4-Trichlorobenzene	ND	5.0	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT
2,4,6-Trichlorophenol	ND	10	µg/L	1		EPA 625.1	8/3/18	8/8/18 3:34	CDT

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	33.4	15-110		8/8/18 3:34
2-Fluorophenol	29.8	15-110		8/8/18 3:56
Phenol-d6	23.6	15-110		8/8/18 3:34
Phenol-d6	21.1	15-110		8/8/18 3:56
Nitrobenzene-d5	69.8	30-130		8/8/18 3:34
Nitrobenzene-d5	67.4	30-130		8/8/18 3:56
2-Fluorobiphenyl	75.0	30-130		8/8/18 3:34
2-Fluorobiphenyl	73.6	30-130		8/8/18 3:56
2,4,6-Tribromophenol	60.7	15-110		8/8/18 3:34
2,4,6-Tribromophenol	55.4	15-110		8/8/18 3:56
p-Terphenyl-d14	86.9	30-130		8/8/18 3:34
p-Terphenyl-d14	81.1	30-130		8/8/18 3:56

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2 | Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.097	0.089	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:36	KAL
Aroclor-1221 [1]	ND	0.097	0.078	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:36	KAL
Aroclor-1232 [1]	ND	0.097	0.097	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:36	KAL
Aroclor-1242 [1]	ND	0.097	0.084	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:36	KAL
Aroclor-1248 [1]	ND	0.097	0.092	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:36	KAL
Aroclor-1254 [1]	ND	0.097	0.051	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:36	KAL
Aroclor-1260 [1]	ND	0.097	0.095	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:36	KAL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	58.5	30-150		8/8/18 15:36
Decachlorobiphenyl [2]	61.9	30-150		8/8/18 15:36
Tetrachloro-m-xylene [1]	72.4	30-150		8/8/18 15:36
Tetrachloro-m-xylene [2]	73.7	30-150		8/8/18 15:36

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA
Sample Description:
Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2
Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	1.4	1.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Arsenic	13	1.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Cadmium	ND	0.20		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Chromium	ND	10		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Chromium, Trivalent	0.0			mg/L	1		Tri Chrome Calc.	8/3/18	8/4/18 13:07	MJH
Copper	45	1.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Iron	86	0.25		mg/L	5	DL-03	EPA 200.7	8/3/18	8/7/18 9:52	QNW
Lead	9.4	0.50		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Mercury	ND	0.00010		mg/L	1		EPA 245.1	8/7/18	8/7/18 14:53	EDF
Nickel	24	5.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Selenium	21	5.0	2.1	µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Silver	ND	0.20		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Zinc	30	20		µg/L	1		EPA 200.8	8/3/18	8/4/18 12:57	MJH
Hardness	1300			mg/L	5		EPA 200.7	8/3/18	8/7/18 10:49	QNW

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2 | Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chlorine, Residual	ND	0.020		mg/L	1	H-03	SM21-22 4500 CL G	8/3/18	8/3/18 17:30	LED
Hexavalent Chromium	ND	0.0040		mg/L	1	H-03	SM21-22 3500 Cr B	8/2/18	8/2/18 19:38	LED
Total Suspended Solids	210	2.5		mg/L	1		SM21-22 2540D	8/6/18	8/6/18 12:45	LL
Silica Gel Treated HEM (SGT-HEM)	13	1.4		mg/L	1		EPA 1664B	8/7/18	8/7/18 11:30	LL

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2 | Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ammonia as N	2.5	0.075	0.024	mg/L	1		SM19-22 4500 NH3 C		8/7/18 20:52	AAL
Cyanide	0.002	0.005	0.001	mg/L	1		SM21-22 4500 CN E		8/8/18 11:13	AAL

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Project Location: Salem, MA
Sample Description:
Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-2
Sampled: 8/1/2018 12:00

Sample ID: 18H0124-02

Sample Matrix: Ground Water

EPA 300.0

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	2630	100	mg/l	100	GS1, D	wc-Chloride-300.0	8/7/18	8/8/18 11:59	ESA

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Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	9.3	50	1.7	µg/L	1	J	EPA 624.1	8/3/18	8/3/18 11:31	LBD
tert-Amyl Methyl Ether (TAME)	ND	0.50	0.28	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Benzene	ND	1.0	0.34	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Bromodichloromethane	ND	2.0	0.48	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Bromoform	ND	2.0	0.28	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Bromomethane	ND	2.0	0.44	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
tert-Butyl Alcohol (TBA)	ND	20	2.9	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Carbon Tetrachloride	ND	2.0	0.39	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Chlorobenzene	ND	2.0	0.30	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Chlorodibromomethane	ND	2.0	0.27	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Chloroethane	ND	2.0	0.38	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Chloroform	ND	2.0	0.33	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Chloromethane	ND	2.0	0.30	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,2-Dichlorobenzene	ND	2.0	0.31	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,3-Dichlorobenzene	ND	2.0	0.33	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,4-Dichlorobenzene	ND	2.0	0.39	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,2-Dichloroethane	ND	2.0	0.28	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,1-Dichloroethane	ND	2.0	0.33	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,1-Dichloroethylene	ND	2.0	0.25	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
trans-1,2-Dichloroethylene	ND	2.0	0.40	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,2-Dichloropropane	ND	2.0	0.31	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
cis-1,3-Dichloropropene	ND	2.0	0.47	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,4-Dioxane	ND	100	26	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
trans-1,3-Dichloropropene	ND	2.0	0.37	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Ethanol	ND	50	28	µg/L	1		EPA 624.1	8/8/18	8/9/18 2:19	BRF
Ethylbenzene	ND	2.0	0.37	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Methyl tert-Butyl Ether (MTBE)	ND	2.0	0.24	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Methylene Chloride	ND	5.0	0.42	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,1,2,2-Tetrachloroethane	ND	2.0	0.27	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Tetrachloroethylene	ND	2.0	0.32	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Toluene	0.71	1.0	0.35	µg/L	1	J	EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,1,1-Trichloroethane	ND	2.0	0.25	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
1,1,2-Trichloroethane	ND	2.0	0.22	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Trichloroethylene	ND	2.0	0.41	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Trichlorofluoromethane (Freon 11)	ND	2.0	0.27	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
Vinyl Chloride	ND	2.0	0.30	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
m+p Xylene	ND	2.0	0.65	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD
o-Xylene	ND	2.0	0.35	µg/L	1		EPA 624.1	8/3/18	8/3/18 11:31	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	90.0	70-130		8/9/18 2:19
1,2-Dichloroethane-d4	97.4	70-130		8/3/18 11:31
Toluene-d8	97.5	70-130		8/9/18 2:19
Toluene-d8	97.4	70-130		8/3/18 11:31
4-Bromofluorobenzene	101	70-130		8/9/18 2:19
4-Bromofluorobenzene	98.8	70-130		8/3/18 11:31

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA
Sample Description:
Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3
Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Surrogates		**% Recovery**		**Recovery Limits**		**Flag/Qual**				

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Benzo(a)anthracene (SIM)	ND	0.049	0.049	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Benzo(a)pyrene (SIM)	ND	0.098	0.039	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Benzo(b)fluoranthene (SIM)	ND	0.049	0.020	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Benzo(k)fluoranthene (SIM)	ND	0.20	0.098	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Bis(2-ethylhexyl)phthalate (SIM)	ND	0.98	0.98	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Chrysene (SIM)	ND	0.20	0.029	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Dibenz(a,h)anthracene (SIM)	ND	0.20	0.039	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.20	0.078	µg/L	1		EPA 625	8/3/18	8/7/18 3:35	IMR
Pentachlorophenol (SIM)	ND	0.98	0.98	µg/L	1	V-05	EPA 625	8/3/18	8/7/18 3:35	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	47.9	15-110		8/7/18 3:35
Phenol-d6	29.5	15-110		8/7/18 3:35
Nitrobenzene-d5	81.2	30-130		8/7/18 3:35
2-Fluorobiphenyl	62.4	30-130		8/7/18 3:35
2,4,6-Tribromophenol	82.6	15-110	V-04	8/7/18 3:35
p-Terphenyl-d14	68.2	30-130		8/7/18 3:35

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Acenaphthylene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Anthracene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Benzidine	ND	20	µg/L	1	L-04, V-04, V-05	EPA 625.1	8/3/18	8/8/18 4:18	CDT
Benzo(g,h,i)perylene	ND	4.9	µg/L	1	V-05	EPA 625.1	8/3/18	8/8/18 4:18	CDT
4-Bromophenylphenylether	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Butylbenzylphthalate	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
4-Chloro-3-methylphenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Bis(2-chloroethyl)ether	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Bis(2-chloroisopropyl)ether	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2-Chloronaphthalene	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2-Chlorophenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
4-Chlorophenylphenylether	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Di-n-butylphthalate	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
1,3-Dichlorobenzene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
1,4-Dichlorobenzene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
1,2-Dichlorobenzene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
3,3-Dichlorobenzidine	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2,4-Dichlorophenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Diethylphthalate	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2,4-Dimethylphenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Dimethylphthalate	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
4,6-Dinitro-2-methylphenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2,4-Dinitrophenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2,4-Dinitrotoluene	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2,6-Dinitrotoluene	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Di-n-octylphthalate	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
1,2-Diphenylhydrazine (as Azobenzene)	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Bis(2-Ethylhexyl)phthalate	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Fluoranthene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Fluorene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Hexachlorobenzene	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Hexachlorobutadiene	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Hexachlorocyclopentadiene	ND	9.8	µg/L	1	V-05	EPA 625.1	8/3/18	8/8/18 4:18	CDT
Hexachloroethane	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Isophorone	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Naphthalene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Nitrobenzene	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2-Nitrophenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
4-Nitrophenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
N-Nitrosodimethylamine	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
N-Nitrosodiphenylamine	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
N-Nitrosodi-n-propylamine	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2-Methylnaphthalene	21	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Phenanthrene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2-Methylphenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Phenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
3/4-Methylphenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
Pyrene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
1,2,4-Trichlorobenzene	ND	4.9	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT
2,4,6-Trichlorophenol	ND	9.8	µg/L	1		EPA 625.1	8/3/18	8/8/18 4:18	CDT

Surrogates	% Recovery	Recovery Limits	Flag/Qual			
2-Fluorophenol	44.0	15-110				8/8/18 4:18
Phenol-d6	29.1	15-110				8/8/18 4:18
Nitrobenzene-d5	71.4	30-130				8/8/18 4:18
2-Fluorobiphenyl	68.7	30-130				8/8/18 4:18
2,4,6-Tribromophenol	62.8	15-110				8/8/18 4:18
p-Terphenyl-d14	90.0	30-130				8/8/18 4:18

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Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.11	0.097	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:54	KAL
Aroclor-1221 [1]	ND	0.11	0.085	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:54	KAL
Aroclor-1232 [1]	ND	0.11	0.10	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:54	KAL
Aroclor-1242 [1]	ND	0.11	0.091	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:54	KAL
Aroclor-1248 [1]	ND	0.11	0.10	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:54	KAL
Aroclor-1254 [1]	ND	0.11	0.055	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:54	KAL
Aroclor-1260 [1]	ND	0.11	0.10	µg/L	1		EPA 608.3	8/6/18	8/8/18 15:54	KAL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	80.5	30-150		8/8/18 15:54
Decachlorobiphenyl [2]	84.4	30-150		8/8/18 15:54
Tetrachloro-m-xylene [1]	72.3	30-150		8/8/18 15:54
Tetrachloro-m-xylene [2]	73.1	30-150		8/8/18 15:54

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Arsenic	ND	1.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Cadmium	ND	0.20		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Chromium	ND	10		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Chromium, Trivalent	0.0			mg/L	1		Tri Chrome Calc.	8/3/18	8/4/18 13:07	MJH
Copper	13	1.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Iron	6.2	0.25		mg/L	5	DL-03	EPA 200.7	8/3/18	8/7/18 9:58	QNW
Lead	1.6	0.50		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Mercury	ND	0.00010		mg/L	1		EPA 245.1	8/7/18	8/7/18 14:55	EDF
Nickel	9.0	5.0		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Selenium	ND	5.0	2.1	µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Silver	ND	0.20		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Zinc	ND	20		µg/L	1		EPA 200.8	8/3/18	8/4/18 13:00	MJH
Hardness	900			mg/L	5		EPA 200.7	8/3/18	8/7/18 10:49	QNW

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Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chlorine, Residual	ND	0.020		mg/L	1	H-03	SM21-22 4500 CL G	8/3/18	8/3/18 17:30	LED
Hexavalent Chromium	ND	0.0040		mg/L	1	H-03	SM21-22 3500 Cr B	8/2/18	8/2/18 19:38	LED
Total Suspended Solids	19	1.2		mg/L	1		SM21-22 2540D	8/6/18	8/6/18 12:45	LL
Silica Gel Treated HEM (SGT-HEM)	ND	1.8		mg/L	1		EPA 1664B	8/7/18	8/7/18 11:30	LL

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Project Location: Salem, MA | Sample Description: | Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3 | Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ammonia as N	2.35	0.075	0.024	mg/L	1		SM19-22 4500 NH3 C		8/7/18 20:53	AAL
Cyanide	ND	0.005	0.001	mg/L	1		SM21-22 4500 CN E		8/8/18 11:14	AAL

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA
Sample Description:
Work Order: 18H0124

Date Received: 8/2/2018

Field Sample #: TW-3
Sampled: 8/1/2018 13:00

Sample ID: 18H0124-03

Sample Matrix: Ground Water

EPA 300.0

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Chloride	1700	100	mg/l	100	GS1, D	wc-Chloride-300.0	8/7/18	8/8/18 12:14	ESA

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Sample Extraction Data

EPA 1664B

Lab Number [Field ID]	Batch	Initial [mL]	Date
18H0124-01 [TW-1]	B209678	800	08/07/18
18H0124-02 [TW-2]	B209678	1000	08/07/18
18H0124-03 [TW-3]	B209678	800	08/07/18

Prep Method: EPA 200.7-EPA 200.7

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209522	50.0	50.0	08/03/18
18H0124-01 [TW-1]	B209522	50.0		08/03/18
18H0124-02 [TW-2]	B209522	50.0	50.0	08/03/18
18H0124-02 [TW-2]	B209522	50.0		08/03/18
18H0124-03 [TW-3]	B209522	50.0	50.0	08/03/18
18H0124-03 [TW-3]	B209522	50.0		08/03/18

Prep Method: EPA 200.8-EPA 200.8

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209523	50.0	50.0	08/03/18
18H0124-02 [TW-2]	B209523	50.0	50.0	08/03/18
18H0124-03 [TW-3]	B209523	50.0	50.0	08/03/18

Prep Method: EPA 245.1-EPA 245.1

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209698	6.00	6.00	08/07/18
18H0124-02 [TW-2]	B209698	6.00	6.00	08/07/18
18H0124-03 [TW-3]	B209698	6.00	6.00	08/07/18

Prep Method: SW-846 3510C-EPA 608.3

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-02 [TW-2]	B209571	1030	5.00	08/06/18
18H0124-03 [TW-3]	B209571	950	5.00	08/06/18

Prep Method: SW-846 3510C-EPA 608.3

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209675	1000	5.00	08/07/18

Prep Method: SW-846 5030B-EPA 624.1

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209464	5	5.00	08/03/18
18H0124-03 [TW-3]	B209464	5	5.00	08/03/18

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Sample Extraction Data

Prep Method: SW-846 5030B-EPA 624.1

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01RE1 [TW-1]	B209816	5	5.00	08/08/18
18H0124-02 [TW-2]	B209816	5	5.00	08/08/18
18H0124-03RE1 [TW-3]	B209816	5	5.00	08/08/18

Prep Method: SW-846 3510C-EPA 625

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209588	930	0.900	08/03/18
18H0124-02 [TW-2]	B209588	1000	1.00	08/03/18
18H0124-03 [TW-3]	B209588	920	0.900	08/03/18

Prep Method: SW-846 3510C-EPA 625.1

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209506	930	0.900	08/03/18
18H0124-02 [TW-2]	B209506	1000	1.00	08/03/18
18H0124-02RE1 [TW-2]	B209506	1000	1.00	08/03/18
18H0124-03 [TW-3]	B209506	920	0.900	08/03/18

SM21-22 2540D

Lab Number [Field ID]	Batch	Initial [mL]	Date
18H0124-01 [TW-1]	B209575	400	08/06/18
18H0124-02 [TW-2]	B209575	200	08/06/18
18H0124-03 [TW-3]	B209575	430	08/06/18

SM21-22 3500 Cr B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209424	50.0	50.0	08/02/18
18H0124-02 [TW-2]	B209424	50.0	50.0	08/02/18
18H0124-03 [TW-3]	B209424	50.0	50.0	08/02/18

SM21-22 4500 CL G

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0124-01 [TW-1]	B209525	100	100	08/03/18
18H0124-02 [TW-2]	B209525	100	100	08/03/18
18H0124-03 [TW-3]	B209525	100	100	08/03/18

Prep Method: EPA 200.8-Tri Chrome Calc.

Lab Number [Field ID]	Batch	Initial [mL]	Date
18H0124-01 [TW-1]	B209523	50.0	08/03/18
18H0124-02 [TW-2]	B209523	50.0	08/03/18
18H0124-03 [TW-3]	B209523	50.0	08/03/18

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209464 - SW-846 5030B										
Blank (B209464-BLK1)				Prepared & Analyzed: 08/03/18						
Acetone	ND	50	µg/L							
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Benzene	ND	1.0	µg/L							
Bromodichloromethane	ND	2.0	µg/L							
Bromoform	ND	2.0	µg/L							
Bromomethane	ND	2.0	µg/L							
tert-Butyl Alcohol (TBA)	ND	20	µg/L							
Carbon Tetrachloride	ND	2.0	µg/L							
Chlorobenzene	ND	2.0	µg/L							
Chlorodibromomethane	ND	2.0	µg/L							
Chloroethane	ND	2.0	µg/L							
Chloroform	ND	2.0	µg/L							
Chloromethane	ND	2.0	µg/L							
1,2-Dichlorobenzene	ND	2.0	µg/L							
1,3-Dichlorobenzene	ND	2.0	µg/L							
1,4-Dichlorobenzene	ND	2.0	µg/L							
1,2-Dichloroethane	ND	2.0	µg/L							
1,1-Dichloroethane	ND	2.0	µg/L							
1,1-Dichloroethylene	ND	2.0	µg/L							
trans-1,2-Dichloroethylene	ND	2.0	µg/L							
1,2-Dichloropropane	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	2.0	µg/L							
1,4-Dioxane	ND	50	µg/L							
trans-1,3-Dichloropropene	ND	2.0	µg/L							
Ethanol	ND	50	µg/L							
Ethylbenzene	ND	2.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	2.0	µg/L							
Methylene Chloride	ND	5.0	µg/L							
1,1,2,2-Tetrachloroethane	ND	2.0	µg/L							
Tetrachloroethylene	ND	2.0	µg/L							
Toluene	ND	1.0	µg/L							
1,1,1-Trichloroethane	ND	2.0	µg/L							
1,1,2-Trichloroethane	ND	2.0	µg/L							
Trichloroethylene	ND	2.0	µg/L							
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L							
Vinyl Chloride	ND	2.0	µg/L							
m+p Xylene	ND	2.0	µg/L							
o-Xylene	ND	2.0	µg/L							
Surrogate: 1,2-Dichloroethane-d4	*23.9*		µg/L	25.0		95.5	70-130			
Surrogate: Toluene-d8	*23.6*		µg/L	25.0		94.2	70-130			
Surrogate: 4-Bromofluorobenzene	*23.9*		µg/L	25.0		95.5	70-130			
LCS (B209464-BS1)				Prepared & Analyzed: 08/03/18						
Acetone	165	50	µg/L	200		82.5	70-160			†
tert-Amyl Methyl Ether (TAME)	20.7	0.50	µg/L	20.0		103	70-130			
Benzene	22.9	1.0	µg/L	20.0		114	65-135			
Bromodichloromethane	21.1	2.0	µg/L	20.0		105	65-135			
Bromoform	24.3	2.0	µg/L	20.0		122	70-130			
Bromomethane	13.7	2.0	µg/L	20.0		68.4	15-185			
tert-Butyl Alcohol (TBA)	220	20	µg/L	200		110	40-160			†
Carbon Tetrachloride	22.3	2.0	µg/L	20.0		111	70-130			
Chlorobenzene	24.2	2.0	µg/L	20.0		121	65-135			

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B209464 - SW-846 5030B												
LCS (B209464-BS1)				Prepared & Analyzed: 08/03/18								
Chlorodibromomethane	21.2	2.0	µg/L	20.0		106		70-135				
Chloroethane	19.2	2.0	µg/L	20.0		96.2		40-160				
Chloroform	22.1	2.0	µg/L	20.0		111		70-135				
Chloromethane	18.8	2.0	µg/L	20.0		94.2		20-205				
1,2-Dichlorobenzene	22.5	2.0	µg/L	20.0		112		65-135				
1,3-Dichlorobenzene	23.2	2.0	µg/L	20.0		116		70-130				
1,4-Dichlorobenzene	22.0	2.0	µg/L	20.0		110		65-135				
1,2-Dichloroethane	20.8	2.0	µg/L	20.0		104		70-130				
1,1-Dichloroethane	22.0	2.0	µg/L	20.0		110		70-130				
1,1-Dichloroethylene	18.8	2.0	µg/L	20.0		93.8		50-150				
trans-1,2-Dichloroethylene	21.0	2.0	µg/L	20.0		105		70-130				
1,2-Dichloropropane	22.7	2.0	µg/L	20.0		113		35-165				
cis-1,3-Dichloropropene	21.5	2.0	µg/L	20.0		108		25-175				
1,4-Dioxane	282	50	µg/L	200		**141**	*	40-130			L-01	†
trans-1,3-Dichloropropene	22.4	2.0	µg/L	20.0		112		50-150				
Ethanol	ND	50	µg/L	200			*	40-160				
Ethylbenzene	25.2	2.0	µg/L	20.0		126		60-140				
Methyl tert-Butyl Ether (MTBE)	21.9	2.0	µg/L	20.0		110		70-130				
Methylene Chloride	17.0	5.0	µg/L	20.0		84.9		60-140				
1,1,2,2-Tetrachloroethane	24.0	2.0	µg/L	20.0		120		60-140				
Tetrachloroethylene	24.9	2.0	µg/L	20.0		124		70-130				
Toluene	23.4	1.0	µg/L	20.0		117		70-130				
1,1,1-Trichloroethane	21.3	2.0	µg/L	20.0		106		70-130				
1,1,2-Trichloroethane	23.0	2.0	µg/L	20.0		115		70-130				
Trichloroethylene	22.3	2.0	µg/L	20.0		111		65-135				
Trichlorofluoromethane (Freon 11)	17.2	2.0	µg/L	20.0		85.8		50-150				
Vinyl Chloride	21.1	2.0	µg/L	20.0		105		5-195				
m+p Xylene	49.8	2.0	µg/L	40.0		125		70-130				
o-Xylene	23.9	2.0	µg/L	20.0		119		70-130				
Surrogate: 1,2-Dichloroethane-d4	*22.7*		µg/L	25.0		90.6		70-130				
Surrogate: Toluene-d8	*24.2*		µg/L	25.0		97.0		70-130				
Surrogate: 4-Bromofluorobenzene	*24.9*		µg/L	25.0		99.8		70-130				
Batch B209816 - SW-846 5030B												
Blank (B209816-BLK1)				Prepared: 08/08/18 Analyzed: 08/09/18								
Acetone	ND	50	µg/L									
tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L									
Benzene	ND	1.0	µg/L									
Bromodichloromethane	ND	2.0	µg/L									
Bromoform	ND	2.0	µg/L									
Bromomethane	ND	2.0	µg/L									
tert-Butyl Alcohol (TBA)	ND	20	µg/L									
Carbon Tetrachloride	ND	2.0	µg/L									
Chlorobenzene	ND	2.0	µg/L									
Chlorodibromomethane	ND	2.0	µg/L									
Chloroethane	ND	2.0	µg/L									
Chloroform	ND	2.0	µg/L									
Chloromethane	ND	2.0	µg/L									
1,2-Dichlorobenzene	ND	2.0	µg/L									
1,3-Dichlorobenzene	ND	2.0	µg/L									
1,4-Dichlorobenzene	ND	2.0	µg/L									
1,2-Dichloroethane	ND	2.0	µg/L									

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209816 - SW-846 5030B										
Blank (B209816-BLK1)				Prepared: 08/08/18 Analyzed: 08/09/18						
1,1-Dichloroethane	ND	2.0	µg/L							
1,1-Dichloroethylene	ND	2.0	µg/L							
trans-1,2-Dichloroethylene	ND	2.0	µg/L							
1,2-Dichloropropane	ND	2.0	µg/L							
cis-1,3-Dichloropropene	ND	2.0	µg/L							
1,4-Dioxane	ND	50	µg/L							
trans-1,3-Dichloropropene	ND	2.0	µg/L							
Ethanol	ND	50	µg/L							
Ethylbenzene	ND	2.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	2.0	µg/L							
Methylene Chloride	ND	5.0	µg/L							
1,1,2,2-Tetrachloroethane	ND	2.0	µg/L							
Tetrachloroethylene	ND	2.0	µg/L							
Toluene	ND	1.0	µg/L							
1,1,1-Trichloroethane	ND	2.0	µg/L							
1,1,2-Trichloroethane	ND	2.0	µg/L							
Trichloroethylene	ND	2.0	µg/L							
Trichlorofluoromethane (Freon 11)	ND	2.0	µg/L							
Vinyl Chloride	ND	2.0	µg/L							
m+p Xylene	ND	2.0	µg/L							
o-Xylene	ND	2.0	µg/L							
Surrogate: 1,2-Dichloroethane-d4	*22.8*		µg/L	25.0		91.1	70-130			
Surrogate: Toluene-d8	*24.7*		µg/L	25.0		98.8	70-130			
Surrogate: 4-Bromofluorobenzene	*24.6*		µg/L	25.0		98.2	70-130			
LCS (B209816-BS1)				Prepared & Analyzed: 08/08/18						
Acetone	157	50	µg/L	200		78.4	70-160			†
tert-Amyl Methyl Ether (TAME)	20.3	0.50	µg/L	20.0		102	70-130			
Benzene	23.7	1.0	µg/L	20.0		118	65-135			
Bromodichloromethane	20.4	2.0	µg/L	20.0		102	65-135			
Bromoform	21.9	2.0	µg/L	20.0		109	70-130			
Bromomethane	11.8	2.0	µg/L	20.0		58.9	15-185			
tert-Butyl Alcohol (TBA)	170	20	µg/L	200		85.1	40-160			†
Carbon Tetrachloride	21.6	2.0	µg/L	20.0		108	70-130			
Chlorobenzene	23.4	2.0	µg/L	20.0		117	65-135			
Chlorodibromomethane	20.0	2.0	µg/L	20.0		100	70-135			
Chloroethane	19.4	2.0	µg/L	20.0		97.2	40-160			
Chloroform	22.4	2.0	µg/L	20.0		112	70-135			
Chloromethane	18.3	2.0	µg/L	20.0		91.4	20-205			
1,2-Dichlorobenzene	21.6	2.0	µg/L	20.0		108	65-135			
1,3-Dichlorobenzene	21.9	2.0	µg/L	20.0		109	70-130			
1,4-Dichlorobenzene	21.5	2.0	µg/L	20.0		107	65-135			
1,2-Dichloroethane	19.8	2.0	µg/L	20.0		98.9	70-130			
1,1-Dichloroethane	22.2	2.0	µg/L	20.0		111	70-130			
1,1-Dichloroethylene	20.2	2.0	µg/L	20.0		101	50-150			
trans-1,2-Dichloroethylene	21.1	2.0	µg/L	20.0		106	70-130			
1,2-Dichloropropane	22.9	2.0	µg/L	20.0		114	35-165			
cis-1,3-Dichloropropene	19.9	2.0	µg/L	20.0		99.7	25-175			
1,4-Dioxane	150	50	µg/L	200		75.2	40-130			†
trans-1,3-Dichloropropene	20.3	2.0	µg/L	20.0		101	50-150			
Ethanol	174	50	µg/L	200		86.9	40-160			
Ethylbenzene	24.4	2.0	µg/L	20.0		122	60-140			

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209816 - SW-846 5030B										
LCS (B209816-BS1)				Prepared & Analyzed: 08/08/18						
Methyl tert-Butyl Ether (MTBE)	21.1	2.0	µg/L	20.0		106	70-130			
Methylene Chloride	17.1	5.0	µg/L	20.0		85.3	60-140			
1,1,2,2-Tetrachloroethane	22.0	2.0	µg/L	20.0		110	60-140			
Tetrachloroethylene	24.6	2.0	µg/L	20.0		123	70-130			
Toluene	23.3	1.0	µg/L	20.0		116	70-130			
1,1,1-Trichloroethane	21.2	2.0	µg/L	20.0		106	70-130			
1,1,2-Trichloroethane	22.5	2.0	µg/L	20.0		112	70-130			
Trichloroethylene	22.3	2.0	µg/L	20.0		112	65-135			
Trichlorofluoromethane (Freon 11)	18.4	2.0	µg/L	20.0		92.0	50-150			
Vinyl Chloride	21.8	2.0	µg/L	20.0		109	5-195			
m+p Xylene	48.0	2.0	µg/L	40.0		120	70-130			
o-Xylene	23.0	2.0	µg/L	20.0		115	70-130			
Surrogate: 1,2-Dichloroethane-d4	*22.1*		µg/L	25.0		88.2	70-130			
Surrogate: Toluene-d8	*24.1*		µg/L	25.0		96.5	70-130			
Surrogate: 4-Bromofluorobenzene	*25.3*		µg/L	25.0		101	70-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209588 - SW-846 3510C										
Blank (B209588-BLK1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Benzo(a)anthracene (SIM)	ND	0.050	µg/L							
Benzo(a)pyrene (SIM)	ND	0.10	µg/L							
Benzo(b)fluoranthene (SIM)	ND	0.050	µg/L							
Benzo(k)fluoranthene (SIM)	ND	0.20	µg/L							
Bis(2-ethylhexyl)phthalate (SIM)	ND	1.0	µg/L							
Chrysene (SIM)	ND	0.20	µg/L							
Dibenz(a,h)anthracene (SIM)	ND	0.20	µg/L							
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.20	µg/L							
Pentachlorophenol (SIM)	ND	1.0	µg/L							V-05
Surrogate: 2-Fluorophenol	*141*		µg/L	200		70.6	15-110			
Surrogate: Phenol-d6	*113*		µg/L	200		56.3	15-110			
Surrogate: Nitrobenzene-d5	*86.1*		µg/L	100		86.1	30-130			
Surrogate: 2-Fluorobiphenyl	*84.7*		µg/L	100		84.7	30-130			
Surrogate: 2,4,6-Tribromophenol	*192*		µg/L	200		95.9	15-110			V-04
Surrogate: p-Terphenyl-d14	*90.4*		µg/L	100		90.4	30-130			
LCS (B209588-BS1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Benzo(a)anthracene (SIM)	41.4	1.2	µg/L	50.0		82.8	40-140			
Benzo(a)pyrene (SIM)	43.3	2.5	µg/L	50.0		86.6	40-140			
Benzo(b)fluoranthene (SIM)	44.8	1.2	µg/L	50.0		89.6	40-140			
Benzo(k)fluoranthene (SIM)	42.3	5.0	µg/L	50.0		84.6	40-140			
Bis(2-ethylhexyl)phthalate (SIM)	45.0	25	µg/L	50.0		90.0	40-140			
Chrysene (SIM)	39.3	5.0	µg/L	50.0		78.6	40-140			
Dibenz(a,h)anthracene (SIM)	45.1	5.0	µg/L	50.0		90.2	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	45.8	5.0	µg/L	50.0		91.6	40-140			
Pentachlorophenol (SIM)	30.6	25	µg/L	50.0		61.2	40-140			V-05
Surrogate: 2-Fluorophenol	*111*		µg/L	200		55.5	15-110			
Surrogate: Phenol-d6	*89.1*		µg/L	200		44.6	15-110			
Surrogate: Nitrobenzene-d5	*75.0*		µg/L	100		75.0	30-130			
Surrogate: 2-Fluorobiphenyl	*68.5*		µg/L	100		68.5	30-130			
Surrogate: 2,4,6-Tribromophenol	*112*		µg/L	200		56.0	15-110			V-04
Surrogate: p-Terphenyl-d14	*60.4*		µg/L	100		60.4	30-130			
LCS Dup (B209588-BSD1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Benzo(a)anthracene (SIM)	43.8	1.2	µg/L	50.0		87.6	40-140	5.63	20	
Benzo(a)pyrene (SIM)	46.2	2.5	µg/L	50.0		92.4	40-140	6.53	20	
Benzo(b)fluoranthene (SIM)	47.7	1.2	µg/L	50.0		95.4	40-140	6.22	20	
Benzo(k)fluoranthene (SIM)	45.5	5.0	µg/L	50.0		91.0	40-140	7.23	20	
Bis(2-ethylhexyl)phthalate (SIM)	47.2	25	µg/L	50.0		94.5	40-140	4.88	20	
Chrysene (SIM)	41.8	5.0	µg/L	50.0		83.6	40-140	6.11	20	
Dibenz(a,h)anthracene (SIM)	48.2	5.0	µg/L	50.0		96.4	40-140	6.70	20	
Indeno(1,2,3-cd)pyrene (SIM)	48.9	5.0	µg/L	50.0		97.8	40-140	6.55	20	‡
Pentachlorophenol (SIM)	31.2	25	µg/L	50.0		62.4	40-140	1.86	20	V-05
Surrogate: 2-Fluorophenol	*119*		µg/L	200		59.5	15-110			
Surrogate: Phenol-d6	*98.5*		µg/L	200		49.3	15-110			
Surrogate: Nitrobenzene-d5	*76.4*		µg/L	100		76.4	30-130			
Surrogate: 2-Fluorobiphenyl	*70.9*		µg/L	100		70.9	30-130			
Surrogate: 2,4,6-Tribromophenol	*111*		µg/L	200		55.7	15-110			V-04
Surrogate: p-Terphenyl-d14	*67.9*		µg/L	100		67.9	30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209588 - SW-846 3510C										
Matrix Spike (B209588-MS1)	**Source: 18H0124-01**			Prepared: 08/03/18 Analyzed: 08/06/18						
Benzo(a)anthracene (SIM)	49.9	1.2	µg/L	50.0	ND	99.8	40-140			
Benzo(a)pyrene (SIM)	52.2	2.5	µg/L	50.0	ND	104	40-140			
Benzo(b)fluoranthene (SIM)	54.6	1.2	µg/L	50.0	ND	109	40-140			
Benzo(k)fluoranthene (SIM)	52.0	5.0	µg/L	50.0	ND	104	40-140			
Bis(2-ethylhexyl)phthalate (SIM)	54.3	25	µg/L	50.0	ND	109	40-140			
Chrysene (SIM)	47.5	5.0	µg/L	50.0	ND	95.0	40-140			
Dibenz(a,h)anthracene (SIM)	55.2	5.0	µg/L	50.0	ND	110	40-140			
Indeno(1,2,3-cd)pyrene (SIM)	55.6	5.0	µg/L	50.0	ND	111	40-140			
Pentachlorophenol (SIM)	34.2	25	µg/L	50.0	ND	68.4	40-140			V-05
Surrogate: 2-Fluorophenol	*112*		µg/L	200		56.0	15-110			
Surrogate: Phenol-d6	*98.4*		µg/L	200		49.2	15-110			
Surrogate: Nitrobenzene-d5	*78.1*		µg/L	100		78.1	30-130			
Surrogate: 2-Fluorobiphenyl	*82.6*		µg/L	100		82.6	30-130			
Surrogate: 2,4,6-Tribromophenol	*137*		µg/L	200		68.6	15-110			V-04
Surrogate: p-Terphenyl-d14	*76.8*		µg/L	100		76.8	30-130			
Matrix Spike Dup (B209588-MSD1)	**Source: 18H0124-01**			Prepared: 08/03/18 Analyzed: 08/06/18						
Benzo(a)anthracene (SIM)	49.0	1.2	µg/L	50.0	ND	98.0	40-140	1.72	30	
Benzo(a)pyrene (SIM)	51.6	2.5	µg/L	50.0	ND	103	40-140	1.15	30	
Benzo(b)fluoranthene (SIM)	54.2	1.2	µg/L	50.0	ND	108	40-140	0.828	30	
Benzo(k)fluoranthene (SIM)	51.3	5.0	µg/L	50.0	ND	103	40-140	1.31	30	
Bis(2-ethylhexyl)phthalate (SIM)	53.0	25	µg/L	50.0	ND	106	40-140	2.52	30	
Chrysene (SIM)	46.9	5.0	µg/L	50.0	ND	93.8	40-140	1.38	30	
Dibenz(a,h)anthracene (SIM)	53.8	5.0	µg/L	50.0	ND	108	40-140	2.39	30	
Indeno(1,2,3-cd)pyrene (SIM)	54.5	5.0	µg/L	50.0	ND	109	40-140	2.13	30	
Pentachlorophenol (SIM)	33.8	25	µg/L	50.0	ND	67.5	40-140	1.40	30	V-05
Surrogate: 2-Fluorophenol	*104*		µg/L	200		52.2	15-110			
Surrogate: Phenol-d6	*86.7*		µg/L	200		43.4	15-110			
Surrogate: Nitrobenzene-d5	*88.8*		µg/L	100		88.8	30-130			
Surrogate: 2-Fluorobiphenyl	*81.9*		µg/L	100		81.9	30-130			
Surrogate: 2,4,6-Tribromophenol	*134*		µg/L	200		67.2	15-110			V-04
Surrogate: p-Terphenyl-d14	*75.5*		µg/L	100		75.5	30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by - GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209506 - SW-846 3510C										
Blank (B209506-BLK1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Acenaphthene	ND	5.0	µg/L							
Acenaphthylene	ND	5.0	µg/L							
Anthracene	ND	5.0	µg/L							
Benzidine	ND	20	µg/L							L-04, V-04, V-05
Benzo(g,h,i)perylene	ND	5.0	µg/L							V-05
4-Bromophenylphenylether	ND	10	µg/L							
Butylbenzylphthalate	ND	10	µg/L							
4-Chloro-3-methylphenol	ND	10	µg/L							
Bis(2-chloroethyl)ether	ND	10	µg/L							
Bis(2-chloroisopropyl)ether	ND	10	µg/L							
2-Chloronaphthalene	ND	10	µg/L							
2-Chlorophenol	ND	10	µg/L							
4-Chlorophenylphenylether	ND	10	µg/L							
Di-n-butylphthalate	ND	10	µg/L							
1,3-Dichlorobenzene	ND	5.0	µg/L							
1,4-Dichlorobenzene	ND	5.0	µg/L							
1,2-Dichlorobenzene	ND	5.0	µg/L							
3,3-Dichlorobenzidine	ND	10	µg/L							
2,4-Dichlorophenol	ND	10	µg/L							
Diethylphthalate	ND	10	µg/L							
2,4-Dimethylphenol	ND	10	µg/L							
Dimethylphthalate	ND	10	µg/L							
4,6-Dinitro-2-methylphenol	ND	10	µg/L							
2,4-Dinitrophenol	ND	10	µg/L							
2,4-Dinitrotoluene	ND	10	µg/L							
2,6-Dinitrotoluene	ND	10	µg/L							
Di-n-octylphthalate	ND	10	µg/L							
1,2-Diphenylhydrazine (as Azobenzene)	ND	10	µg/L							
Bis(2-Ethylhexyl)phthalate	ND	10	µg/L							
Fluoranthene	ND	5.0	µg/L							
Fluorene	ND	5.0	µg/L							
Hexachlorobenzene	ND	10	µg/L							
Hexachlorobutadiene	ND	10	µg/L							
Hexachlorocyclopentadiene	ND	10	µg/L							V-05
Hexachloroethane	ND	10	µg/L							
Isophorone	ND	10	µg/L							
Naphthalene	ND	5.0	µg/L							
Nitrobenzene	ND	10	µg/L							
2-Nitrophenol	ND	10	µg/L							
4-Nitrophenol	ND	10	µg/L							
N-Nitrosodimethylamine	ND	10	µg/L							
N-Nitrosodiphenylamine	ND	10	µg/L							
N-Nitrosodi-n-propylamine	ND	10	µg/L							
2-Methylnaphthalene	ND	5.0	µg/L							
Phenanthrene	ND	5.0	µg/L							
2-Methylphenol	ND	10	µg/L							
Phenol	ND	10	µg/L							
3/4-Methylphenol	ND	10	µg/L							
Pyrene	ND	5.0	µg/L							
1,2,4-Trichlorobenzene	ND	5.0	µg/L							
2,4,6-Trichlorophenol	ND	10	µg/L							
Surrogate: 2-Fluorophenol	*124*		µg/L	200		61.9	15-110			

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QUALITY CONTROL

Semivolatile Organic Compounds by - GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B209506 - SW-846 3510C											
Blank (B209506-BLK1)				Prepared: 08/03/18 Analyzed: 08/06/18							
Surrogate: Phenol-d6	*100*		µg/L	200		50.2		15-110			
Surrogate: Nitrobenzene-d5	*73.7*		µg/L	100		73.7		30-130			
Surrogate: 2-Fluorobiphenyl	*80.5*		µg/L	100		80.5		30-130			
Surrogate: 2,4,6-Tribromophenol	*152*		µg/L	200		76.2		15-110			
Surrogate: p-Terphenyl-d14	*96.8*		µg/L	100		96.8		30-130			
LCS (B209506-BS1)				Prepared: 08/03/18 Analyzed: 08/06/18							
Acenaphthene	32.3	5.0	µg/L	50.0		64.6		47-145			
Acenaphthylene	31.9	5.0	µg/L	50.0		63.8		33-145			
Anthracene	36.5	5.0	µg/L	50.0		72.9		27-133			
Benzidine	10.6	20	µg/L	50.0		**21.2**	*	40-140			V-04, V-05, L-04
Benzo(g,h,i)perylene	34.4	5.0	µg/L	50.0		68.8		10-219			V-05
4-Bromophenylphenylether	33.6	10	µg/L	50.0		67.1		53-127			
Butylbenzylphthalate	37.3	10	µg/L	50.0		74.5		10-152			
4-Chloro-3-methylphenol	35.0	10	µg/L	50.0		69.9		22-147			
Bis(2-chloroethyl)ether	33.2	10	µg/L	50.0		66.4		12-158			
Bis(2-chloroisopropyl)ether	38.4	10	µg/L	50.0		76.7		36-166			
2-Chloronaphthalene	28.1	10	µg/L	50.0		**56.2**	*	60-120			L-07
2-Chlorophenol	32.5	10	µg/L	50.0		64.9		23-134			
4-Chlorophenylphenylether	32.4	10	µg/L	50.0		64.7		25-158			
Di-n-butylphthalate	35.9	10	µg/L	50.0		71.9		10-120			
1,3-Dichlorobenzene	31.8	5.0	µg/L	50.0		63.6		10-172			
1,4-Dichlorobenzene	32.1	5.0	µg/L	50.0		64.1		20-124			
1,2-Dichlorobenzene	33.1	5.0	µg/L	50.0		66.1		32-129			
3,3-Dichlorobenzidine	38.2	10	µg/L	50.0		76.3		10-262			
2,4-Dichlorophenol	34.4	10	µg/L	50.0		68.7		39-135			
Diethylphthalate	31.2	10	µg/L	50.0		62.4		10-120			
2,4-Dimethylphenol	34.6	10	µg/L	50.0		69.2		32-120			
Dimethylphthalate	32.8	10	µg/L	50.0		65.5		10-120			
4,6-Dinitro-2-methylphenol	35.6	10	µg/L	50.0		71.2		10-181			
2,4-Dinitrophenol	32.2	10	µg/L	50.0		64.4		10-191			
2,4-Dinitrotoluene	34.6	10	µg/L	50.0		69.1		39-139			
2,6-Dinitrotoluene	35.8	10	µg/L	50.0		71.6		50-158			
Di-n-octylphthalate	37.6	10	µg/L	50.0		75.2		4-146			
1,2-Diphenylhydrazine (as Azobenzene)	33.5	10	µg/L	50.0		67.0		40-140			
Bis(2-Ethylhexyl)phthalate	37.8	10	µg/L	50.0		75.5		8-158			
Fluoranthene	37.4	5.0	µg/L	50.0		74.8		26-137			
Fluorene	32.6	5.0	µg/L	50.0		65.1		59-121			
Hexachlorobenzene	33.3	10	µg/L	50.0		66.6		10-152			
Hexachlorobutadiene	33.9	10	µg/L	50.0		67.8		24-120			
Hexachlorocyclopentadiene	21.8	10	µg/L	50.0		43.6		40-140			V-05
Hexachloroethane	31.0	10	µg/L	50.0		62.0		40-120			
Isophorone	35.3	10	µg/L	50.0		70.6		21-196			
Naphthalene	34.0	5.0	µg/L	50.0		68.0		21-133			
Nitrobenzene	30.8	10	µg/L	50.0		61.5		35-180			
2-Nitrophenol	36.6	10	µg/L	50.0		73.1		29-182			
4-Nitrophenol	23.7	10	µg/L	50.0		47.5		10-132			
N-Nitrosodimethylamine	25.1	10	µg/L	50.0		50.3		40-140			
N-Nitrosodiphenylamine	42.0	10	µg/L	50.0		84.1		40-140			
N-Nitrosodi-n-propylamine	29.9	10	µg/L	50.0		59.9		10-230			
2-Methylnaphthalene	36.3	5.0	µg/L	50.0		72.7		40-140			
Phenanthrene	36.0	5.0	µg/L	50.0		72.0		54-120			

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QUALITY CONTROL

Semivolatile Organic Compounds by - GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209506 - SW-846 3510C										
LCS (B209506-BS1)				Prepared: 08/03/18 Analyzed: 08/06/18						
2-Methylphenol	32.3	10	µg/L	50.0		64.7	40-140			
Phenol	21.7	10	µg/L	50.0		43.4	5-120			
3/4-Methylphenol	33.9	10	µg/L	50.0		67.7	40-140			
Pyrene	36.7	5.0	µg/L	50.0		73.3	52-120			
1,2,4-Trichlorobenzene	33.2	5.0	µg/L	50.0		66.3	44-142			
2,4,6-Trichlorophenol	32.7	10	µg/L	50.0		65.4	37-144			
Surrogate: 2-Fluorophenol	*113*		µg/L	200		56.3	15-110			
Surrogate: Phenol-d6	*91.6*		µg/L	200		45.8	15-110			
Surrogate: Nitrobenzene-d5	*65.5*		µg/L	100		65.5	30-130			
Surrogate: 2-Fluorobiphenyl	*74.5*		µg/L	100		74.5	30-130			
Surrogate: 2,4,6-Tribromophenol	*135*		µg/L	200		67.7	15-110			
Surrogate: p-Terphenyl-d14	*87.5*		µg/L	100		87.5	30-130			
LCS Dup (B209506-BSD1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Acenaphthene	34.1	5.0	µg/L	50.0		68.1	47-145	5.27	48	
Acenaphthylene	33.8	5.0	µg/L	50.0		67.5	33-145	5.57	74	
Anthracene	38.8	5.0	µg/L	50.0		77.5	27-133	6.11	66	
Benzidine	ND	20	µg/L	50.0		*	40-140			L-04, V-04, V-05
Benzo(g,h,i)perylene	36.2	5.0	µg/L	50.0		72.5	10-219	5.21	97	V-05
4-Bromophenylphenylether	35.7	10	µg/L	50.0		71.3	53-127	6.13	43	
Butylbenzylphthalate	40.3	10	µg/L	50.0		80.5	10-152	7.74	60	
4-Chloro-3-methylphenol	37.1	10	µg/L	50.0		74.2	22-147	5.91	73	
Bis(2-chloroethyl)ether	35.4	10	µg/L	50.0		70.9	12-158	6.56	108	
Bis(2-chloroisopropyl)ether	43.8	10	µg/L	50.0		87.7	36-166	13.3	76	
2-Chloronaphthalene	30.8	10	µg/L	50.0		61.6	60-120	9.27	24	
2-Chlorophenol	35.2	10	µg/L	50.0		70.5	23-134	8.24	61	
4-Chlorophenylphenylether	34.0	10	µg/L	50.0		68.0	25-158	4.91	61	
Di-n-butylphthalate	38.6	10	µg/L	50.0		77.3	10-120	7.24	47	
1,3-Dichlorobenzene	34.3	5.0	µg/L	50.0		68.6	10-172	7.44		
1,4-Dichlorobenzene	34.4	5.0	µg/L	50.0		68.7	20-124	6.92		
1,2-Dichlorobenzene	36.2	5.0	µg/L	50.0		72.5	32-129	9.15		
3,3-Dichlorobenzidine	40.3	10	µg/L	50.0		80.6	10-262	5.48	108	
2,4-Dichlorophenol	36.0	10	µg/L	50.0		72.1	39-135	4.80	50	
Diethylphthalate	33.6	10	µg/L	50.0		67.1	10-120	7.22	100	
2,4-Dimethylphenol	37.0	10	µg/L	50.0		74.0	32-120	6.82	58	
Dimethylphthalate	34.3	10	µg/L	50.0		68.6	10-120	4.59	183	
4,6-Dinitro-2-methylphenol	38.3	10	µg/L	50.0		76.6	10-181	7.34	203	
2,4-Dinitrophenol	33.4	10	µg/L	50.0		66.8	10-191	3.60	132	
2,4-Dinitrotoluene	36.3	10	µg/L	50.0		72.5	39-139	4.80	42	
2,6-Dinitrotoluene	37.6	10	µg/L	50.0		75.2	50-158	4.82	48	
Di-n-octylphthalate	40.3	10	µg/L	50.0		80.6	4-146	6.91	69	
1,2-Diphenylhydrazine (as Azobenzene)	37.0	10	µg/L	50.0		74.1	40-140	10.0		
Bis(2-Ethylhexyl)phthalate	40.4	10	µg/L	50.0		80.7	8-158	6.66	82	
Fluoranthene	39.8	5.0	µg/L	50.0		79.7	26-137	6.35	66	
Fluorene	34.2	5.0	µg/L	50.0		68.3	59-121	4.74	38	
Hexachlorobenzene	34.6	10	µg/L	50.0		69.2	10-152	3.74	55	
Hexachlorobutadiene	34.9	10	µg/L	50.0		69.7	24-120	2.88	62	
Hexachlorocyclopentadiene	22.2	10	µg/L	50.0		44.3	40-140	1.64		V-05
Hexachloroethane	33.8	10	µg/L	50.0		67.6	40-120	8.58	52	
Isophorone	38.0	10	µg/L	50.0		75.9	21-196	7.29	93	
Naphthalene	36.0	5.0	µg/L	50.0		71.9	21-133	5.63	65	
Nitrobenzene	33.5	10	µg/L	50.0		67.0	35-180	8.44	62	

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QUALITY CONTROL

Semivolatile Organic Compounds by - GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209506 - SW-846 3510C										
LCS Dup (B209506-BSD1)				Prepared: 08/03/18 Analyzed: 08/06/18						
2-Nitrophenol	38.2	10	µg/L	50.0		76.3	29-182	4.28	55	
4-Nitrophenol	25.2	10	µg/L	50.0		50.3	10-132	5.85	131	
N-Nitrosodimethylamine	28.1	10	µg/L	50.0		56.1	40-140	11.0		
N-Nitrosodiphenylamine	44.9	10	µg/L	50.0		89.8	40-140	6.58		
N-Nitrosodi-n-propylamine	33.3	10	µg/L	50.0		66.5	10-230	10.5	87	
2-Methylnaphthalene	38.8	5.0	µg/L	50.0		77.7	40-140	6.62	30	
Phenanthrene	38.4	5.0	µg/L	50.0		76.8	54-120	6.37	39	
2-Methylphenol	35.4	10	µg/L	50.0		70.9	40-140	9.12	30	
Phenol	23.7	10	µg/L	50.0		47.4	5-120	8.86	64	
3/4-Methylphenol	36.9	10	µg/L	50.0		73.9	40-140	8.67	30	
Pyrene	38.6	5.0	µg/L	50.0		77.2	52-120	5.16	49	
1,2,4-Trichlorobenzene	35.0	5.0	µg/L	50.0		69.9	44-142	5.31	50	
2,4,6-Trichlorophenol	34.2	10	µg/L	50.0		68.4	37-144	4.55	58	
Surrogate: 2-Fluorophenol	*122*		µg/L	200		61.2	15-110			
Surrogate: Phenol-d6	*101*		µg/L	200		50.3	15-110			
Surrogate: Nitrobenzene-d5	*71.4*		µg/L	100		71.4	30-130			
Surrogate: 2-Fluorobiphenyl	*77.6*		µg/L	100		77.6	30-130			
Surrogate: 2,4,6-Tribromophenol	*140*		µg/L	200		70.1	15-110			
Surrogate: p-Terphenyl-d14	*91.0*		µg/L	100		91.0	30-130			

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209571 - SW-846 3510C										
Blank (B209571-BLK1)				Prepared: 08/06/18 Analyzed: 08/08/18						
Aroclor-1016	ND	0.10	µg/L							
Aroclor-1016 [2C]	ND	0.10	µg/L							
Aroclor-1221	ND	0.10	µg/L							
Aroclor-1221 [2C]	ND	0.10	µg/L							
Aroclor-1232	ND	0.10	µg/L							
Aroclor-1232 [2C]	ND	0.10	µg/L							
Aroclor-1242	ND	0.10	µg/L							
Aroclor-1242 [2C]	ND	0.10	µg/L							
Aroclor-1248	ND	0.10	µg/L							
Aroclor-1248 [2C]	ND	0.10	µg/L							
Aroclor-1254	ND	0.10	µg/L							
Aroclor-1254 [2C]	ND	0.10	µg/L							
Aroclor-1260	ND	0.10	µg/L							
Aroclor-1260 [2C]	ND	0.10	µg/L							
Surrogate: Decachlorobiphenyl	*1.93*		µg/L	2.00		96.5	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.95*		µg/L	2.00		97.5	30-150			
Surrogate: Tetrachloro-m-xylene	*1.73*		µg/L	2.00		86.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.71*		µg/L	2.00		85.3	30-150			
LCS (B209571-BS1)				Prepared: 08/06/18 Analyzed: 08/08/18						
Aroclor-1016	0.50	0.20	µg/L	0.500		100	50-140			
Aroclor-1016 [2C]	0.52	0.20	µg/L	0.500		103	50-140			
Aroclor-1260	0.46	0.20	µg/L	0.500		92.6	8-140			
Aroclor-1260 [2C]	0.47	0.20	µg/L	0.500		93.3	8-140			
Surrogate: Decachlorobiphenyl	*1.87*		µg/L	2.00		93.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.84*		µg/L	2.00		92.0	30-150			
Surrogate: Tetrachloro-m-xylene	*1.62*		µg/L	2.00		81.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.60*		µg/L	2.00		80.0	30-150			
LCS Dup (B209571-BSD1)				Prepared: 08/06/18 Analyzed: 08/08/18						
Aroclor-1016	0.48	0.20	µg/L	0.500		95.3	50-140	5.00		
Aroclor-1016 [2C]	0.50	0.20	µg/L	0.500		100	50-140	2.63		
Aroclor-1260	0.46	0.20	µg/L	0.500		92.7	8-140	0.117		
Aroclor-1260 [2C]	0.46	0.20	µg/L	0.500		92.3	8-140	1.14		
Surrogate: Decachlorobiphenyl	*1.89*		µg/L	2.00		94.4	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.85*		µg/L	2.00		92.6	30-150			
Surrogate: Tetrachloro-m-xylene	*1.49*		µg/L	2.00		74.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.46*		µg/L	2.00		73.2	30-150			
Batch B209675 - SW-846 3510C										
Blank (B209675-BLK1)				Prepared: 08/07/18 Analyzed: 08/08/18						
Aroclor-1016	ND	0.10	µg/L							
Aroclor-1016 [2C]	ND	0.10	µg/L							
Aroclor-1221	ND	0.10	µg/L							
Aroclor-1221 [2C]	ND	0.10	µg/L							
Aroclor-1232	ND	0.10	µg/L							
Aroclor-1232 [2C]	ND	0.10	µg/L							
Aroclor-1242	ND	0.10	µg/L							
Aroclor-1242 [2C]	ND	0.10	µg/L							
Aroclor-1248	ND	0.10	µg/L							
Aroclor-1248 [2C]	ND	0.10	µg/L							
Aroclor-1254	ND	0.10	µg/L							

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209675 - SW-846 3510C										
Blank (B209675-BLK1)				Prepared: 08/07/18 Analyzed: 08/08/18						
Aroclor-1254 [2C]	ND	0.10	µg/L							
Aroclor-1260	ND	0.10	µg/L							
Aroclor-1260 [2C]	ND	0.10	µg/L							
Surrogate: Decachlorobiphenyl	*0.981*		µg/L	1.00		98.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.982*		µg/L	1.00		98.2	30-150			
Surrogate: Tetrachloro-m-xylene	*0.918*		µg/L	1.00		91.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*0.901*		µg/L	1.00		90.1	30-150			
LCS (B209675-BS1)				Prepared: 08/07/18 Analyzed: 08/08/18						
Aroclor-1016	0.58	0.20	µg/L	0.500		115	50-140			
Aroclor-1016 [2C]	0.56	0.20	µg/L	0.500		111	50-140			
Aroclor-1260	0.53	0.20	µg/L	0.500		105	8-140			
Aroclor-1260 [2C]	0.55	0.20	µg/L	0.500		110	8-140			
Surrogate: Decachlorobiphenyl	*2.07*		µg/L	2.00		104	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.09*		µg/L	2.00		105	30-150			
Surrogate: Tetrachloro-m-xylene	*2.06*		µg/L	2.00		103	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.05*		µg/L	2.00		103	30-150			
LCS Dup (B209675-BSD1)				Prepared: 08/07/18 Analyzed: 08/08/18						
Aroclor-1016	0.60	0.20	µg/L	0.500		120	50-140	3.72		
Aroclor-1016 [2C]	0.57	0.20	µg/L	0.500		115	50-140	3.41		
Aroclor-1260	0.56	0.20	µg/L	0.500		112	8-140	6.23		
Aroclor-1260 [2C]	0.58	0.20	µg/L	0.500		116	8-140	5.75		
Surrogate: Decachlorobiphenyl	*1.90*		µg/L	2.00		94.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.93*		µg/L	2.00		96.6	30-150			
Surrogate: Tetrachloro-m-xylene	*2.15*		µg/L	2.00		108	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*2.15*		µg/L	2.00		107	30-150			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209522 - EPA 200.7										
Blank (B209522-BLK1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Iron	ND	0.25	mg/L							
LCS (B209522-BS1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Iron	3.87	0.050	mg/L	4.00		96.7	85-115			
LCS Dup (B209522-BSD1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Iron	3.88	0.050	mg/L	4.00		97.1	85-115	0.430	20	
Batch B209523 - EPA 200.8										
Blank (B209523-BLK1)				Prepared: 08/03/18 Analyzed: 08/04/18						
Antimony	ND	1.0	µg/L							
Arsenic	ND	1.0	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	10	µg/L							
Copper	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Nickel	ND	5.0	µg/L							
Selenium	ND	5.0	µg/L							
Silver	ND	0.20	µg/L							
Zinc	ND	20	µg/L							
LCS (B209523-BS1)				Prepared: 08/03/18 Analyzed: 08/04/18						
Antimony	501	10	µg/L	500		100	85-115			
Arsenic	507	10	µg/L	500		101	85-115			
Cadmium	511	2.0	µg/L	500		102	85-115			
Chromium	514	100	µg/L	500		103	85-115			
Copper	993	10	µg/L	1000		99.3	85-115			
Lead	503	5.0	µg/L	500		101	85-115			
Nickel	510	50	µg/L	500		102	85-115			
Selenium	518	50	µg/L	500		104	85-115			
Silver	495	2.0	µg/L	500		99.1	85-115			
Zinc	1060	200	µg/L	1000		106	85-115			
LCS Dup (B209523-BSD1)				Prepared: 08/03/18 Analyzed: 08/04/18						
Antimony	532	10	µg/L	500		106	85-115	6.10	20	
Arsenic	533	10	µg/L	500		107	85-115	5.02	20	
Cadmium	536	2.0	µg/L	500		107	85-115	4.65	20	
Chromium	537	100	µg/L	500		107	85-115	4.43	20	
Copper	1050	10	µg/L	1000		105	85-115	5.26	20	
Lead	533	5.0	µg/L	500		107	85-115	5.80	20	
Nickel	531	50	µg/L	500		106	85-115	4.05	20	
Selenium	546	50	µg/L	500		109	85-115	5.29	20	
Silver	519	2.0	µg/L	500		104	85-115	4.71	20	
Zinc	1100	200	µg/L	1000		110	85-115	4.05	20	

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209698 - EPA 245.1										
Blank (B209698-BLK1)				Prepared & Analyzed: 08/07/18						
Mercury	ND	0.00010	mg/L							
LCS (B209698-BS1)				Prepared & Analyzed: 08/07/18						
Mercury	0.00184	0.00010	mg/L	0.00200		91.8	85-115			
LCS Dup (B209698-BSD1)				Prepared & Analyzed: 08/07/18						
Mercury	0.00195	0.00010	mg/L	0.00200		97.3	85-115	5.87	20	

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209424 - SM21-22 3500 Cr B										
Blank (B209424-BLK1)				Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	ND	0.0040	mg/L							
LCS (B209424-BS1)				Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	0.10	0.0040	mg/L	0.100		100	83.2-114			
LCS Dup (B209424-BSD1)				Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	0.11	0.0040	mg/L	0.100		106	83.2-114	5.06	7.51	
Duplicate (B209424-DUP1)	**Source: 18H0124-03**			Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	ND	0.0040	mg/L		ND			NC	56.3	H-03
Matrix Spike (B209424-MS1)	**Source: 18H0124-03**			Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	0.10	0.0040	mg/L	0.100	ND	103	10.8-151			
Batch B209525 - SM21-22 4500 CL G										
Blank (B209525-BLK1)				Prepared & Analyzed: 08/03/18						
Chlorine, Residual	ND	0.020	mg/L							
LCS (B209525-BS1)				Prepared & Analyzed: 08/03/18						
Chlorine, Residual	1.2	0.020	mg/L	1.34		86.1	76-135			
LCS Dup (B209525-BSD1)				Prepared & Analyzed: 08/03/18						
Chlorine, Residual	1.2	0.020	mg/L	1.34		88.2	76-135	2.36	7.41	
Duplicate (B209525-DUP1)	**Source: 18H0124-01**			Prepared & Analyzed: 08/03/18						
Chlorine, Residual	0.045	0.020	mg/L		0.049			8.34	35.9	H-03
Matrix Spike (B209525-MS1)	**Source: 18H0124-01**			Prepared & Analyzed: 08/03/18						
Chlorine, Residual	1.2	0.020	mg/L	1.00	0.049	112	10-185			
Batch B209575 - SM21-22 2540D										
Blank (B209575-BLK1)				Prepared & Analyzed: 08/06/18						
Total Suspended Solids	ND	2.5	mg/L							
LCS (B209575-BS1)				Prepared & Analyzed: 08/06/18						
Total Suspended Solids	174	10	mg/L	200		87.0	64.3-117			
Batch B209678 - EPA 1664B										
Blank (B209678-BLK1)				Prepared & Analyzed: 08/07/18						
Silica Gel Treated HEM (SGT-HEM)	ND	1.4	mg/L							

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209678 - EPA 1664B										
LCS (B209678-BS1)				Prepared & Analyzed: 08/07/18						
Silica Gel Treated HEM (SGT-HEM)	11		mg/L	10.0		106	64-132			
Matrix Spike (B209678-MS1)		**Source: 18H0124-03**		Prepared & Analyzed: 08/07/18						
Silica Gel Treated HEM (SGT-HEM)	100	14	mg/L	100	ND	104	64-132			

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA 608.3

LCS

Lab Sample ID: B209571-BS1 Date(s) Analyzed: 08/08/2018 08/08/2018

Instrument ID (1): ECD10 Instrument ID (2): ECD10

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.50	
	2	0.000	0.000	0.000	0.52	3.9
Aroclor-1260	1	0.000	0.000	0.000	0.46	
	2	0.000	0.000	0.000	0.47	2.2

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA 608.3

LCS Dup

Lab Sample ID: B209571-BSD1 Date(s) Analyzed: 08/08/2018 08/08/2018

Instrument ID (1): ECD10 Instrument ID (2): ECD10

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.48	
	2	0.000	0.000	0.000	0.50	4.1
Aroclor-1260	1	0.000	0.000	0.000	0.46	
	2	0.000	0.000	0.000	0.46	0.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA 608.3

LCS

Lab Sample ID: B209675-BS1 Date(s) Analyzed: 08/08/2018 08/08/2018

Instrument ID (1): ECD10 Instrument ID (2): ECD10

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.58	
	2	0.000	0.000	0.000	0.56	3.5
Aroclor-1260	1	0.000	0.000	0.000	0.53	
	2	0.000	0.000	0.000	0.55	3.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA 608.3

LCS Dup

Lab Sample ID: B209675-BSD1 Date(s) Analyzed: 08/08/2018 08/08/2018

Instrument ID (1): ECD10 Instrument ID (2): ECD10

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.60	
	2	0.000	0.000	0.000	0.57	5.1
Aroclor-1260	1	0.000	0.000	0.000	0.56	
	2	0.000	0.000	0.000	0.58	3.5

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
D	[Undefined]
DL-03	Elevated reporting limit due to matrix.
DL-15	Sample required a dilution due to low internal standard recovery of the lesser diluted digestion, reporting limit is elevated.
GS1	Sample dilution required for high concentration of target analytes to be within the instrument calibration range.
H-03	Sample received after recommended holding time was exceeded.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-01	Laboratory fortified blank /laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
S-07	One associated surrogate standard recovery is outside of control limits but the other(s) is/are within limits. All recoveries are > 10%.
V-04	Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.
V-05	Continuing calibration did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.7 in Water	
Iron	CT,MA,NH,NY,RI,NC,ME,VA
Hardness	CT,MA,NH,NY,RI,VA
EPA 200.8 in Water	
Antimony	CT,MA,NH,NY,RI,NC,ME,VA
Arsenic	CT,MA,NH,NY,RI,NC,ME,VA
Cadmium	CT,MA,NH,NY,RI,NC,ME,VA
Chromium	CT,MA,NH,NY,RI,NC,ME,VA
Copper	CT,MA,NH,NY,RI,NC,ME,VA
Lead	CT,MA,NH,NY,RI,NC,ME,VA
Nickel	CT,MA,NH,NY,RI,NC,ME,VA
Selenium	CT,MA,NH,NY,RI,NC,ME,VA
Silver	CT,MA,NH,NY,RI,NC,ME,VA
Zinc	CT,MA,NH,NY,RI,NC,ME,VA
EPA 245.1 in Water	
Mercury	CT,MA,NH,RI,NY,NC,ME,VA
EPA 300.0 in Water	
Chloride	NC,NY,MA,VA,ME,NH,CT,RI
EPA 608.3 in Water	
Aroclor-1016	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1016 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1221	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1221 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1232	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1232 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1242	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1242 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1248	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1248 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1254	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1254 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1260	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1260 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
EPA 624.1 in Water	
Acetone	CT,NY,MA,NH
tert-Amyl Methyl Ether (TAME)	MA
Benzene	CT,NY,RI,NC,MA,NH
Bromodichloromethane	CT,NY,RI,NC,MA,NH
Bromoform	CT,NY,RI,NC,MA,NH
Bromomethane	CT,NY,RI,NC,MA,NH
tert-Butyl Alcohol (TBA)	MA
Carbon Tetrachloride	CT,NY,RI,NC,MA,NH
Chlorobenzene	CT,NY,RI,NC,MA,NH
Chlorodibromomethane	CT,NY,RI,NC,MA,NH
Chloroethane	CT,NY,RI,NC,MA,NH
Chloroform	CT,NY,RI,NC,MA,NH

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA 624.1 in Water	
Chloromethane	CT,NY,RI,NC,MA,NH
1,2-Dichlorobenzene	CT,NY,RI,NC,MA,NH
1,3-Dichlorobenzene	CT,NY,RI,NC,MA,NH
1,4-Dichlorobenzene	CT,NY,RI,NC,MA,NH
1,2-Dichloroethane	CT,NY,RI,NC,MA,NH
1,1-Dichloroethane	CT,NY,RI,NC,MA,NH
1,1-Dichloroethylene	CT,NY,RI,NC,MA,NH
trans-1,2-Dichloroethylene	CT,NY,RI,NC,MA,NH
1,2-Dichloropropane	CT,NY,RI,NC,MA,NH
cis-1,3-Dichloropropene	CT,NY,RI,NC,MA,NH
1,4-Dioxane	MA
trans-1,3-Dichloropropene	CT,NY,RI,NC,MA,NH
Ethanol	MA
Ethylbenzene	CT,NY,RI,NC,MA,NH
Methyl tert-Butyl Ether (MTBE)	NY,NC,MA,NH
Methylene Chloride	CT,NY,RI,NC,MA,NH
Naphthalene	NC,MA
1,1,2,2-Tetrachloroethane	CT,NY,RI,NC,MA,NH
Tetrachloroethylene	CT,NY,RI,NC,MA,NH
Toluene	CT,NY,RI,NC,MA,NH
1,2,4-Trichlorobenzene	NC,MA
1,1,1-Trichloroethane	CT,NY,RI,NC,MA,NH
1,1,2-Trichloroethane	CT,NY,RI,NC,MA,NH
Trichloroethylene	CT,NY,RI,NC,MA,NH
Trichlorofluoromethane (Freon 11)	CT,NY,RI,NC,MA,NH
Vinyl Chloride	CT,NY,RI,NC,MA,NH
m+p Xylene	CT,NY,RI,NC,MA,NH
o-Xylene	CT,NY,RI,NC,MA,NH
EPA 625 in Water	
2-Fluorophenol	NC,VA
Phenol-d6	VA
Nitrobenzene-d5	VA
EPA 625.1 in Water	
Acenaphthene	CT,MA,NH,NY,NC,RI,ME,VA
Acenaphthylene	CT,MA,NH,NY,NC,RI,ME,VA
Anthracene	CT,MA,NH,NY,NC,RI,ME,VA
Benzidine	CT,MA,NH,NY,NC,RI,ME,VA
Benzo(g,h,i)perylene	CT,MA,NH,NY,NC,RI,ME,VA
4-Bromophenylphenylether	CT,MA,NH,NY,NC,RI,ME,VA
Butylbenzylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
4-Chloro-3-methylphenol	CT,MA,NH,NY,NC,RI,VA
Bis(2-chloroethyl)ether	CT,MA,NH,NY,NC,RI,ME,VA
Bis(2-chloroisopropyl)ether	CT,MA,NH,NY,NC,RI,ME,VA
2-Chloronaphthalene	CT,MA,NH,NY,NC,RI,ME,VA
2-Chlorophenol	CT,MA,NH,NY,NC,RI,ME,VA
4-Chlorophenylphenylether	CT,MA,NH,NY,NC,RI,ME,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA 625.1 in Water	
Di-n-butylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
1,3-Dichlorobenzene	MA,NC
1,4-Dichlorobenzene	MA,NC
1,2-Dichlorobenzene	MA,NC
3,3-Dichlorobenzidine	CT,MA,NH,NY,NC,RI,ME,VA
2,4-Dichlorophenol	CT,MA,NH,NY,NC,RI,ME,VA
Diethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
2,4-Dimethylphenol	CT,MA,NH,NY,NC,RI,ME,VA
Dimethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
4,6-Dinitro-2-methylphenol	CT,MA,NH,NY,NC,RI,ME,VA
2,4-Dinitrophenol	CT,MA,NH,NY,NC,RI,ME,VA
2,4-Dinitrotoluene	CT,MA,NH,NY,NC,RI,ME,VA
2,6-Dinitrotoluene	CT,MA,NH,NY,NC,RI,ME,VA
Di-n-octylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
1,2-Diphenylhydrazine (as Azobenzene)	NC
Bis(2-Ethylhexyl)phthalate	CT,MA,NH,NY,NC,RI,ME,VA
Fluoranthene	CT,MA,NH,NY,NC,RI,ME,VA
Fluorene	CT,MA,NH,NY,NC,RI,ME,VA
Hexachlorobenzene	CT,MA,NH,NY,NC,RI,ME,VA
Hexachlorobutadiene	CT,MA,NH,NY,NC,RI,ME,VA
Hexachlorocyclopentadiene	CT,MA,NH,NY,NC,RI,ME,VA
Hexachloroethane	CT,MA,NH,NY,NC,RI,ME,VA
Isophorone	CT,MA,NH,NY,NC,RI,ME,VA
Naphthalene	CT,MA,NH,NY,NC,RI,ME,VA
Nitrobenzene	CT,MA,NH,NY,NC,RI,ME,VA
2-Nitrophenol	CT,MA,NH,NY,NC,RI,ME,VA
4-Nitrophenol	CT,MA,NH,NY,NC,RI,ME,VA
N-Nitrosodimethylamine	CT,MA,NH,NY,NC,RI,ME,VA
N-Nitrosodiphenylamine	CT,MA,NH,NY,NC,RI,ME,VA
N-Nitrosodi-n-propylamine	CT,MA,NH,NY,NC,RI,ME,VA
2-Methylnaphthalene	NC
Phenanthrene	CT,MA,NH,NY,NC,RI,ME,VA
2-Methylphenol	NY,NC
Phenol	CT,MA,NH,NY,NC,RI,ME,VA
3/4-Methylphenol	NY,NC
Pyrene	CT,MA,NH,NY,NC,RI,ME,VA
1,2,4-Trichlorobenzene	CT,MA,NH,NY,NC,RI,ME,VA
2,4,6-Trichlorophenol	CT,MA,NH,NY,NC,RI,ME,VA
2-Fluorophenol	NC
SM19-22 4500 NH3 C in Water	
Ammonia as N	NY,MA,CT,RI,VA,NC,ME
SM21-22 2540D in Water	
Total Suspended Solids	CT,MA,NH,NY,RI,NC,ME,VA
SM21-22 3500 Cr B in Water	
Hexavalent Chromium	NY,CT,NH,RI,ME,VA,NC

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SM21-22 4500 CL G in Water	
Chlorine, Residual	CT,MA,RI,ME
SM21-22 4500 CN E in Water	
Cyanide	CT,MA,NH,NY,RI,NC,ME,VA

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2005	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2019
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2019
NY	New York State Department of Health	10899 NELAP	04/1/2019
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2019
RI	Rhode Island Department of Health	LAO00112	12/30/2018
NC	North Carolina Div. of Water Quality	652	12/31/2018
NJ	New Jersey DEP	MA007 NELAP	06/30/2019
FL	Florida Department of Health	E871027 NELAP	06/30/2019
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2019
ME	State of Maine	2011028	06/9/2019
VA	Commonwealth of Virginia	460217	12/14/2018
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2018
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2019
NC-DW	North Carolina Department of Health	25703	07/31/2019

con-test ANALYTICAL LABORATORY

Phone: 413-525-2332 18H0124
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Email: info@contestlabs.com

http://www.contestlabs.com
CHAIN OF CUSTODY RECORD

Doc # 381 Rev 0 5 8 2015

39 Spruce Street
East Longmeadow, MA 01028

Page Page of 1 of 1

Company Name:	Lockwood Remediation Technologies, LLC
Address:	89 Crawford Street, Leominster, MA
Phone:	774-450-7177
Project Name:	Salem Power Plant
Project Location:	Salem, MA
Project Number:	2-1725
Project Manager:	John Henry
Con-Test Bid:	
Invoice Recipient:	
Sampled By:	

Requested Turnaround Time
7-Day ☐ 10-Day ☐
Other: 5 DAY

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☐
Other:
Enhanced Data Package Required: ☐
Email To: jhenry@lrt-llc.net
Fax To #:

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	[1]Matrix Code	Conc Code	TSS	Ammonia by SM4500B	Chloride by 300.0	TRC by SM4500-Cl D	Sb, As, Cd, Cr III, Cr VI, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn by 200.8	Cyanide by 335.4	VOCs by 624	SVOCs by 625	PCBs by 608	TPH by 1664	Ethanol by 1671	MTBE, TBA and TAME by 8260	Hardness
	# of Containers							1	1	1	1	1	1	3	2	1	1	3	3	2
	[2] Preservation Code							I	S	I	I	N	X	H	I	I	S	H	H	I/N
	[3] Container Code							P	P	P	P	P	P	V	A	A	A	V	V	P
1	TW-1	8/1/18	11:00		X	GW	M/L	X	X	X	X	X	X	X	X	X	X	X	X	X
2	TW-2	8/1/18	12:00		X	GW	M/L	X	X	X	X	X	X	X	X	X	X	X	X	X
3	TW-3	8/1/18	1:00		X	GW	M/L	X	X	X	X	X	X	X	X	X	X	X	X	X

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil/Solid
SL = Sludge
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Comments:

pH: Temp:

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:	8/2/18
Received by: (signature)	Date/Time:	7:30
Relinquished by: (signature) JB 24.0/25.2	Date/Time:	15:30 8-2-18
ived by: (signature)	Date/Time:	
quished by: (signature)	Date/Time:	
ived by: (signature)	Date/Time:	

Detection Limit Requirements
MA
CT
Other: 2017 NPDES RGP Standards

Program Information
○ MCP Analytical Certification Form Required
○ RCP Analysis Certification Form Required
○ MA State DW Form Required
PWSID # _____

NELAC and AIHA-LAP, LLC Accredited

TURNAROUND TIME (BUSINESS DAYS) STARTS AT 9:00 AM THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON THIS CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME CANNOT START UNTIL ALL QUESTIONS HAVE BEEN ANSWERED.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

Table of Contents

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Lockwood

Received By ESD Date 8-2-18 Time 15:30

How were the samples received? In Cooler T No Cooler _____ On Ice _____ No Ice T

Direct from Sampling _____ Ambient _____ Melted Ice _____

By Gun # 7 Actual Temp - 29.0 / 25.2

Were samples within Temperature? 2-6°C F By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? NP Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? F

Did COC include all pertinent Information? Client T Analysis T Sampler Name F

Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? T Who was notified? Luke

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? T Acid pH<2 Base pH>12

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	12	1 Liter Plastic		16 oz Amb.	
HCL-	27	500 mL Amb.		500 mL Plastic	12	8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	12	4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

- Not all chassis in Holding time.
- Coolers Looked like they once had ice in them but have since melted.

con-test ANALYTICAL LABORATORY
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Fax: 413-525-6405
Email: info@contestlabs.com

1810124

http://www.contestlabs.com

Doc # 381 Rev 0 5 8 2015

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Company Name:	Lockwood Remediation Technologies, LLC
Address:	89 Crawford Street, Leominster, MA
Phone:	774-450-7177
Project Name:	Salem Power Plant
Project Location:	Salem, MA
Project Number:	2-1725
Project Manager:	John Henry
Con-Test Bid:	
Invoice Recipient:	
Sampled By:	

Requested Turnaround Time
7-Day ☐ 10-Day ☐
Other: 5 day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☐
Other:
Enhanced Data Package Required: ☐
Email To: jhenry@irt-llc.net
Fax To #:

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	[1]Matrix Code	Conc Code	PCBs by 608										
1	TW-1	8/1/2018	11:00		X	GW	M/L	x										

4
I
A

# of Containers
[2] Preservation Code
[3] Container Code

ANALYSIS REQUESTED

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil/Solid
SL = Sludge
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] Container Codes:
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Comments: * additional sample volume submitted for PCBs -KKM 8/7

Sample pH:

Please use the following codes to indicate possible sample concentration within the **Conc Code** column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time: 8/7/18
Received by: (signature)	Date/Time: 8/7/18 905
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Detection Limit Requirements
MA
CT
Other: 2017 NPDES RGP Standards

Program Information

○ MCP Analytical Certification Form Required
○ RCP Analysis Certification Form Required
○ MA State DW Form Required
PWSID # _____

NELAC and AIHA-LAP, LLC Accredited

TURNAROUND TIME (BUSINESS DAYS) STARTS AT 9:00 AM THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON THIS CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME CANNOT START UNTIL ALL QUESTIONS HAVE BEEN ANSWERED.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

Table of Contents

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

August 9, 2018

John Henry
Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453

Project Location: Salem, MA
Client Job Number:
Project Number: 2-1725
Laboratory Work Order Number: 18H0125

Enclosed are results of analyses for samples received by the laboratory on August 2, 2018. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kerry K. McGee
Project Manager

Table of Contents

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
ATTN: John Henry

REPORT DATE: 8/9/2018

PURCHASE ORDER NUMBER: 2-1725

PROJECT NUMBER: 2-1725

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 18H0125

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Salem, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
Receiving water	18H0125-01	Surface Water		EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				SM19-22 4500 NH3 C	MA M-MA-086/CT PH-0574/NY11148
				SM21-22 3500 Cr B	
				SM2520B	NY11393/MA-MAI138/MA1110
				Tri Chrome Calc.	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

EPA 200.7

Qualifications:

DL-03

Elevated reporting limit due to matrix.

Analyte & Samples(s) Qualified:

Iron
18H0125-01[Receiving water], B209522-DUP1, B209522-MS1

EPA 200.8

Qualifications:

DL-15

Sample required a dilution due to low internal standard recovery of the lesser diluted digestion, reporting limit is elevated.

Analyte & Samples(s) Qualified:

Antimony
18H0125-01[Receiving water]

Arsenic
18H0125-01[Receiving water]

Cadmium
18H0125-01[Receiving water]

Chromium
18H0125-01[Receiving water]

Copper
18H0125-01[Receiving water]

Lead
18H0125-01[Receiving water]

Nickel
18H0125-01[Receiving water]

Selenium
18H0125-01[Receiving water]

Silver
18H0125-01[Receiving water]

Zinc
18H0125-01[Receiving water]

SM21-22 3500 Cr B

Qualifications:

H-03

Sample received after recommended holding time was exceeded.

Analyte & Samples(s) Qualified:

Hexavalent Chromium
18H0125-01[Receiving water]

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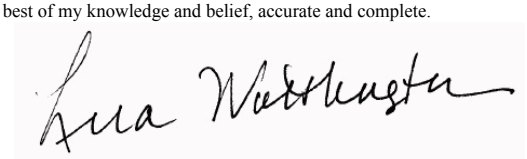
The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Project Manager

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0125

Date Received: 8/2/2018

Field Sample #: Receiving water | Sampled: 8/1/2018 14:00

Sample ID: 18H0125-01

Sample Matrix: Surface Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	5.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH
Arsenic	45	5.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH
Cadmium	ND	1.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH
Chromium	ND	50		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH
Chromium, Trivalent	0.0			mg/L	1		Tri Chrome Calc.	8/3/18	8/7/18 5:52	MJH
Copper	130	10		µg/L	10	DL-15	EPA 200.8	8/3/18	8/6/18 13:35	MJH
Iron	ND	0.25		mg/L	5	DL-03	EPA 200.7	8/3/18	8/7/18 9:39	QNW
Lead	ND	5.0		µg/L	10	DL-15	EPA 200.8	8/3/18	8/6/18 13:35	MJH
Mercury	ND	0.00010		mg/L	1		EPA 245.1	8/7/18	8/7/18 14:50	EDF
Nickel	ND	25		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH
Selenium	140	25	11	µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH
Silver	ND	1.0		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH
Zinc	ND	100		µg/L	5	DL-15	EPA 200.8	8/3/18	8/6/18 13:42	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0125

Date Received: 8/2/2018

Field Sample #: Receiving water | Sampled: 8/1/2018 14:00

Sample ID: 18H0125-01

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexavalent Chromium	ND	0.0040		mg/L	1	H-03	SM21-22 3500 Cr B	8/2/18	8/2/18 19:38	LED

con-test® ANALYTICAL LABORATORY
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Project Location: Salem, MA | Sample Description: | Work Order: 18H0125

Date Received: 8/2/2018

Field Sample #: Receiving water | Sampled: 8/1/2018 14:00

Sample ID: 18H0125-01

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ammonia as N	0.073	0.075	0.024	mg/L	1		SM19-22 4500 NH3 C		8/7/18 20:44	AAL

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Salem, MA | Sample Description: | Work Order: 18H0125

Date Received: 8/2/2018

Field Sample #: Receiving water | Sampled: 8/1/2018 14:00

Sample ID: 18H0125-01

Sample Matrix: Surface Water

SM 2520

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Salinity	31.4	1.00	ppt (1000)	1		wc-Salinity-SM2520	8/7/18	8/7/18 17:29	ESA

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Sample Extraction Data

Prep Method: EPA 200.7-EPA 200.7

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0125-01 [Receiving water]	B209522	50.0	50.0	08/03/18

Prep Method: EPA 200.8-EPA 200.8

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0125-01 [Receiving water]	B209523	50.0	50.0	08/03/18

Prep Method: EPA 245.1-EPA 245.1

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0125-01 [Receiving water]	B209698	6.00	6.00	08/07/18

SM21-22 3500 Cr B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
18H0125-01 [Receiving water]	B209424	50.0	50.0	08/02/18

Prep Method: EPA 200.8-Tri Chrome Calc.

Lab Number [Field ID]	Batch	Initial [mL]	Date
18H0125-01 [Receiving water]	B209523	50.0	08/03/18

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209522 - EPA 200.7										
Blank (B209522-BLK1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Iron	ND	0.25	mg/L							
LCS (B209522-BS1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Iron	3.87	0.050	mg/L	4.00		96.7	85-115			
LCS Dup (B209522-BSD1)				Prepared: 08/03/18 Analyzed: 08/06/18						
Iron	3.88	0.050	mg/L	4.00		97.1	85-115	0.430	20	
Duplicate (B209522-DUP1)	**Source: 18H0125-01**			Prepared: 08/03/18 Analyzed: 08/07/18						
Iron	ND	0.25	mg/L		ND			NC	20	DL-03
Matrix Spike (B209522-MS1)	**Source: 18H0125-01**			Prepared: 08/03/18 Analyzed: 08/07/18						
Iron	4.22	0.25	mg/L	4.00	ND	106	70-130			DL-03
Batch B209523 - EPA 200.8										
Blank (B209523-BLK1)				Prepared: 08/03/18 Analyzed: 08/04/18						
Antimony	ND	1.0	µg/L							
Arsenic	ND	1.0	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	10	µg/L							
Copper	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Nickel	ND	5.0	µg/L							
Selenium	ND	5.0	µg/L							
Silver	ND	0.20	µg/L							
Zinc	ND	20	µg/L							
LCS (B209523-BS1)				Prepared: 08/03/18 Analyzed: 08/04/18						
Antimony	501	10	µg/L	500		100	85-115			
Arsenic	507	10	µg/L	500		101	85-115			
Cadmium	511	2.0	µg/L	500		102	85-115			
Chromium	514	100	µg/L	500		103	85-115			
Copper	993	10	µg/L	1000		99.3	85-115			
Lead	503	5.0	µg/L	500		101	85-115			
Nickel	510	50	µg/L	500		102	85-115			
Selenium	518	50	µg/L	500		104	85-115			
Silver	495	2.0	µg/L	500		99.1	85-115			
Zinc	1060	200	µg/L	1000		106	85-115			
LCS Dup (B209523-BSD1)				Prepared: 08/03/18 Analyzed: 08/04/18						
Antimony	532	10	µg/L	500		106	85-115	6.10	20	
Arsenic	533	10	µg/L	500		107	85-115	5.02	20	
Cadmium	536	2.0	µg/L	500		107	85-115	4.65	20	
Chromium	537	100	µg/L	500		107	85-115	4.43	20	
Copper	1050	10	µg/L	1000		105	85-115	5.26	20	
Lead	533	5.0	µg/L	500		107	85-115	5.80	20	
Nickel	531	50	µg/L	500		106	85-115	4.05	20	
Selenium	546	50	µg/L	500		109	85-115	5.29	20	
Silver	519	2.0	µg/L	500		104	85-115	4.71	20	
Zinc	1100	200	µg/L	1000		110	85-115	4.05	20	

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209523 - EPA 200.8										
Duplicate (B209523-DUP1)		**Source: 18H0125-01**		Prepared: 08/03/18 Analyzed: 08/06/18						
Antimony	ND	5.0	µg/L		ND			NC	20	
Arsenic	46.9	5.0	µg/L		45.1			3.85	20	
Cadmium	ND	1.0	µg/L		ND			NC	20	
Chromium	ND	50	µg/L		ND			NC	20	
Copper	107	10	µg/L		128			17.7	20	
Lead	ND	5.0	µg/L		ND			NC	20	
Nickel	ND	25	µg/L		ND			NC	20	
Selenium	149	25	µg/L		136			8.97	20	
Silver	ND	1.0	µg/L		ND			NC	20	
Zinc	ND	100	µg/L		ND			NC	20	
Matrix Spike (B209523-MS1)		**Source: 18H0125-01**		Prepared: 08/03/18 Analyzed: 08/04/18						
Antimony	530	10	µg/L	500	ND	106	70-130			
Arsenic	574	10	µg/L	500	45.1	106	70-130			
Cadmium	472	2.0	µg/L	500	ND	94.3	70-130			
Chromium	544	100	µg/L	500	ND	109	70-130			
Copper	1050	10	µg/L	1000	128	92.0	70-130			
Lead	570	5.0	µg/L	500	ND	114	70-130			
Nickel	503	50	µg/L	500	12.4	98.0	70-130			
Selenium	684	50	µg/L	500	136	109	70-130			
Silver	441	2.0	µg/L	500	ND	88.2	70-130			
Zinc	930	200	µg/L	1000	ND	93.0	70-130			
Batch B209698 - EPA 245.1										
Blank (B209698-BLK1)				Prepared & Analyzed: 08/07/18						
Mercury	ND	0.00010	mg/L							
LCS (B209698-BS1)				Prepared & Analyzed: 08/07/18						
Mercury	0.00184	0.00010	mg/L	0.00200		91.8	85-115			
LCS Dup (B209698-BSD1)				Prepared & Analyzed: 08/07/18						
Mercury	0.00195	0.00010	mg/L	0.00200		97.3	85-115	5.87	20	
Duplicate (B209698-DUP1)		**Source: 18H0125-01**		Prepared & Analyzed: 08/07/18						
Mercury	ND	0.00010	mg/L		ND			NC	30	
Matrix Spike (B209698-MS1)		**Source: 18H0125-01**		Prepared & Analyzed: 08/07/18						
Mercury	0.00173	0.00010	mg/L	0.00200	ND	86.7	75-125			

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B209424 - SM21-22 3500 Cr B										
Blank (B209424-BLK1)				Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	ND	0.0040	mg/L							
LCS (B209424-BS1)				Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	0.10	0.0040	mg/L	0.100		100	83.2-114			
LCS Dup (B209424-BSD1)				Prepared & Analyzed: 08/02/18						
Hexavalent Chromium	0.11	0.0040	mg/L	0.100		106	83.2-114	5.06	7.51	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
DL-03	Elevated reporting limit due to matrix.
DL-15	Sample required a dilution due to low internal standard recovery of the lesser diluted digestion, reporting limit is elevated.
H-03	Sample received after recommended holding time was exceeded.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.7 in Water	
Iron	CT,MA,NH,NY,RI,NC,ME,VA
EPA 200.8 in Water	
Antimony	CT,MA,NH,NY,RI,NC,ME,VA
Arsenic	CT,MA,NH,NY,RI,NC,ME,VA
Cadmium	CT,MA,NH,NY,RI,NC,ME,VA
Chromium	CT,MA,NH,NY,RI,NC,ME,VA
Copper	CT,MA,NH,NY,RI,NC,ME,VA
Lead	CT,MA,NH,NY,RI,NC,ME,VA
Nickel	CT,MA,NH,NY,RI,NC,ME,VA
Selenium	CT,MA,NH,NY,RI,NC,ME,VA
Silver	CT,MA,NH,NY,RI,NC,ME,VA
Zinc	CT,MA,NH,NY,RI,NC,ME,VA
EPA 245.1 in Water	
Mercury	CT,MA,NH,RI,NY,NC,ME,VA
SM19-22 4500 NH3 C in Water	
Ammonia as N	NY,MA,CT,RI,VA,NC,ME
SM21-22 3500 Cr B in Water	
Hexavalent Chromium	NY,CT,NH,RI,ME,VA,NC

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2005	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2019
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2019
NY	New York State Department of Health	10899 NELAP	04/1/2019
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2019
RI	Rhode Island Department of Health	LAO00112	12/30/2018
NC	North Carolina Div. of Water Quality	652	12/31/2018
NJ	New Jersey DEP	MA007 NELAP	06/30/2019
FL	Florida Department of Health	E871027 NELAP	06/30/2019
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2019
ME	State of Maine	2011028	06/9/2019
VA	Commonwealth of Virginia	460217	12/14/2018
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2018
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2019
NC-DW	North Carolina Department of Health	25703	07/31/2019

con-test ANALYTICAL LABORATORY
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com
39 Spruce Street
East Longmeadow, MA 01028

1840125

CHAIN OF CUSTODY RECORD

Page Page of 1 of 1

FKG

Company Name:	Lockwood Remediation Technologies, LLC
Address:	89 Crawford Street, Leominster, MA
Phone:	774-450-7177
Project Name:	Salem Power Plant
Project Location:	Salem, MA
Project Number:	2-1725
Project Manager:	John Henry
Con-Test Bid:	
Invoice Recipient:	
Sampled By:	

Requested Turnaround Time
7-Day ☐ 10-Day ☐
Other: 5 DAY

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☐
Other:
Enhanced Data Package Required: ☐
Email To: jhenry@lrt-llc.net
Fax To #:

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	[1]Matrix Code	Conc Code	Salinity	Total Recoverable Metals: Sb, As, Cd, Cr III, Cr VI, Cu, Fe, Pb, Hg, Ni, Se, Ag and Zn	Ammonia by SM4500B
								1	1	1
								I	N	S
								P	P	P
1	Receiving Water	8/1/18	2:00		X	O	M/L	X	X	X

ANALYSIS REQUESTED

# of Containers
[2] Preservation Code
[3] Container Code

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Comments:

pH: Temp:

Please use the following codes to indicate possible sample concentration within the **Conc Code** column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil/Solid
SL = Sludge
O = Other (please define) **O = Surface Water**

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

[3] **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Relinquished by: (signature)	Date/Time: 8/2/18
Received by: (signature)	Date/Time: 2:30
Relinquished by: (signature)	Date/Time: 15:30 8-2-18
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Detection Limit Requirements
MA
CT
Other: NPDES RGP Standards

Program Information
○ MCP Analytical Certification Form Required
○ RCP Analysis Certification Form Required
○ MA State DW Form Required
PWSID # _____

NELAC and AIHA-LAP, LLC Accredited

TURNAROUND TIME (BUSINESS DAYS) STARTS AT 9:00 AM THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON THIS CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME CANNOT START UNTIL ALL QUESTIONS HAVE BEEN ANSWERED.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT

Table of Contents

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client LOCKWOOD

Received By ESO Date 8-2-2 Time 15:30

How were the samples received? In Cooler T No Cooler ____ On Ice T(EN) No Ice T
Direct from Sampling ____ Ambient ____ Melted Ice ____

By Gun # 7 Actual Temp - 29.0

Were samples within Temperature? 2-6°C F By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? F

Did COC include all pertinent Information? Client T Analysis T Sampler Name F
Project T ID's T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ____

Are there Rushes? F Who was notified? ____

Are there Short Holds? T Who was notified? LUKE

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? P

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? F On COC? F

Do all samples have the proper pH? T Acid PH<2 Base ____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	3	4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

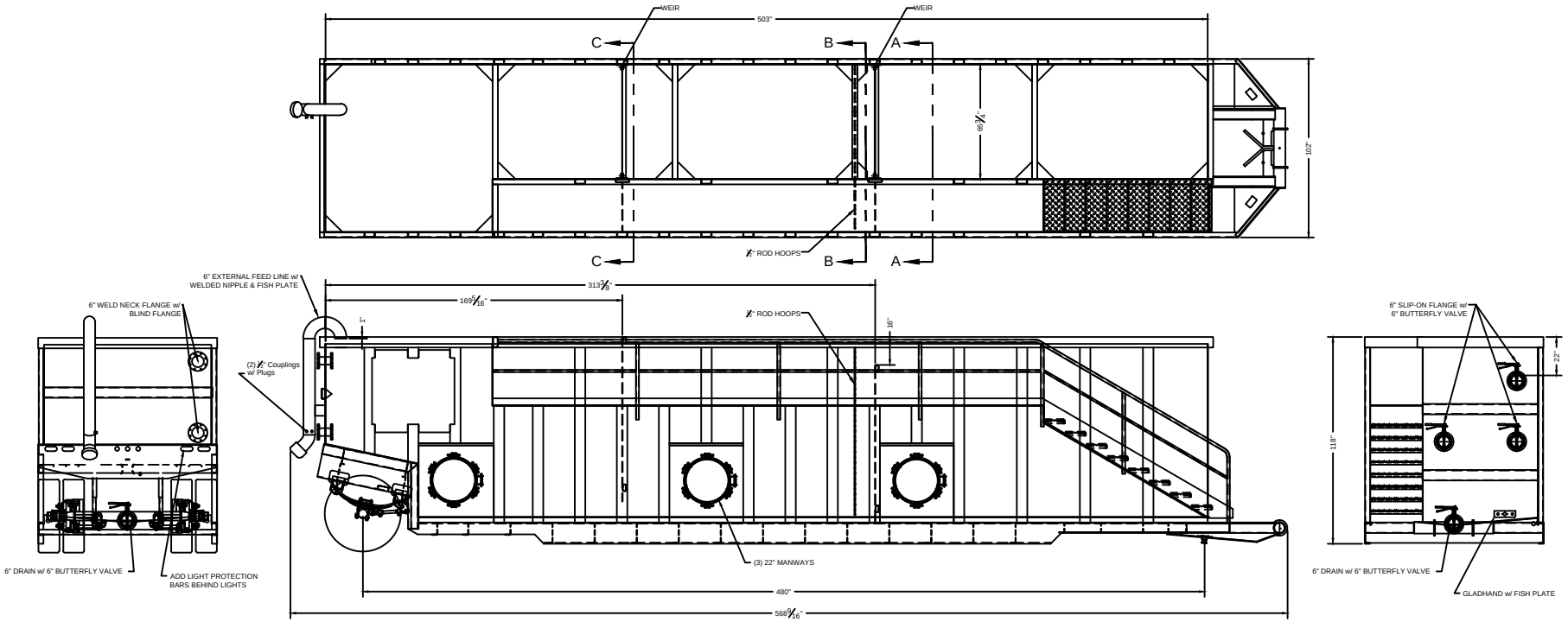
Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

- Not All Analysis Received within Hold time.
- Cooler Looks Like there was ice in but melted After a While.

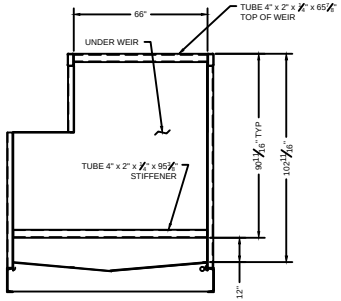
Appendix C

Water Treatment System

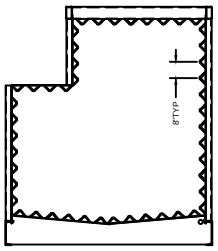


STANDARD SPECIFICATION

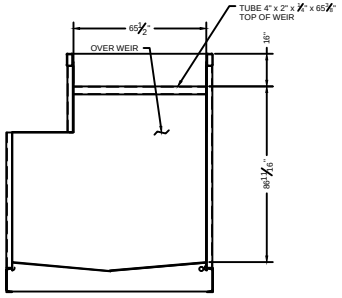
CAPACITY: .... 18,480 GALLONS (440 BBL)
SIDE SHEETS: .... 1/4" A36 PLATE
FRONT SHEET: .... 1/4" A36 PLATE
REAR SHEET: .... 1/4" A36 PLATE
FLOOR: .... 1/4" A36 PLATE
MAIN FLOOR RAILS: .... 12" x 20.7# STRUCTURAL CHANNEL
FLOOR CROSSMEMBERS: .... 1/4" A36 PLATE
SIDE STAKES: .... ONE PIECE 3/16" A36 PLATE
SUSPENSION: .... 3 LEAF SPRING, 22,500 LBS. CACPACITY
AXLE: .... 77.5" TRACK, 22,500 LBS. CAPACITY
TIRES: .... 11R22.5 RADIAL
WHEELS: .... 8.25 x 22.5 STEEL
MANWAYS: .... 3 - 22" DIA. CURB SIDE
VALVES: .... 3 - 6" BUTTERFLY VALVE (FRONT)
1 - 6" DRAIN BUTTERFLY VALVE (FRONT)
1 - 6" DRAIN BUTTERFLY VALVE (REAR)
2 - 6" BLIND FLANGE CONNECTION (REAR)
INLET PIPING: .... 1 - 6" PIPE SYSTEM (REAR)
BLAST: .... (INTERIOR) SSPC-SP-10 (NEAR WHITE)
(EXTERIOR) SSPC-SP-6 (COMMERCIAL BLAST)
PAINT: .... (INTERIOR) EPOXYPHENOLIC 100% SOLID 20.0 MILS D.F.T.
(EXTERIOR) FINISH COAT POLURETHANE 4.0 TO 5.0 D.F.T.



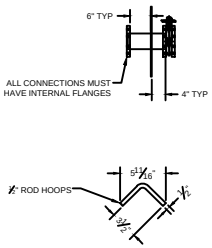
SECTION VIEW "C-C"



SECTION VIEW "B-B"



SECTION VIEW "A-A"



18,000 Gal. Weir Tank

Lockwood Remediation Technologies, LLC

89 Crawford Street
Leominster, Massachusetts 01453
O: 774-450-7177
F: 888-835-0617

The Pulsatron Series HV designed for high viscosity applications for precise and accurate metering control. The Series HV offers manual control over stroke length and stroke rate as standard with the option to choose between 4-20mA and external pace inputs for automatic control.

Five distinct models are available, having pressure capabilities to 150 PSIG (10 BAR) @ 12 GPD (1.9 lph), and flow capacities to 240 GPD (37.9 lph) @ 80 PSIG (5.6 BAR), with a turndown ratio of 100:1. Metering performance is reproducible to within ± 2% of maximum capacity.

Features

- Automatic Control, available with 4-20mADC direct or external pacing, with stop function.
- Manual Control by on-line adjustable stroke rate and stroke length.
- Auto-Off-Manual switch.
- Highly Reliable timing circuit.
- Circuit Protection against voltage and current upsets.
- Panel Mounted Fuse.
- Solenoid Protection by thermal overload with auto-reset.
- Water Resistant, for outdoor and indoor applications.
- Indicator Lights, panel mounted.
- Guided Ball Check Valve Systems, to reduce back flow and enhance outstanding priming characteristics.
- Viscosities to 20,000 CPS.

Controls

Manual Stroke Rate

- Turn-Down Ratio 10:1

Manual Stroke Length

- Turn-Down Ratio 10:1

4-20mA or 20-4mA Input

- Automatic Control

Operating Benefits

- Reliable metering performance.
- Rated "hot" for continuous duty.
- High viscosity capability.
- Leak-free, sealless, liquid end.

Aftermarket

- KOPkits
- Gauges
- Dampeners
- Pressure Relief Valves
- Tanks
- Pre-Engineered Systems
- Process Controllers (PULSAblue, MicroVision)

Series HV

Specifications and Model Selection

MODEL		LVB3	LVF4	LVG4	LVG5	LVH7
Capacity	GPH	0.50	1.00	2.00	4.00	10.00
nominal	GPD	12	24	48	96	240
(max.)	LPH	1.9	3.8	7.6	15.1	37.9
Pressure	PSIG	150	150	110	110	80
(max.)	BAR	10	10	7	7	5.6
Connections:	Tubing	(S) .50" I.D. X .75" O.D. .38" I.D. X .50" OD (LVB3 & F4 only) (S & D) .50" I.D. X .75" O.D. (LVG4,G5 & H7 only)				

Engineering Data

Pump Head Materials Available: GFPPL, PVC, PVDF, 316 SS

Diaphragm: PTFE-faced CSPE-backed

Check Valves Materials Available:

Seats/O-Rings: PTFE, CSPE, Viton

Balls: Ceramic, PTFE, 316 SS, Alloy C

Fittings Materials Available: GFPPL, PVC, PVDF

Bleed Valve: Same as fitting and check valve selected, except 316SS

Injection Valve & Foot Valve Assy: Same as fitting and check valve selected

Tubing: Clear PVC, White PE

Important: Material Code - GFPPL=Glass-filled Polypropylene, PVC=Polyvinyl Chloride, PE=Polyethylene, PVDF=Polyvinylidene Fluoride, CSPE=Generic formulation of Hypalon, a registered trademark of E.I. DuPont Company. Viton is a registered trademark of E.I. DuPont Company. PVC wetted end recommended for sodium hypochlorite.

Engineering Data

Reproducibility: +/- 2% at maximum capacity

Viscosity Max CPS: 20,000 CPS

Stroke Frequency Max SPM: 125

Stroke Frequency Turn-Down Ratio: 10:1

Stroke Length Turn-Down Ratio: 10:1

Power Input: 115 VAC/50-60 HZ/1 ph, 230 VAC/50-60 HZ/1 ph

Average Current Draw:

@ 115 VAC; Amps: 1.0 Amps

@ 230 VAC; Amps: 0.5 Amps @ 230 VAC

Peak Input Power: 300 Watts

Average Input Power @ Max SPM: 130 Watts

Custom Engineered Designs – Pre-Engineered Systems

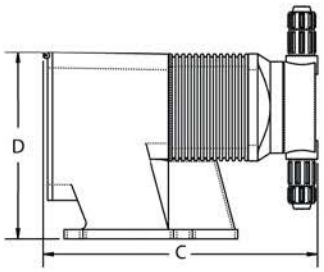
Pre-Engineered Systems

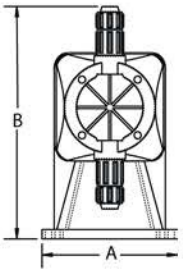
Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key simplicity and industrial-grade durability. The UV-stabilized, high-grade HDPE frame offers maximum chemical compatibility and structural rigidity. Each system is factory assembled and hydrostatically tested prior to shipment.

Dimensions

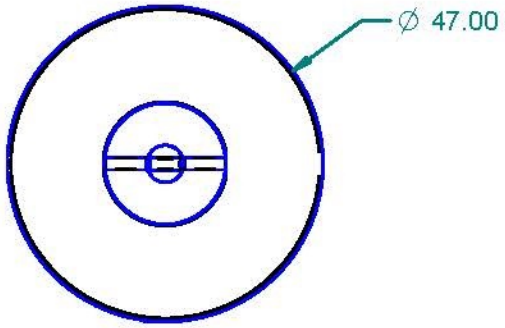
Series HV Dimensions (inches)					
Model No.	A	B	C	D	Shipping Weight
LVB3	5.4	9.3	9.5	7.5	13
LVF4	5.4	10.8	10.8	7.5	18
LVG4	5.4	9.5	10.6	7.5	18
LVG5	5.4	10.8	10.8	7.5	18
LVH7	6.1	11.5	11	8.2	25

NOTE: Inches X 2.54 = cm

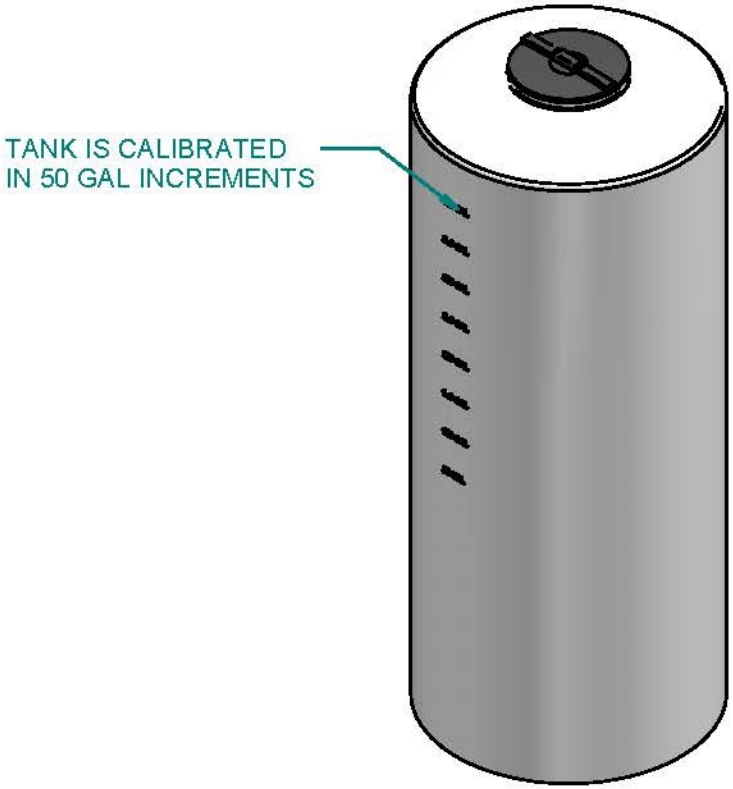




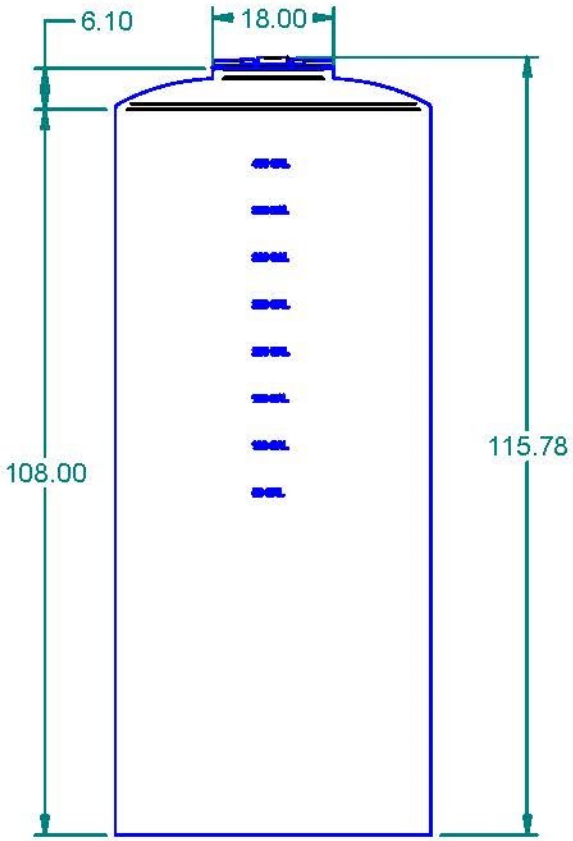
REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED



Top View



ISO View



Side View

wall thickness: 0.350"

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR		
MGR APPR		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
ANGLES ±0.5°
2 PL ±0.125" 3 PL ±0.060"

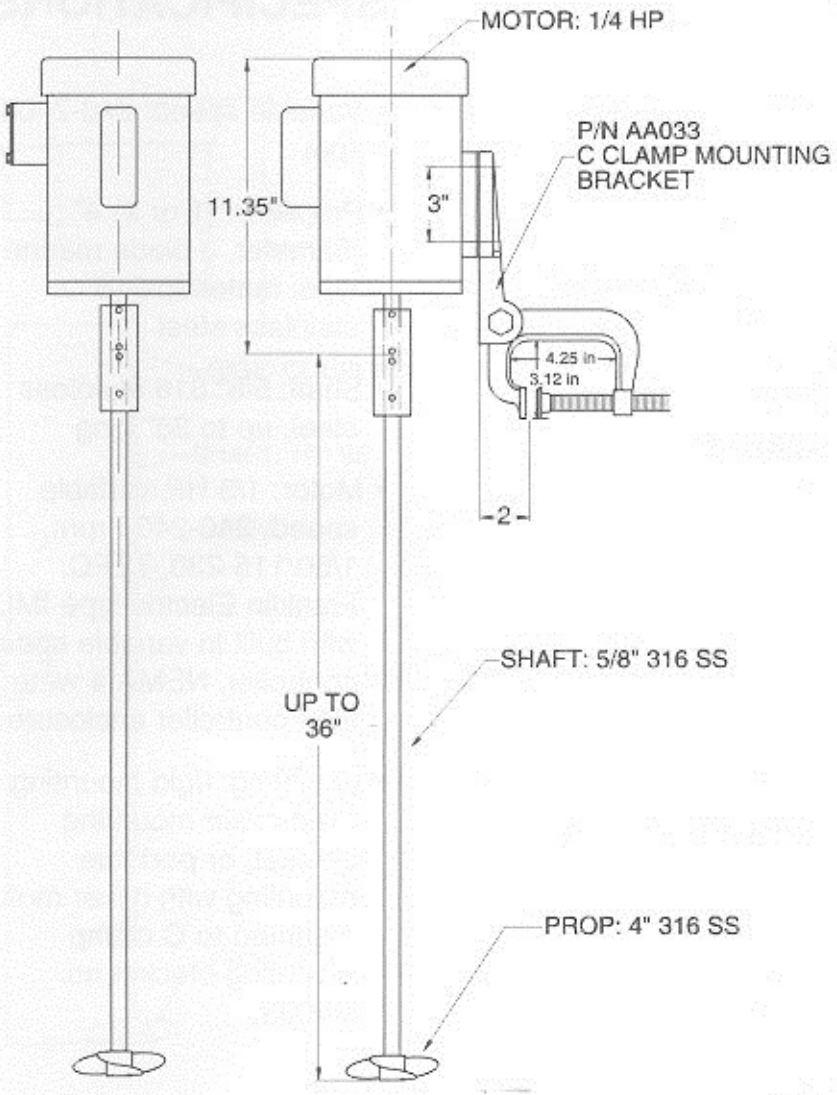
TITLE V-800 Gallon Tank

SIZE	MATERIAL: Error: No reference	REV
A		

FILE NAME: V-800 Vertical.dft

PART#: 900800	WEIGHT: Error: No reference	SHEET 1 OF 1

MIXER MODEL NO. AA102A



AA102A

SPECIFICATIONS

- Speed: 1,725 rpm
- Propeller: (1 or 2) 4" diameter, 3 blade marine type, material: 316 stainless steel
- Shaft: 5/8" 316 stainless steel, up to 36" long
- Motor: 1/4 HP, 1,725 rpm, 1/60/115-230, capacitor start, or 3/60/230-460, TEFC
- Mounting: rigid mounting to fixed mixer mounting bracket, or portable mounting with mixer motor mounted to C clamp mounting bracket no. AA033.

PRODUCT DATA

LRT 823

ANIONIC FLOCCULANT

APPLICATION:

LRT 810 is a high molecular weight, polyacrylamide-based flocculant that exhibits a medium degree of anionic charge. LRT 810, once hydrated in water, reacts readily to provide superior floc formation and performance in a variety of solids/liquid separation processes. The product is supplied in a free-flowing granular form. LRT 810 has been designed as a flocculant for a variety of municipal and industrial waste substrates. It has been proven especially effective for conditioning these substrates for solids sedimentation, thickening, and dewatering processes. LRT 810 offers greatly improved solids/liquid separation efficiencies over a wide range of pH.

PRODUCT DESCRIPTION:

Appearance:	Off-white, free-flowing granules
Bulk density:	45 lbs./ft^3
Solution pH:	6 – 8
Particle Size:	10% > 780µm, 50% > 570µm, and 90% > 240 µm

PRODUCT DOSAGE:

As product feed rates are highly dependent upon makeup water characteristics and system operating conditions, your sales representative should be consulted for specific dosage recommendations. Typically, however, LRT 810 is diluted to the following stock and feed solutions:

Stock Solution:	0.25% - 0.5%	2 – 5 days storage
Feed Solution:	0.01% - 0.2%	1 – 3 days storage

Storage of the product and solutions for longer periods may be acceptable under correct conditions, but may result in some loss of product efficiency. Product and solutions should be stored in a cool and dry place, and conditions of high temperature and humidity should be avoided.

PRODUCT SAFETY:

As with any industrial chemical, LRT 810 should be handled with appropriate care. Therefore, please have all supervisory personnel and operating employees review the Material Safety Data Sheet (MSDS) to obtain recommended application, storage and disposal procedures before using the product in your facility.

PRODUCT PACKAGING:

LRT 810 is packaged in 55 pound bags or 36 bags to a crate (1,980 lbs total).

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, Massachusetts 01453
Phone: 774-450-7177
Fax: 885-835-0617

SAFETY DATA SHEET

Revision date 2015-03-12 **Revision number** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name Redux E50

Other means of identification

Product code
Synonyms Water And Wastewater Treatment Coagulant/Flocculant

Recommended use of the chemical and restrictions on use

Recommended use [RU] No information available
Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, Massachusetts 01453
Tel: (774) 450-7177
Hours: Monday-Friday 9:00-5:00 EST

Emergency telephone number

24 Hour Emergency Phone Number CHEMTREC: (800) 424-9300
Outside USA - +1 (703) 527-3887 collect calls accepted

Contact Point info@reduxtech.com

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Corrosive to metals	Category 1

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Physical state	Color	Appearance	Odor
liquid	colorless to yellow	clear	no appreciable odor

WARNING

Hazard statements
Causes skin irritation
Causes serious eye irritation
May be corrosive to metals

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original container

Precautionary Statements - Response
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Absorb spillage to prevent material damage

Precautionary Statements - Storage
Store in corrosive resistant container with a resistant inner liner

Other information
• May be harmful in contact with skin

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	weight-%	TRADE SECRET
Trade Secret Ingredient	PROPRIETARY	45 - 55%	*

*The exact percentage (concentration) of composition has been withheld as a trade secret

4. FIRST AID MEASURES

First Aid Measures

Eye contact
Immediately flush with plenty of water for at least 20 minutes, holding eyelids apart to ensure flushing of the entire surface. Washing within one minute is essential to achieve maximum effectiveness. Seek immediate medical attention.

Skin contact
Immediately wash thoroughly with soap and water, remove contaminated clothing and footwear. Wash clothing before reuse. Get medical attention if irritation should develop.

Ingestion
Seek medical attention immediately. Give large amounts of water to drink. If vomiting should occur spontaneously, keep airway clear. Never give anything by mouth to an unconscious person.

Inhalation
Remove to fresh air.

Most important symptoms and effects, both acute and delayed

Acute effects
Possible eye, skin and respiratory tract irritation.

Chronic effects
May aggravate existing skin, eye, and lung conditions. Persons with kidney disorders have an increased risk from exposure based on general information found on aluminum salts.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Aluminum soluble salts may cause gastroenteritis if ingested. Treatment includes the use of demulcents. Note: Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media
Water Spray, Carbon Dioxide, Foam, Dry Chemical.

Extinguishing media which must not be used for safety reasons
No information available

Special hazards arising from the substance or mixture

Special Hazard
May produce hazardous fumes or hazardous decomposition products.

Advice for firefighters

Firefighting measures
Product is a water solution and nonflammable. In a fire, this product may build up pressure and rupture a sealed container; cool exposed containers with water spray. Use self-contained breathing apparatus in confined areas; avoid breathing mist or spray.

Special protective equipment for firefighters
Not determined

Explosion data

Sensitivity to Mechanical Impact
None.

Sensitivity to Static Discharge
None.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions
Wear suitable protective clothing and gloves.

Environmental precautions

Environmental precautions
Do not permit run-off to get into sewers or surface waterways.

Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so. Dike to collect large liquid spills.

Methods for cleaning up
Clear spills immediately. Contain large spill and remove using a vacuum truck. Soak up small spills with inert absorbent material and place in a labeled waste container for disposal. Ventilate area of leak or spill. Spills of solution are extremely slippery so all residue must be removed promptly.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling
Keep container closed when not in use
Keep away from heat and open flame.
Avoid contact with eyes, skin and clothing
Wash thoroughly after handling
Wear chemical splash goggles, gloves, and protective clothing when handling.
Avoid breathing vapor or mist
Use with adequate ventilation and employ respiratory protection where mist or spray may be generated.
FOR INDUSTRIAL USE ONLY.

Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Do not store in unlined metal containers.
Product may slowly corrode iron, brass, copper, aluminum, mild steel, and stainless steel.
Store in a cool, dry place away from direct heat.
Keep in tightly closed container.

Incompatible products
Oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering controls
Local exhaust ventilation as necessary to maintain exposures to within applicable limits. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details. If there are no applicable or established exposure limit requirements or guidelines, general ventilation should be sufficient.

Individual protection measures, such as personal protective equipment

Eye/face Protection
Wear chemical splash goggles and face shield (when eye and face contact is possible due to splashing or spraying of material).

Hand Protection
Appropriate chemical resistant gloves should be worn.

Skin and body protection
Standard work clothing and work shoes.

Respiratory protection
If exposures exceed the PEL or TLV, use NIOSH/MSHA approved respirator in accordance with OSHA Respiratory Protection Requirements under 29 CFR 1910.134.

Other personal protection data
Eyewash fountains and safety showers must be easily accessible.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	liquid
Color	colorless to yellow
Appearance	clear
Odor	no appreciable odor
Odor threshold	No information available

Property	Values	Remarks / Method
pH	3.5	as is
Melting / freezing point	-7 °C / 19 °F	No information available
Boiling point / boiling range	No information available	No information available
Flash point	Not applicable	No information available
Evaporation rate	No information available	No information available

Flammability (solid, gas)	Not applicable	No information available
Flammability Limit in Air		
Upper flammability limit	Not applicable	No information available
Lower flammability limit	Not applicable	No information available
Vapor pressure	No information available	No information available
Vapor density	No information available	No information available
Specific gravity	1.33 - 1.35	No information available
Solubility (water)	Soluble	No information available
Solubility in other solvents	No information available	No information available
Partition coefficient: n-octanol/water	No information available	No information available
Autoignition temperature	Not applicable	No information available
Decomposition temperature	No information available	No information available
Kinematic viscosity	No information available	No information available
Dynamic viscosity	< 100 cps @ 20 °C	No information available

Other information

Density	11.0 - 11.3 lb/gal
Bulk Density	No information available
Explosive properties	No information available.
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
Volatile organic compounds (VOCs) content	No information available
Percent Volatile, wt.%	40 - 50%

10. STABILITY AND REACTIVITY

Reactivity

Reactivity
No data available.

Chemical stability

Chemical stability
Stable.

Possibility of hazardous reactions

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
No.

Conditions to avoid

Conditions to avoid
None

Incompatible materials

Materials to avoid
Oxidizing agents.

Hazardous decomposition products

Hazardous decomposition products
Thermal decomposition may release toxic and/or hazardous gases such as Cl_2 and HCl.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Eye contact
May cause moderate eye irritation that can become severe with prolonged contact. Prolonged exposure to Aluminum salts may cause conjunctivitis.

Skin contact
May be harmful in contact with skin. Prolonged and/or repeated contact may cause skin irritation.

Ingestion
May cause irritation of the mouth, throat and stomach. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Inhalation
Inhalation of mist or vapor may cause respiratory tract irritation.

Acute toxicity - Product Information

Oral LD50	No information available
Dermal LD50	No information available
Inhalation LC50	No information available

Acute toxicity - Component Information

Component	weight-%	Oral LD50	Dermal LD50	Inhalation LC50
Trade Secret Ingredient	45 - 55%	= 9187 mg/kg (Rat)	> 2000 mg/kg (Rat)	--

Information on toxicological effects

Symptoms
No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation
Irritating to skin

Serious eye damage/eye irritation
Causes serious eye irritation

Sensitization
No information available

Germ cell mutagenicity
No information available

Carcinogenicity
This product does not contain any components in concentrations greater than or equal to 0.1% that are listed as known or suspected carcinogens by NTP, IARC, ACGIH, or OSHA.

Reproductive toxicity
No information available

Specific target organ toxicity - Single exposure
No information available.

Specific target organ toxicity - Repeated exposure
No information available

Aspiration hazard
No information available.

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	18374 mg/kg
ATEmix (dermal)	4004 mg/kg

Other information
Conclusions are drawn from sources other than direct testing.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Acute aquatic toxicity - Product Information

Fish	LC 50 (96 hour, static) 776.4 mg/L *Pimephales promelas* (Fathead Minnow) [1] EC 50 (96 hour, static) 265.5 mg/L *Pimephales promelas* (Fathead Minnow) [1]
Crustacea	LC 50 (48 hour, static) 803.8 mg/L *Ceriodaphnia dubia* (Water Flea) [1] EC 50 (48 hour, static) 33.2 mg/L *Ceriodaphnia dubia* (Water Flea) [1]
Algae/aquatic plants	No information available

Acute aquatic toxicity - Component Information

Component	weight-%	Algae/aquatic plants	Fish	Toxicity to daphnia and other aquatic invertebrates
Trade Secret Ingredient	45 - 55%	--	LC50 (96 h static) 100 - 500 mg/L (Brachydanio rerio)	--

Persistence and degradability

Persistence and degradability
No information available

Bioaccumulative potential

Bioaccumulative potential
No information available.

Mobility

Mobility
No information available

Results of PBT and vPvB assessment

PBT and vPvB assessment
No information available

Other adverse effects

Other information
[1] Generated from tests conducted by ECT-Superior Laboratories May 2010

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
Do NOT mix with other chemical wastes. Do not put solutions containing this product into sewer systems. Dispose of product in an approved chemical waste landfill or incinerate in accordance with applicable Federal, state and local regulations. Do not re-use empty containers.

Contaminated packaging
Since empty containers retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

DOT

NOT REGULATED FOR TRANSPORTATION
This product is excepted from DOT regulations under 49 CFR 173.154(d) when shipped by road or railway. The product exception is referenced in 49 CFR 172.101 Table. Packaging material must not be aluminum, steel or be degraded by this product

ICAO/IATA

Regulated

UN number	UN3264
Proper shipping name	Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class	8
Packing group	III
ERG Code	8L

IMDG

Regulated

UN number	UN3264
Proper shipping name	Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class	8
Packing group	III
EmS	F-A, S-B

Harmonized Tariff Number 2827.32

15. REGULATORY INFORMATION

International Inventories

TSCA (United States)
All ingredients are on the inventory or exempt from listing

Australia (AICS)
All ingredients are on the inventory or exempt from listing

Canada (DSL)
All ingredients are on the inventory or exempt from listing

Canada (NDSL)
None of the ingredients are on the inventory.

China (IECSC)
All ingredients are on the inventory or exempt from listing

EINECS (European Inventory of Existing Chemical Substances)
All ingredients are on the inventory or exempt from listing

ELINCS (European List of Notified Chemical Substances)
None of the ingredients are on the inventory.

ENCS (Japan)
All ingredients are on the inventory or exempt from listing

South Korea (KECL)
All ingredients are on the inventory or exempt from listing

Philippines (PICCS)
All ingredients are on the inventory or exempt from listing

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
AICS - Australian Inventory of Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
IECSC - China Inventory of Existing Chemical Substances
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

U.S. Federal Regulations

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic health hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive hazard	No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated under applicable state right-to-know regulations

16. OTHER INFORMATION

NFPA Rating	Health - 1	Flammability - 0	Instability - 0	Special Hazard -
HMIS Rating	Health - 1	Flammability - 0	Physical hazard - 0	Personal protection - B

Product code

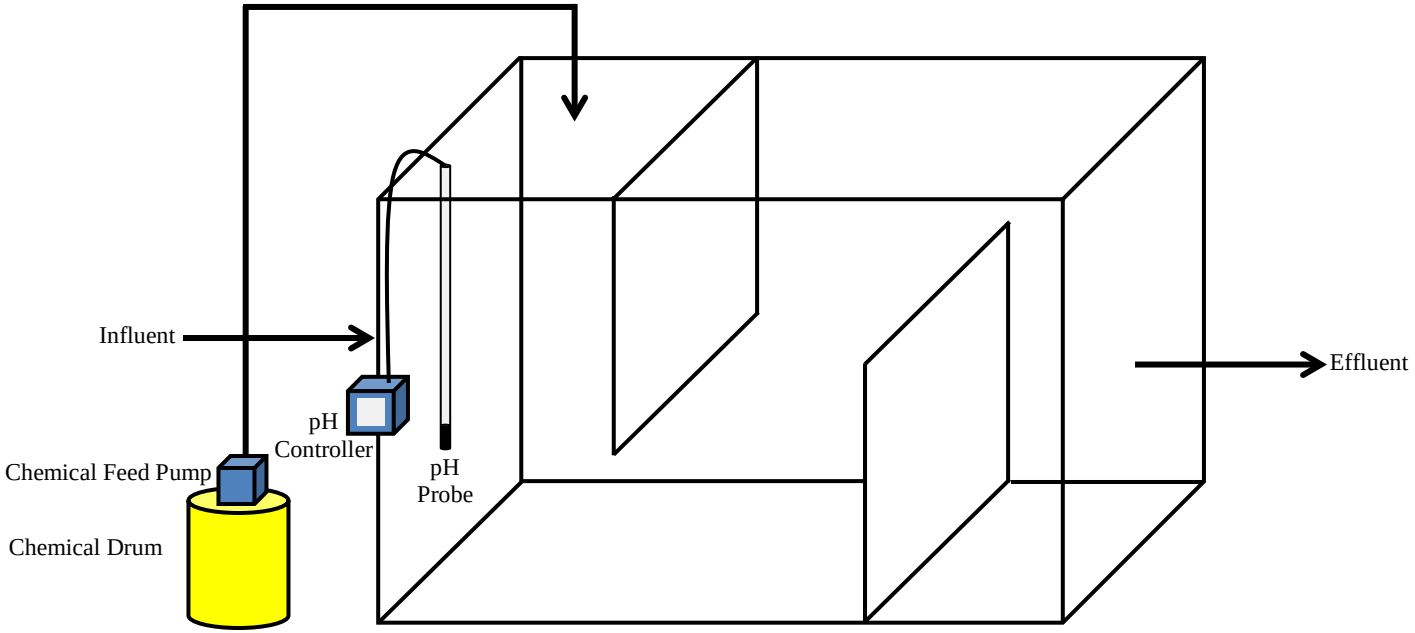
Revision date 2015-03-12

Revision number 1

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet



Notes:

1.) Figure is not to scale.
2.) System layout can vary with site conditions.

89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

Configuration of pH Adjustment System

One Controller for the Broadest Range of Sensors.

Choose from 30 digital and analog sensor families for up to 17 di:erent parameters.

Maximum Versatility

The sc200 controller allows the use of digital and analog sensors, either alone or in combination, to provide compatibility with Hach's broad range of sensors, eliminating the need for dedicated, parameter-specific controllers.

Ease of Use and Confidence in Results

Large, high-resolution, transreflective display provides optimal viewing resolution in any lighting condition. Guided calibration procedures in 19 languages minimize complexity and reduce operator error. Password-protected SD card reader o:ers a simple solution for data download and transfer. Visual warning system provides critical alerts.

Wide Variety of Communication Options

Utilize two to five analog outputs to transmit primary and secondary values for each sensor, or integrate Hach sensors and analyzers into MODBUS RS232/RS485, Profibus® DP, and HART networks.

Password protected SD card reader offers a simple solution for data download and transfer, and sc200 and digital sensor configuration file duplication and backup.

Controller Comparison

Features	Previous Models sc100™ Controller	Previous Models GLI53 Controller	sc200™ Controller	Benefits
Display	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	160 x 240 pixels 48 x 68 mm (1.89 x 2.67 in.) Transreflective	• Improved user interface—50% bigger • Easier to read in daylight and sunlight
Data Management	irDA Port/PDA Service Cable	N/A	SD Card Service Cable	• Simplifies data transfer • Standardized accessories/max compatibility
Sensor Inputs	2 Max Direct Digital Analog via External Gateway	2 Max Analog Depending on Parameter	2 Max Digital and/or Analog with Sensor Card	• Simplifies analog sensor connections • Works with analog and digital sensors
Analog Inputs	N/A	N/A	1 Analog Input Signal Analog 4-20mA Card	• Enables non-sc analyzer monitoring • Accepts mA signals from other analyzers for local display • Consolidates analog mA signals to a digital output
4-20 mA Outputs	2 Standard	2 Standard	2 Standard Optional 3 Additional	• Total of five (5) 4-20 mA outputs allows multiple mA outputs per sensor input
Digital Communication	MODBUS RS232/RS485 Profibus DP V1.0	HART	MODBUS RS232/RS485 Profibus DP V1.0 HART 7.2	• Unprecedented combination of sensor breadth and digital communication options

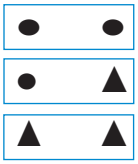
Choose from Hach's Broad Range of Digital and Analog Sensors

Parameter	Sensor	Digital or Analog
Ammonia	AMTAX™ sc, NH4D sc, AISE sc, AN-ISE sc	●
Chlorine	CLF10 sc, CLT10 sc, 9184 sc	●
Chlorine Dioxide	9185 sc	●
Conductivity	GLI 3400 Contacting, GLI 3700 Inductive	▲
Dissolved Oxygen	LDO® Model 2, 5740 sc	●
Dissolved Oxygen	5500	▲
Flow	U53, F53 Sensors	▲
Nitrate	NITRATAX™ sc, NO3D sc, NISE sc, AN-ISE sc	●
Oil in Water	FP360 sc	●
Organics	UVAS sc	●
Ozone	9187 sc	●
pH/ORP	pHD	●
pH/ORP	pHD, pH Combination, LCP	▲
Phosphate	PHOSPHAX™ sc	●
Sludge Level	SONATAX™ sc	●
Suspended Solids	SOLITAX™ sc, TSS sc	●
Turbidity	1720E, FT660 sc, SS7 sc, ULTRATURB sc, SOLITAX sc, TSS sc	●
Ultra Pure Conductivity	8310, 8311, 8312, 8315, 8316, 8317 Contacting	▲
Ultra Pure pH/ORP	8362	▲

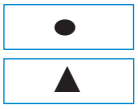
● = Digital ▲ = Analog

Connect up to two of any of the sensors listed above, in any combination, to meet your application needs. The diagrams below demonstrate the potential configurations. Operation of analog sensors requires the controller to be equipped with the appropriate sensor module. Contact Hach Technical Support for help with selecting the appropriate module.

2 Channel Configurations



1 Channel Configurations



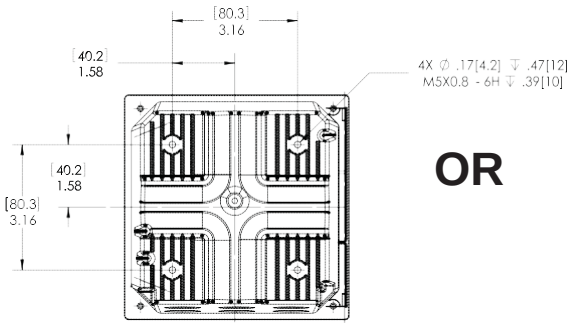
Specifications*

Dimensions (H x W x D)	5.7 in x 5.7 in x 7.1 in (144 mm x 144 mm x 181 mm)
Display	Graphic dot matrix LCD with LED backlighting, transreflective
Display Size	1.9 x 2.7 in. (48 mm x 68 mm)
Display Resolution	240 x 160 pixels
Weight	3.75 lbs. (1.70 kg)
Power Requirements (Voltage)	100 - 240 V AC, 24 V DC
Power Requirements (Hz)	50/60 Hz
Operating Temperature Range	-20 to 60 °C , 0 to 95% RH non-condensing
Analog Outputs	Two (Five with optional expansion module) to isolated current outputs, max 550 Ω , Accuracy: ± 0.1% of FS (20mA) at 25 °C, ± 0.5% of FS over -20 °C to 60 °C range Operational Mode: measurement or calculated value
Analog Output Functional Mode	Linear, Logarithmic, Bi-linear, PID
Security Levels	2 password-protected levels
Mounting Configurations	Wall, pole, and panel mounting
Enclosure Rating	NEMA 4X/IP66
Conduit Openings	1/2 in NPT Conduit
Relay: Operational Mode	Primary or secondary measurement, calculated value (dual channel only) or timer
Relay Functions	Scheduler (Timer), Alarm, Feeder Control, Event Control, Pulse Width Modulation, Frequency Control, and Warning
Relays	Four electromechanical SPDT (Form C) contacts, 1200 W, 5 A
Communication	MODBUS RS232/RS485, PROFIBUS DPV1, or HART 7.2 optional
Memory Backup	Flash memory
Electrical Certifications	EMC CE compliant for conducted and radiated emissions: - CISPR 11 (Class A limits) - EMC Immunity EN 61326-1 (Industrial limits) Safety cETLus safety mark for: - General Locations per ANSI/UL 61010-1 & CAN/CSA C22.2. No. 61010-1 - Hazardous Location Class I, Division 2, Groups A,B,C & D (Zone 2, Group IIC) per FM 3600 / FM 3611 & CSA C22.2 No. 213 M1987 with approved options and appropriately rated Class I, Division 2 or Zone 2 sensors cULus safety mark - General Locations per UL 61010-1 & CAN/CSA C22.2. No. 61010-1

**Subject to change without notice.*

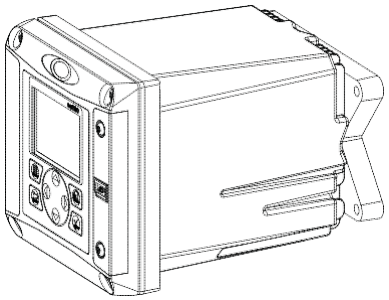
Dimensions

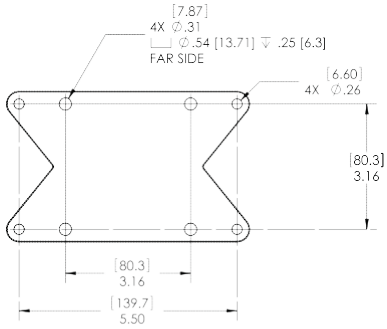
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

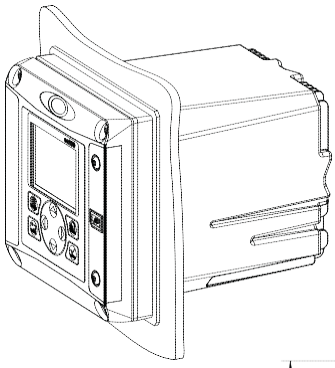
OR

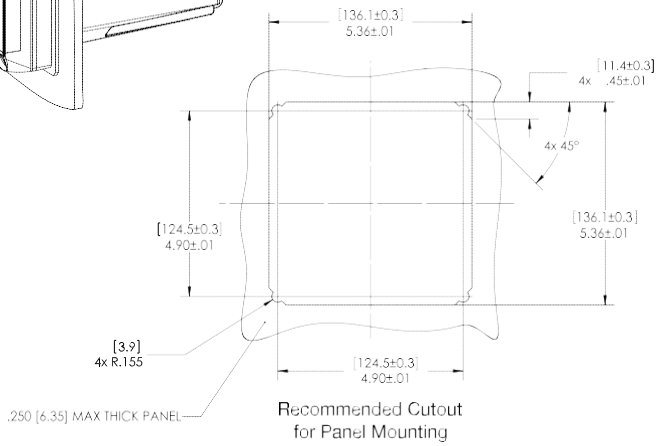




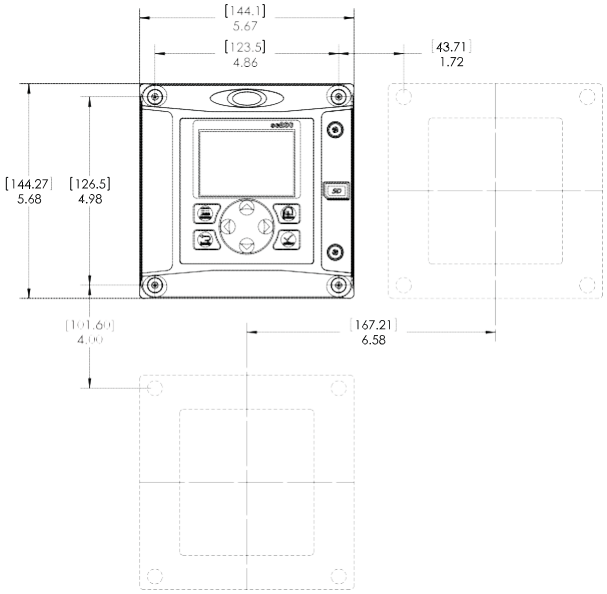
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



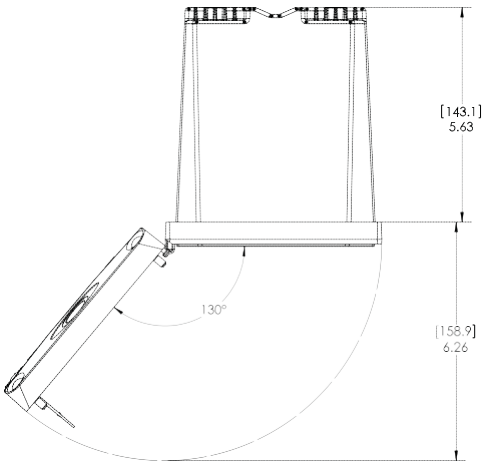


Recommended Cutout
for Panel Mounting

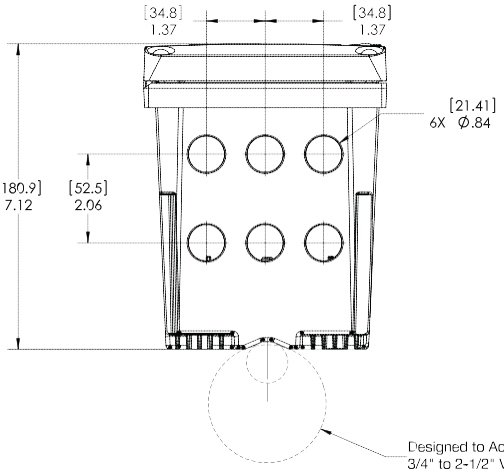


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views



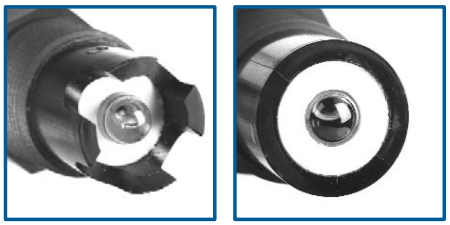
Door Opening Details



Designed to Accommodate
3/4" to 2-1/2" Vertical / Horizontal Pipe

3/4-inch Combination pH and ORP Sensor Kits

Use the Digital Gateway to make any Hach analog combination pH or ORP sensor compatible with the Hach sc1000 Controller.



Digital combination pH and ORP sensors are available in convertible, insertion, and sanitary mounting styles. Choose from rugged dome electrodes or "easy-to-clean" flat glass electrodes.

Features and Benefits

Low Price—High Performance

These combination sensors are designed for specialty applications for immersion or in-line mounting. The reference cell features a double-junction design for extended service life, and a built-in solution ground. The body is molded from chemically-resistant Ryton® or PVDF, and the reference junction is coaxial porous Teflon®. All sensors are rated 0 to 105ºC up to 100 psig, and have integral 4.5 m (15 ft.) cables with tinned leads. The PC-series (for pH) and RC-series (for ORP) combination sensors are ideal for measuring mild and aggressive media.

Special Electrode Configurations

Sensors with rugged dome electrodes, "easy-to-clean" flat glass electrodes, and even HF (hydrofluoric acid) resistant glass electrodes are available for a wide variety of process solutions.

Temperature Compensation Element Option

The PC-series combination pH sensors are available with or without a Pt 1000 ohm RTD temperature element. The RC-series combination ORP sensors are supplied without a temperature element.

Versatile Mounting Styles

Sensors are available in three mounting styles—convertible, insertion, and sanitary. Please turn to page 3 for more information.

Full-Featured "Plug and Play" Hach sc Digital Controllers

There are no complicated wiring or set up procedures with any Hach sc controller. Just plug in any combination of Hach digital sensors and it's ready to use—it's "plug and play."

One or multiple sensors—The sc controller family allows you to receive data from up to eight Hach digital sensors in any combination using a single controller.

Communications—Multiple alarm/control schemes are available using the relays and PID control outputs. Available communications include analog 4-20 mA, digital MODBUS® (RS485 and RS232) or Profibus DP protocols. (Other digital protocols are available. Contact your Hach representative for details.)

Data logger—A built-in data logger collects measurement data, calibration, verification points, and alarm history.

Specifications*

Most pH applications fall in the 2.5-12.5 pH range. General purpose pH glass electrodes perform well in this range. Some industrial applications require accurate measurements and control at pH values below 2 or above 12. Consult Hach Technical Support for details on these applications.

Combination pH Sensors

Measuring Range
0 to 14 pH

Accuracy
Less than 0.1 pH under reference conditions

Temperature Range
0 to 105ºC (32 to 221ºF)

Flow Rate
0 to 2 m/s (0 to 6.6 ft./s); non-abrasive

Pressure Range
0 to 6.9 bar at 100ºC (0 to 100 psig at 212ºF)

Signal Transmission Distance
100 m (328 ft.) when used with the Hach Digital Gateway and a Hach sc Digital Controller.

1000 m (3280 ft.) when used with the Hach Digital Gateway, Termination Box, and a Hach sc Digital Controller.

Sensor Cable
Integral coaxial cable (plus two conductors for temperature compensator option); 4.5 m (15 ft.) long

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Sanitary style: 316 stainless steel sleeved PVDF body

Common materials for all sensor styles include PTFE Teflon double junction, glass process electrode, and Viton® O-rings

Warranty
90 days

Combination ORP Sensors

Measuring Range
-2000 to +2000 millivolts

Accuracy
Limited to calibration solution accuracy (± 20 mV)

Temperature Range
0 to 105ºC (32 to 221ºF)

Flow Rate
0 to 2 m/s (0 to 6.6 ft./s); non-abrasive

Pressure Range
0 to 6.9 bar at 100ºC (0 to 100 psig at 212ºF)

Signal Transmission Distance
100 m (328 ft.) when used with the Hach Digital Gateway and a Hach sc Digital Controller.

1000 m (3280 ft.) when used with the Hach Digital Gateway, Termination Box, and a Hach sc Digital Controller.

Sensor Cable
Integral coaxial cable; 4.5 m (15 ft.) long; terminated with stripped and tinned wires

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Common materials for all sensor styles include PTFE Teflon double junction, glass with platinum process electrode, and Viton® O-rings

Warranty
90 days

**Specifications subject to change without notice.*

Engineering Specifications

1. The pH sensor shall be available in convertible, insertion or sanitary styles. The ORP sensor shall be available in only convertible or insertion styles.
2. The convertible style sensor shall have a Ryton® body. The insertion style sensor shall have a PVDF body. The sanitary style sensor shall have a 316 stainless steel sleeved PVDF body. Common materials for all sensor styles shall include a PTFE Teflon® double junction, and Viton® O-rings. The pH sensor shall have a glass pH electrode. The ORP sensor shall have a platinum ORP electrode.
3. The convertible style pH sensor shall be available with or without a built-in Pt 1000 ohm RTD temperature element. Insertion and sanitary style pH sensors shall have a built-in Pt 1000 ohm RTD temperature element. Convertible and insertion style ORP sensors shall not have a built-in temperature element.
4. The sensor shall communicate via MODBUS® RS-485 to a Hach sc Digital Controller.
5. The sensor shall be Hach Company Model PC sc or PC-series for pH measurement or Model PC sc or RC-series for ORP measurement.

Dimensions

Convertible Style Sensor

The convertible style sensor has a Ryton® body that features 3/4-inch NPT threads on both ends. The sensor can be directly mounted into a standard 3/4-inch pipe tee for flow-through mounting or fastened onto the end of a pipe for immersion mounting. The convertible style sensor enables inventory consolidation, thereby reducing associated costs. Mounting tees and immersion mounting hardware are offered in a variety of materials to suit application requirements.

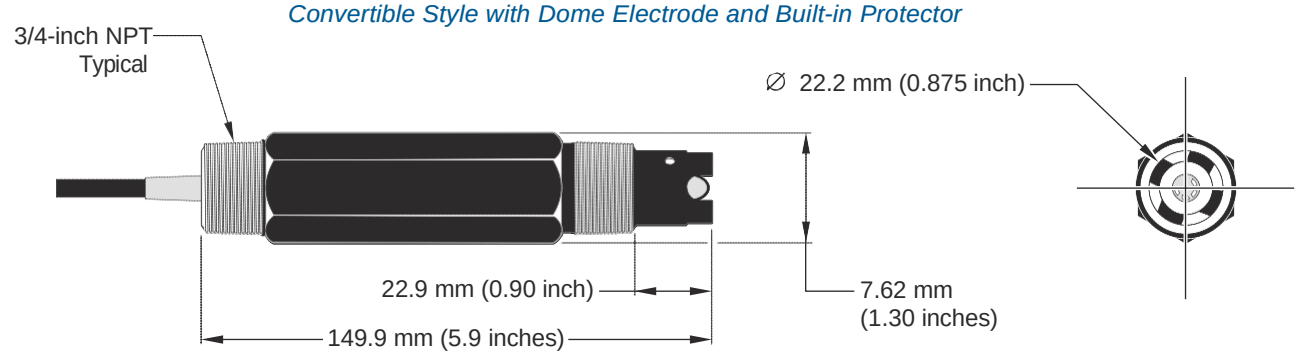
Insertion Style Sensor

Insertion style sensors feature a longer, non-threaded PVDF body with two Viton® O-rings, providing a seal when used with the optional Hach insertion mount hardware assembly. This ball valve hardware enables sensor insertion and retraction from a pipe or vessel without having to stop the process flow.

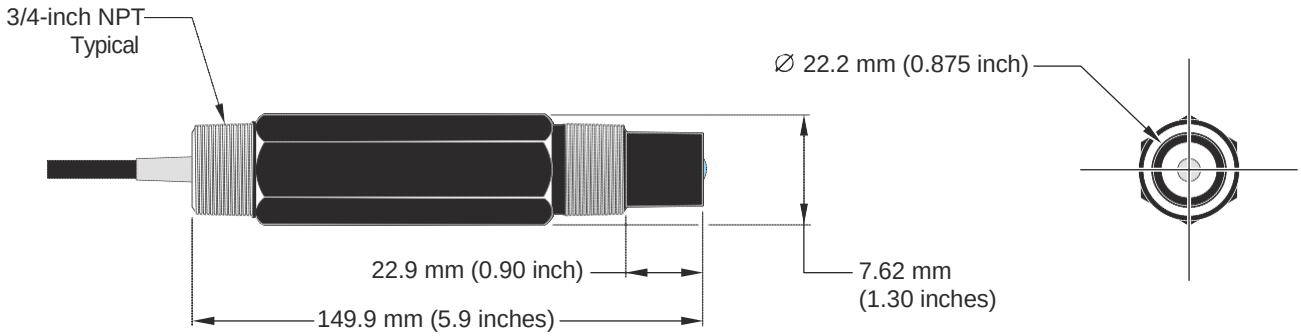
Sanitary Style Sensor

The sanitary style sensor, offered for pH measurement, has a 316 stainless steel-sleeved PVDF body with a 2-inch flange. The sensor mates to a standard 2-inch Tri-Clover fitting. The optional Hach sanitary mounting hardware includes a standard 2-inch sanitary tee, sanitary clamp, and Viton® sanitary gasket.

Convertible Style with Dome Electrode and Built-in Protector



Convertible Style with Flat Electrode



Lockwood Remediation Technologies, LLC

The Pulsatron Series A Plus offers manual function controls over stroke length and stroke rate as standard with the option to select external pace for automatic control.

Ten distinct models are available, having pressure capabilities to 250 PSIG (17 BAR) @ 12 GPO (1.9 lph), and flow capacities to 58 GPO (9.1 lph) @ 100 PSIG (7.0 BAR), with a standard turndown ratio of 100:1, and optional ratio of 1000:1. Metering performance is reproducible to within ± 3% of maximum capacity.

Features

- Manual Control by on-line adjustable stroke rate and stroke length.
- Highly Reliable timing circuit.
- Circuit Protection against voltage and current upsets.
- Solenoid Protection by thermal overload with auto-reset.
- Water Resistant, for outdoor and indoor applications.
- Internally Dampened To Reduce Noise.
- Guided Ball Check Valve Systems, to reduce back flow and enhance outstanding priming characteristics.
- Few Moving Parts and Wall Mountable.
- Safe & Easy Priming with durable leak-free bleed valve assembly (standard).
- Optional Control: External pace with auto/manual selection.

Controls

Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

Controls Options		
Feature	Standard Configuration	Optional Configuration [1]
External Pacing	--	Auto / Manual Selection
External Pace w/ Stop (125 SPM only)	--	Auto / Manual Selection [2]
Manual Stroke Rate	10:1 Ratio	100:1 Raio
Manual Stroke Length	10:1 Ratio	10:1 Ratio
Total Turndown Ratio	100:1 Ratio	1000:1 Ratio

Note 1: On S2, S3 & S4 sizes only.

Note 2: Not available on 1000:1 turndown pumps.

Operating Benefits

- Reliable metering performance.
- Rated "hot" for continuous duty.
- High viscosity capability.
- Leak-free, sealless, liquid end.

Aftermarket

- KOPkits
- Gauges
- Dampeners
- Pressure Relief Valves
- Tanks
- Pre-Engineered Systems
- Process Controllers (PULSAblue, MicroVision)

Series A Plus
Electronic Metering Pumps

Lockwood Remediation Technologies, LLC

Series A Plus

Specifications and Model Selection

MODEL			LBC2	LB02	LBC3	LB03	LB04	LB64	LBC4	LBS2	LBS3	LBS4
Capacity nominal (max.)		GPH	0.25	0.25	0.42	0.50	1.00	1.25	2.00	0.50	1.38	2.42
		GPO	6	6	10	12	24	30	48	12	33	58
		LPH	0.9	0.9	1.6	1.9	3.8	4.7	7.6	1.9	5.2	9.14
Pressure[3] (max.)	GFPP, PVDF, 316SS or PVC <;N code) wITFE Seats)	PSIG (Bar)	250 (17)	150 (10)	250 (17)	150 (10)	100 (7)	100 (7)	50 (3.3)	250 (17)	150 (10)	100 (7)
	PVC (V code) Viton or CSPE Seats IDegas Liquid End		150 (10)							150 (10)		
Connections:		Tubina	1.14" ID X 3.8" OD						3.8" D X 1.2" OD	1.14" D X 3.8" OD		
		Pioina	1.14" FNPT									
Strokes/Minute		SPM	125							250		

Note 3: Pumps with rated pressure above 150 PSI will be de-rated to 150 PSI Max. when selecting certain valve options, see Price Book for details.

Engineering Data

Pump Head Materials Available:	GFPPL
	PVC
	PVDF
	316 SS
Diaphragm:	PTFE-faced CSPE-backed
Check Valves Materials Available:	
Seats/0-Rings:	PTFE
	CSPE
	Viton
Balls:	Ceramic
	PTFE
	316 SS
	Alloy C
Fittings Materials Available:	GFPPL
	PVC
	PVDF
Bleed Valve:	Same as fitting and check valve selected, except 316SS
Injection Valve & Foot Valve Assy:	Same as fitting and check valve selected
Tubing:	Clear PVC
	White PE

Important: Material Code - GFPPL=Glass-filled Polypropylene, PVC=Polyvinyl Chloride, PE=Polyethylene, PVDF=Polyvinylidene Fluoride, CSPE=Generic formulation of Hypalon, a registered trademark of E.I. DuPont Company. Viton is a registered trademark of E.I. DuPont Company. PVC wetted end recommended for sodium hypochlorite.

Engineering Data

Reproducibility:	+/- 3% at maximum capacty
Viscosity Max CPS:	1000 CPS
Stroke Frequency Max SPM:	125 / 250 by Model
Stroke Frequency Turn-Down Ratio:	10:1 / 100:1 by Model
Stroke Length Turn-Down Ratio:	10:1
Power Input:	115 VAC/50-60 HZ/1 ph
	230 VAC/50-60 HZ/1 ph
Average Current Draw:	
@ 115 VAC; Amps:	0.6 Amps
@ 230 VAC; Amps:	0.3 Amps
Peak hput Power:	130 Watts
Average Input Power @ Max SPM:	50 Watts

Custom Engineered Designs - Pre-Engineered Systems

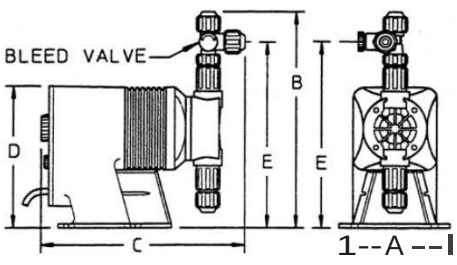
Pre-Engineered Systems

Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key simplicity and industrial-grade durability. The UV-stabilized, high-grade HOPE frame offers maximum chemical compatibility and structural rigidity. Each system is factory assembled and hydrostatically tested prior to shipment.

Dimensions

Series A PLUS Dimensions (inches)						
Model No.	A	B	C	D	E	Shipping Weight
LB02 IS2	5.0	9.6	9.5	6.5	8.2	10
LBC2	5.0	9.9	9.5	6.5	8.5	10
LBC3	5.0	9.9	9.5	6.5	8.5	10
LB03 IS3	5.0	9.9	9.5	6.5	8.5	10
LB0B4	5.0	9.9	9.5	6.5	8.5	10
LB64	5.0	9.9	9.5	6.5	8.5	10
LBC4	5.0	9.9	9.5	6.5	8.5	10

NOTE: Inches X 2.54 cm



95-Gallon OverPack - 32" dia x 41.5", 1 each/package

Stock a SpillTech® OverPack with sorbents for emergency spill response, or use it as a salvage drum to ship damaged containers or hazardous waste.

- DOT-Approved for Salvage: All SpillTech® OverPacks are DOT-approved and X-rated for use as salvage drums. Helps companies conform to federal regulations when shipping damaged or leaking containers of hazardous materials, or absorbents contaminated with hazardous substances.
- Perfect for Spill Kits: Stores sorbent products (not included) for easy access as needed for spill control. Saves time when quick response is necessary.
- Sturdy Construction: 100% polyethylene OverPack resists chemicals, rust and corrosion for years of use. Integrated handles make them easy to lift, move or carry with standard material handling equipment. Twist-on, double-wall lid with closed-cell gasket provides sealed, secure closure to prevent leaks and protect contents from moisture, dirt and damage. Durable to withstand rough handling.
- Customized for You: We can customize a Spill Kit to your exact specifications, including the container, its contents and accessories, with no upcharge! Contact your local Distributor for details.

A95OVER Specifications

Dimensions:	ext. dia. 32" x 41.5" H
Shipping Dimensions:	31.75" W x 41.5" L x 31.75" H
Sold as:	1 per package
Color:	Yellow
Composition:	Polyethylene
# per Pallet:	3
Incinerable:	No
Ship Class:	250

Metric Equivalent Specifications

Dimensions:	ext. dia. 81.3cm x 105.4cm H
Shipping Dimensions:	80.6cm W x 105.4cm L x 80.6cm H

A95OVER Technical Information

Warnings & Restrictions:
There are no known warnings and restrictions for this product.

Regulations and Compliance:
49 CFR 173.3(c)(1) - If a container of hazardous waste is damaged or leaking, it can be placed in a compatible salvage drum that meets UN criteria for shipping

49 CFR 173.12(b)(2)(iv) - When labpacking, "Inner packagings…must be surrounded by a chemically compatible absorbent material in sufficient quantity to absorb the total liquid contents."

49 CFR 173.12(b) - A container used for labpacking must be "a UN 1A2 or UN 1B2 metal drum, a UN 1D plywood drum, a UN 1G fiber drum or a UN 1H2 plastic drum tested and marked at least for the Packing Group III performance level for liquids or solids."

Safety Data Sheet

Revision Date Feb-23-2015 **Item #** 10927 **Safety Data Sheet** 1683

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Sodium Hydroxide (Caustic) 50%
UN/ID No. UN1824
Synonyms Caustic soda Caustic Lye [Sodium hydroxide]
Recommended Use pH adjustment, Manufacture of pulp, paper and paper products, Detergent, Soap
Uses advised against Consumer uses: Private households (= general public = consumers).

Company Name
PVS-Nolwood Chemicals, Inc
10900 Harper Ave.
Detroit, MI 48213
(800) 284-9735

24 Hour Emergency Phone Number CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 1 Sub-category A
Serious eye damage/eye irritation	Category 1
May be corrosive to metals	Category 1

Emergency Overview

DANGER

Hazard statements
Causes severe skin burns and eye damage
Causes serious eye damage
May be corrosive to metals
Harmful if swallowed

Physical hazards
Corrosive
Corrosive to metals

Precautionary statements

Prevention

- Wear eye/face protection
- Wear protective gloves/protective clothing/eye protection/face protection
- Do not breathe dust/fume/gas/mist/vapors/spray
- Wash face, hands and any exposed skin thoroughly after handling
- Do not eat, drink or smoke when using this product

Response
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- Immediately call a POISON CENTER or doctor/physician
- IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
- Wash contaminated clothing before reuse
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Storage
- Store locked up

Disposal
- Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
None known.

Other Information

Other hazards
- May be harmful in contact with skin
- Harmful to aquatic life with long lasting effects
- Harmful to aquatic life

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	EC No.	Weight-% *
Water	7732-18-5	231-791-2	50
Sodium hydroxide	1310-73-2	215-185-5	50

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

General advice
- Immediate medical attention is required

Eye contact
- Immediate medical attention is required
- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes
- Keep eye wide open while rinsing
- Do not rub affected area

Skin Contact
- Immediate medical attention is required
- Take off contaminated clothing
- Wash off immediately with plenty of water for at least 15 minutes
- Wash contaminated clothing before reuse

Inhalation
- Remove to fresh air
- Call a physician or poison control center immediately
- If not breathing, give artificial respiration
- If breathing is difficult, give oxygen

Ingestion
- Immediate medical attention is required
- Do NOT induce vomiting
- Rinse mouth
- Drink plenty of water
- Never give anything by mouth to an unconscious person

Note to physician
Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure. Treat symptomatically.

Self-protection of the first aider Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
- Water spray (fog)
- Water
- Foam
- Dry chemical
- Carbon dioxide (CO2)
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment

Unsuitable extinguishing media
- Do not use halogenated extinguishing agents or foam

Specific hazards arising from the chemical
- The product causes burns of eyes, skin and mucous membranes
- Thermal decomposition can lead to release of irritating and toxic gases and vapors
- In the event of fire and/or explosion do not breathe fumes

Protective equipment and precautions for firefighters
- Wear a self-contained breathing apparatus and chemical protective clothing

Flammable properties
- No information available

Explosive properties
- No information available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
- Evacuate personnel to safe areas
- Use personal protective equipment as required
- Avoid contact with skin, eyes or clothing
- Keep people away from and upwind of spill/leak

Environmental precautions
- Collect contaminated fire extinguishing water separately. Do not allow to enter drains or surface water

Methods for cleaning up
- Dike far ahead of liquid spill for later disposal
- Soak up with inert absorbent material
- Take up mechanically, placing in appropriate containers for disposal
- Clean contaminated surface thoroughly
- Prevent product from entering drains
- Dam up

Other Information
- No information available

7. HANDLING AND STORAGE

Advice on safe handling
- Use personal protective equipment as required
- Avoid contact with skin, eyes or clothing
- Ensure adequate ventilation, especially in confined areas
- In case of insufficient ventilation, wear suitable respiratory equipment
- Use only with adequate ventilation and in closed systems

Storage Conditions
- Keep container tightly closed in a dry and well-ventilated place
- Keep out of the reach of children
- Keep containers tightly closed in a dry, cool and well-ventilated place
- Keep in properly labeled containers

Incompatible materials Aluminum, Zinc, Tin, Oxidizers, Acetaldehyde, Acrolein, Acrylonitrile

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium hydroxide 1310-73-2	Ceiling: 2 mg/m^3	TWA: 2 mg/m^3 (vacated) Ceiling: 2 mg/m^3	IDLH: 10 mg/m^3 Ceiling: 2 mg/m^3

Exposure Guidelines .

Engineering Controls Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Respiratory protection
• A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respriator.

Eye/face protection
• Tight sealing safety goggles
• Face protection shield

Skin and body protection
• Wear suitable protective clothing
• Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact

General Hygiene Considerations
• When using do not eat, drink or smoke
• Wash contaminated clothing before reuse
• Keep away from food, drink and animal feeding stuffs
• Contaminated work clothing should not be allowed out of the workplace
• Regular cleaning of equipment, work area and clothing is recommended
• Avoid contact with skin, eyes or clothing
• Take off all contaminated clothing and wash it before reuse
• Wear suitable gloves and eye/face protection

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Clear to slightly hazy
Color	colorless
Odor	Odorless
Odor threshold	No information available

Property	**Values**	**Remarks • Method**
pH	14	
Melting point/Freezing Point	10-11.7	
Boiling point / boiling range	130-140	
Flash point	No information available	
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit (%)	No information available	
Lower flammability limit (%):	No information available	
Vapor pressure	23.76 mm Hg	@ 25 °C
Vapor density	No information available	
Specific Gravity	1.529	
Water solubility	Miscible in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point °C	No information available
Molecular weight	40.1
VOC Content (%)	No information available

Density No information available
Bulk density 12.75186 Pounds per gallon (lb/gal)

10. STABILITY AND REACTIVITY

Stability • Stable under recommended storage conditions

Conditions to avoid • Strong acids
• Strong oxidizing agents

Incompatible materials Aluminum, Zinc, Tin, Oxidizers, Acetaldehyde, Acrolein, Acrylonitrile

Hazardous Decomposition Products • Thermal decomposition can lead to release of irritating and toxic gases and vapors
• Contact with metals may evolve flammable hydrogen gas

Possibility of Hazardous Reactions • None under normal processing and storage

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principle Routes of Exposure Inhalation Skin Contact Eye contact
Inhalation May cause irritation of respiratory tract. Avoid breathing vapors or mists.
Ingestion No data available.
Skin Contact No data available.
Eye contact Contact with eyes may cause irritation.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Sodium hydroxide 1310-73-2	300-500 mg/kg (rat) 40 mg/kg (mouse)(Intraperitoneal)	= 1350 mg/kg (Rabbit)	-

Information on toxicological effects

Symptoms No information available
Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.
Germ cell mutagenicity No information available.
Carcinogenicity No information available.
Reproductive toxicity No information available.
STOT - single exposure No information available.
STOT - repeated exposure No information available.
Chronic toxicity Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Possible risk of irreversible effects.
Target Organ Effects Eyes, Respiratory system, Skin.
Aspiration hazard No information available.

Numerical measures of toxicity - Product Information

Unknown Acute Toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity
The following values are calculated based on chapter 3.1 of the GHS document . mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity Harmful to aquatic life with long lasting effects
0% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Chemical Name	Algae/aquatic plants	Fish	Crustacea

Sodium hydroxide 1310-73-2	-	45.4: 96 h Oncorhynchus mykiss mg/L LC50 static	-

Persistence and degradability No information available.
Bioaccumulation The product is not expected to bioaccumulate.

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Disposal of wastes • This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261)
Contaminated packaging • Do not reuse container
US EPA Waste Number • D002

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste Status
Sodium hydroxide 1310-73-2	Toxic Corrosive

14. TRANSPORT INFORMATION

DOT

Proper shipping name	SODIUM HYDROXIDE SOLUTION
Hazard Class	8
UN/ID No.	UN1824
Packing Group	II
Reportable Quantity (RQ) (lbs)	1000
RQ as is (lbs)	2000
Description	UN1824, Sodium hydroxide solution, 8, II
Special Provisions	B2, IB2, N34, T7, TP2
Emergency Response Guide Number	154

IATA

UN/ID No.	UN1824
Proper shipping name	SODIUM HYDROXIDE SOLUTION
Hazard Class	8
Packing Group	II
ERG Code	8L
Special Provisions	A3

IMDG

UN/ID No.	UN1824
Proper shipping name	SODIUM HYDROXIDE SOLUTION
Hazard Class	8
Packing Group	II
EmS-No.	F-A, S-B

15. REGULATORY INFORMATION

US Federal Regulations

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	Yes

SARA 313 Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

CWA (Clean Water Act) This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium hydroxide 1310-73-2	1000 lb	-	-	X

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ) (lbs)
Sodium hydroxide 1310-73-2	1000 lb	-	RQ 1000 lb final RQ RQ 454 kg final RQ

US State Regulations

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Sodium hydroxide 1310-73-2	X	X	X

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

16. OTHER INFORMATION

NFPA	**Health hazards** 3	**Flammability** 0	**Instability** 1	**Physical and Chemical Properties** -
HMIS	**Health hazards** 3	**Flammability** 0	**Physical hazards** 1	**Personal protection** X

Item #	**10927**
Safety Data Sheet	**1683**
Revision Date	Feb-23-2015
Issue Date	Feb-23-2015
Version	1
Revision Note	*** Updated value on SDS.

Disclaimer

All information, statements, data, advice, and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping, and transportation (collectively referred to herein as "information") are believed to be accurate, reliable, and based on reliable industry and regulatory references. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness for a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. The Company providing this SDS is not engaged in the business of providing technical, operational, engineering, or safety information for a fee, and therefore, any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill, and experience in the chemical industry. The Company providing this SDS shall not be responsible or liable for the use, application, or implementation of the information provided herein, and all such information is to be used at the risk, and in the sole judgment and discretion of such persons, their employees, advisors, and agents. This safety data sheet (SDS) is offered for your information, consideration, and investigation as required by federal hazardous products act and related legislation.

End of Safety Data Sheet

Sulfuric Acid, 70-100%

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and

Regulations Revision Date: 05/15/15 Version: 1.0

SECTION 1: IDENTIFICATION

Product Identifier

Product Name: Sulfuric Acid, 70-100%

Formula: H_2-O_4-S

Intended Use of the Product

Use of the Substance/Mixture: Industrial use.

Name, Address, and Telephone of the Responsible Party

Manufacturer

Emergency Telephone Number

Emergency number : CHEMTREC 1-800-424-9300

For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

Classification (GHS-US)

Acute Tox. 2 (Inhalation:dust,mist)	H330
Skin Corr. 1A	H314
Eye Dam. 1	H318
Carc. 1A	H350

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :

GHS05 GHS06 GHS08

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) : H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H330 - Fatal if inhaled
H350 - May cause cancer

Precautionary Statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe fume, mist, vapors, spray
P264 - Wash hands and forearms thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear eye protection, face protection, protective gloves, protective clothing
P284 - Wear respiratory protection
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P308+P313 - If exposed or concerned: Get medical advice/attention
P310 - Immediately call a POISON CENTER or doctor/physician
P320 - Specific treatment is urgent (see Section 4)
P363 - Wash contaminated clothing before reuse
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container according to local, regional, national, and international regulations

Other Hazards

Other Hazards Not Contributing to the Classification: Not available

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Name	Product identifier	% (w/w)	Classification (GHS-US)
Sulfuric acid	(CAS No) 7664-93-9	70 - 100	Met. Corr. 1, H290 Skin Corr. 1A, H314 Eye Dam. 1, H318 Carc. 1A, H350

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: Using proper respiratory protection, immediately move the exposed person to fresh air. Keep at rest and in a position comfortable for breathing. Give oxygen or artificial respiration if necessary. Seek immediate medical advice. Symptoms may be delayed.

Skin Contact: Remove/Take off immediately all contaminated clothing. Rinse immediately with plenty of water (for at least 15 minutes). Seek medical attention immediately if exposure is severe. Obtain medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

Eye Contact: Immediately rinse with water for a prolonged period (at least 15 minutes) while holding the eyelids wide open. Seek medical attention immediately if exposure is severe. Obtain medical attention if irritation develops or persists.

Ingestion: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Most Important Symptoms and Effects Both Acute and Delayed

General: Corrosive. Causes burns.

Inhalation: Causes severe respiratory irritation if inhaled. Symptoms may include burning of nose and throat, constriction of airway, difficulty breathing, shortness of breath, bronchial spasms, chest pain, and pink frothy sputum. Contact may cause immediate severe irritation progressing quickly to chemical burns. May cause pulmonary edema. Symptoms may be delayed.

Skin Contact: Contact may cause immediate severe irritation progressing quickly to chemical burns.

Eye Contact: Contact may cause immediate severe irritation progressing quickly to chemical burns. Can cause blindness.

Ingestion: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. Swallowing a small quantity of this material will result in serious health hazard.

Chronic Symptoms: Repeated or prolonged inhalation may damage lungs. Prolonged and repeated contact will eventually cause permanent tissue damage.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not get water inside containers. Do not apply water stream directly at source of leak. Do not use a heavy water stream. A direct water stream will cause violent splattering and generation of heat.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable. Under conditions of fire this material may produce: Sulphur oxides.

Explosion Hazard: Product is not explosive.

Reactivity: Reacts with water.

Advice for Firefighters

Precautionary Measures Fire: Not available

Firefighting Instructions: Keep upwind. Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Firefighters must use full bunker gear including NIOSH-approved positive-pressure self-contained breathing apparatus to protect against potential hazardous combustion and decomposition products.

Hazardous Combustion Products: Sulphur oxides.

Other information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Do not breathe vapour or mist.

For Non-Emergency Personnel

Protective Equipment: Use recommended respiratory protection. Wear suitable protective clothing, gloves and eye/face protection.

Emergency Procedures: Stop leak if safe to do so. Eliminate ignition sources. Evacuate unnecessary personnel. Ventilate area. Keep upwind.

For Emergency Personnel

Protective Equipment: Use recommended respiratory protection. Wear suitable protective clothing, gloves and eye/face protection.

Emergency Procedures: Stop leak if safe to do so. Eliminate ignition sources. Evacuate unnecessary personnel. Ventilate area.

Environmental Precautions

If spill could potentially enter any waterway, including intermittent dry creeks, contact the U.S. COAST GUARD NATIONAL RESPONSE CENTER at 800-424-8802. In case of accident or road spill notify CHEMTREC at 800-424-9300

Methods and Material for Containment and Cleaning Up

For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

Methods for Cleaning Up: Ventilate area. Small quantities of liquid spill: take up in non-combustible absorbent material and shovel into container for disposal. Collect absorbed material and place into a sealed, labeled container for proper disposal. Practice good housekeeping - spillage can be slippery on smooth surface either wet or dry. Liquid spill: neutralize with powdered limestone or sodium bicarbonate.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Wash contaminated clothing before reuse.

Conditions for Safe Storage, Including Any Incompatibilities

Storage Conditions: Detached outside storage is preferable.

Incompatible Materials: Reducing agents. Organic materials. Alkalis. Moisture.

Storage Area: Store in dry, cool area. Store in a well-ventilated place. Keep away from combustible materials.

Specific End Use(s) Not available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Sulfuric acid (7664-93-9)		
Mexico	OEL TWA (mg/m³)	1 mg/m³
USA ACGIH	ACGIH TWA (mg/m³)	0.2 mg/m³
USA OSHA	OSHA PEL (TWA) (mg/m³)	1 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	1 mg/m³
USA IDLH	US IDLH (mg/m³)	15 mg/m³

Alberta	OEL STEL (mg/m³)	3 mg/m³
Alberta	OEL TWA (mg/m³)	1 mg/m³
British Columbia	OEL TWA (mg/m³)	0.2 mg/m³ (Thoracic, contained in strong inorganic acid mists)
Manitoba	OEL TWA (mg/m³)	0.2 mg/m³
New Brunswick	OEL STEL (mg/m³)	3 mg/m³
New Brunswick	OEL TWA (mg/m³)	1 mg/m³
Newfoundland & Labrador	OEL TWA (mg/m³)	0.2 mg/m³
Nova Scotia	OEL TWA (mg/m³)	0.2 mg/m³
Nunavut	OEL STEL (mg/m³)	3 mg/m³
Nunavut	OEL TWA (mg/m³)	1 mg/m³
Northwest Territories	OEL STEL (mg/m³)	3 mg/m³
Northwest Territories	OEL TWA (mg/m³)	1 mg/m³
Ontario	OEL TWA (mg/m³)	0.2 mg/m³
Prince Edward Island	OEL TWA (mg/m³)	0.2 mg/m³
Québec	VECD (mg/m³)	3 mg/m³
Québec	VEMP (mg/m³)	1 mg/m³
Saskatchewan	OEL STEL (mg/m³)	0.6 mg/m³
Saskatchewan	OEL TWA (mg/m³)	0.2 mg/m³
Yukon	OEL STEL (mg/m³)	1 mg/m³
Yukon	OEL TWA (mg/m³)	1 mg/m³

Exposure Controls

Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment: Face shield. Gas mask at concentration in the air > > TLV. Corrosionproof clothing.

Materials for Protective Clothing: Acid-resistant clothing.

Hand Protection: Impermeable protective gloves.

Eye Protection: Face shield.

Skin and Body Protection: Wear suitable protective clothing. Chemical resistant suit. Rubber apron, boots.

Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Environmental Exposure Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Liquid
Appearance	:	Clear,Colorless to Amber,Oily
Odor	:	Pungent.
Odor Threshold	:	Not available
pH	:	0.3
Relative Evaporation Rate (butylacetate=1)	:	Not available
Melting Point	:	10.56 °C (51.08 °F)
Freezing Point	:	Not available
Boiling Point	:	290 °C (554 °F)
Flash Point	:	Not available
Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	0.00027 - 0.16 kPa at 25 °C (77 °F)

Relative Vapor Density at 20 °C	:	3.4
Relative Density	:	Not available
Specific Gravity	:	1.84 g/l
Solubility	:	Water: Miscible
Partition coefficient: n-octanol/water	:	Not available
Viscosity	:	Not available
Explosion Data – Sensitivity to Mechanical Impact	:	Not expected to present an explosion hazard due to mechanical impact.
Explosion Data – Sensitivity to Static Discharge	:	Not expected to present an explosion hazard due to static discharge.

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Reacts with water.

Chemical Stability: Stable at standard temperature and pressure.

Possibility of Hazardous Reactions: Hazardous polymerization can occur in contact with certain incompatible materials.

Conditions to Avoid: Protect from moisture.

Incompatible Materials: Avoid contact with most metals, carbides, hydrogen sulfide, turpentine, organic acids, combustibles (wood, paper, cotton) and other organic and readily oxidized materials.

Hazardous Decomposition Products: Under conditions of fire this material may produce: Sulphur oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity: Fatal if inhaled.

LD50 and LC50 Data:

Sulfuric Acid, 70-100%	
ATE US (dust, mist)	0.05000000 mg/l/4h

Skin Corrosion/Irritation: Causes severe skin burns and eye damage.

pH: 0.3

Serious Eye Damage/Irritation: Causes serious eye damage.

pH: 0.3

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: May cause cancer.

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Causes severe respiratory irritation if inhaled. Symptoms may include burning of nose and throat, constriction of airway, difficulty breathing, shortness of breath, bronchial spasms, chest pain, and pink frothy sputum. Contact may cause immediate severe irritation progressing quickly to chemical burns. May cause pulmonary edema. Symptoms may be delayed.

Symptoms/Injuries After Skin Contact: Contact may cause immediate severe irritation progressing quickly to chemical burns.

Symptoms/Injuries After Eye Contact: Contact may cause immediate severe irritation progressing quickly to chemical burns. Can cause blindness.

Symptoms/Injuries After Ingestion: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. Swallowing a small quantity of this material will result in serious health hazard.

Chronic Symptoms: Repeated or prolonged inhalation may damage lungs. Prolonged and repeated contact will eventually cause permanent tissue damage.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Sulfuric acid (7664-93-9)	
LD50 Oral Rat	2140 mg/kg
LC50 Inhalation Rat (mg/l)	510 mg/m³ (Exposure time: 2 h)

Sulfuric acid (7664-93-9)	
IARC Group	1

SECTION 12: ECOLOGICAL INFORMATION

Toxicity Not classified

Sulfuric acid (7664-93-9)	
LC50 Fish 1	500 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])

Persistence and Degradability

Sulfuric Acid, 70-100%	
Persistence and Degradability	Product is biodegradable.

Bioaccumulative Potential

Sulfuric Acid, 70-100%	
Bioaccumulative Potential	Not expected to bioaccumulate.

Sulfuric acid (7664-93-9)	
BCF fish 1	(no bioaccumulation)

Mobility in Soil Not available

Other Adverse Effects Not available

SECTION 13: DISPOSAL CONSIDERATIONS

Sewage Disposal Recommendations: This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

SECTION 14: TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name : SULFURIC ACIDwith more than 51 percent acid

Hazard Class : 8

Identification Number : UN1830

Label Codes : 8

Packing Group : II

ERG Number : 157

14.2 In Accordance with IMDG

Proper Shipping Name : SULPHURIC ACID

Hazard Class : 8

Identification Number : UN1830

Packing Group : II

Label Codes : 8

EmS-No. (Fire) : F-A

EmS-No. (Spillage) : S-B

14.3 In Accordance with IATA

Proper Shipping Name : SULPHURIC ACID

Packing Group : II

Identification Number : UN1830

Hazard Class : 8

Label Codes : 8

ERG Code (IATA) : 8L

14.4 In Accordance with TDG

Proper Shipping Name : SULPHURIC ACIDwith more than 51 per cent acid

Packing Group : II

Hazard Class : 8

Identification Number : UN1830

Label Codes : 8

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Sulfuric Acid, 70-100%	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Reactive hazard

Sulfuric acid (7664-93-9)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on SARA Section 302 (Specific toxic chemical listings) Listed on SARA Section 313 (Specific toxic chemical listings)	
SARA Section 302 Threshold Planning Quantity (TPQ)	1000
SARA Section 313 - Emission Reporting	1.0 % (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

US State Regulations

Sulfuric Acid, 70-100%()

Sulfuric acid (7664-93-9)	
U.S. - California - Proposition 65 - Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer.

Sulfuric acid (7664-93-9)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

Canadian Regulations

Sulfuric Acid, 70-100%	
WHMIS Classification	Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class E - Corrosive Material

Sulfuric acid (7664-93-9)	
Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class E - Corrosive Material

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 2 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 2
Carc. 1A	Carcinogenicity Category 1A
Eye Dam. 1	Serious eye damage/eye irritation Category 1

Met. Corr. 1	Corrosive to metals Category 1
Skin Corr. 1A	Skin corrosion/irritation Category 1A
H290	May be corrosive to metals
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H330	Fatal if inhaled
H350	May cause cancer

Handle product with due care and avoid unnecessary contact. This information is supplied under U.S. OSHA'S "Right to Know" (29 CFR 1910.1200) and Canada's WHMIS regulations. Although certain hazards are described herein, we cannot guarantee these are the only hazards that exist. The information contained herein is based on data available to us and is believed to be true and accurate but it is not offered as a product specification. No warranty, expressed or implied, regarding the accuracy of this data, the hazards connected with the use of the product, or the results to be obtained from the use thereof, is made and Mann Distribution assume no responsibility.

Basic Pedestal

Standard Centrifugal Pump

Model VGH5B31-B

Size 6” x 5”

PUMP SPECIFICATIONS

Size: 6” x 5” (152 mm x 127 mm) Raised Face Flanges.

Casing: Ductile Iron.
Maximum Operating Pressure 110 psi (662 kPa).*

Enclosed Type, Six Vane Impeller: Gray Iron 40.
Handles 7/8” (23 mm) Diameter Spherical Solids.

Impeller Shaft: Steel 1045.

Two Replaceable Wear Rings: Gray Iron 25.

Seal Plate: Ductile Iron.

Bypass Flush Piping.

Bearing Housing: Gray Iron 25.

Radial Bearing: Open Cylindrical Roller.

Thrust Bearing: Open Double Row Ball.
Bearing Lubrication: SAE 30 Non-Detergent Oil.

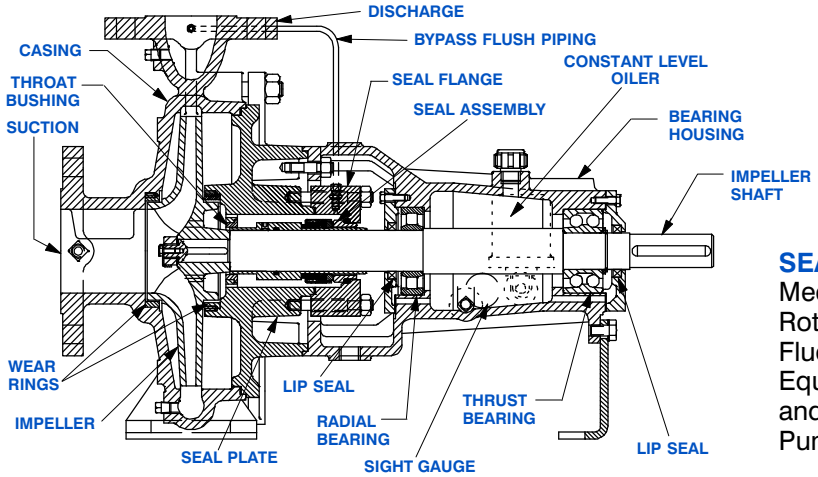
Gaskets: Nitrile Rubber.

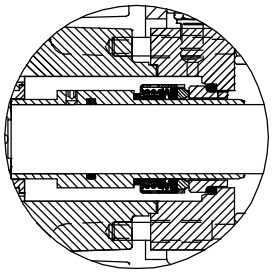
Hardware: Standard Plated Steel.

Bearing Housing Level Oiler.

Optional Equipment: Strainer. NPT Suction and Discharge Flanges. Discharge Check Valve. Consult Factory for Optional Seals.

**Consult Factory for Applications Exceeding Maximum Pressure and/or Temperature Indicated.*





SEAL DETAIL

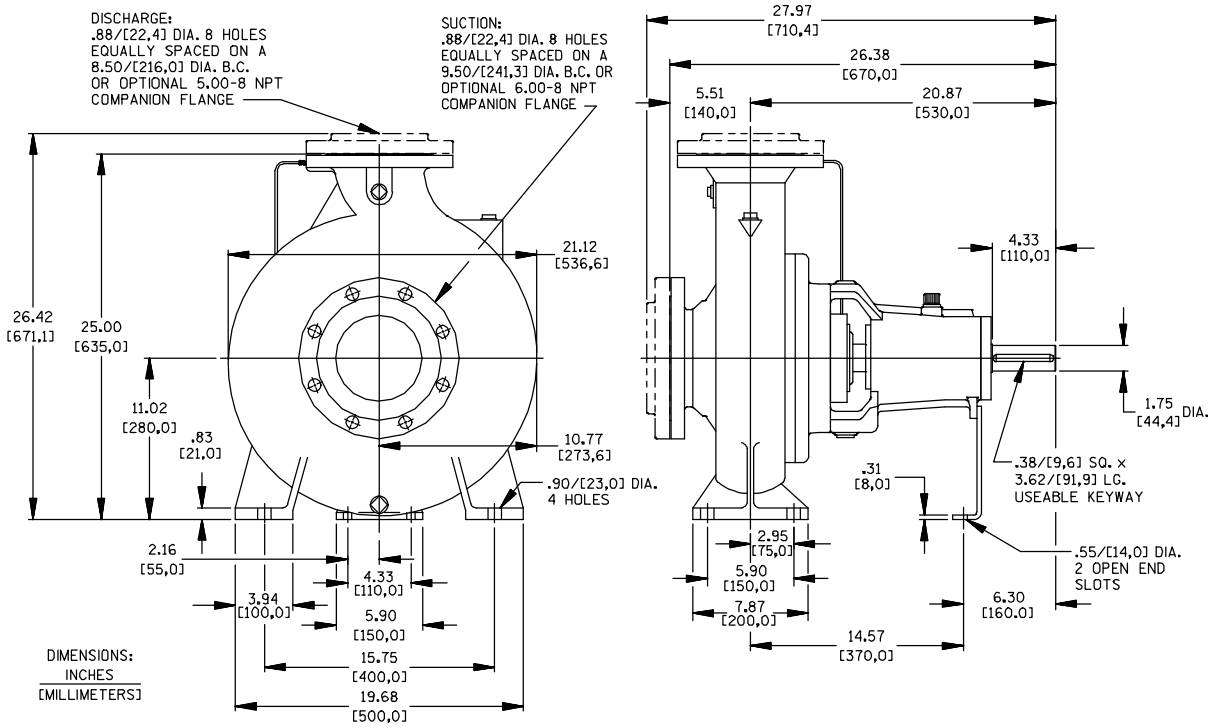
Mechanical, Self-Lubricated. Silicon Carbide Rotating and Stationary Faces. Fluorocarbon Elastomers (DuPont Viton® or Equivalent). Stainless Steel 316 Shaft Sleeve and Spring. Maximum Temperature of Liquid Pumped, 160°F (71°C).*

Specification Data

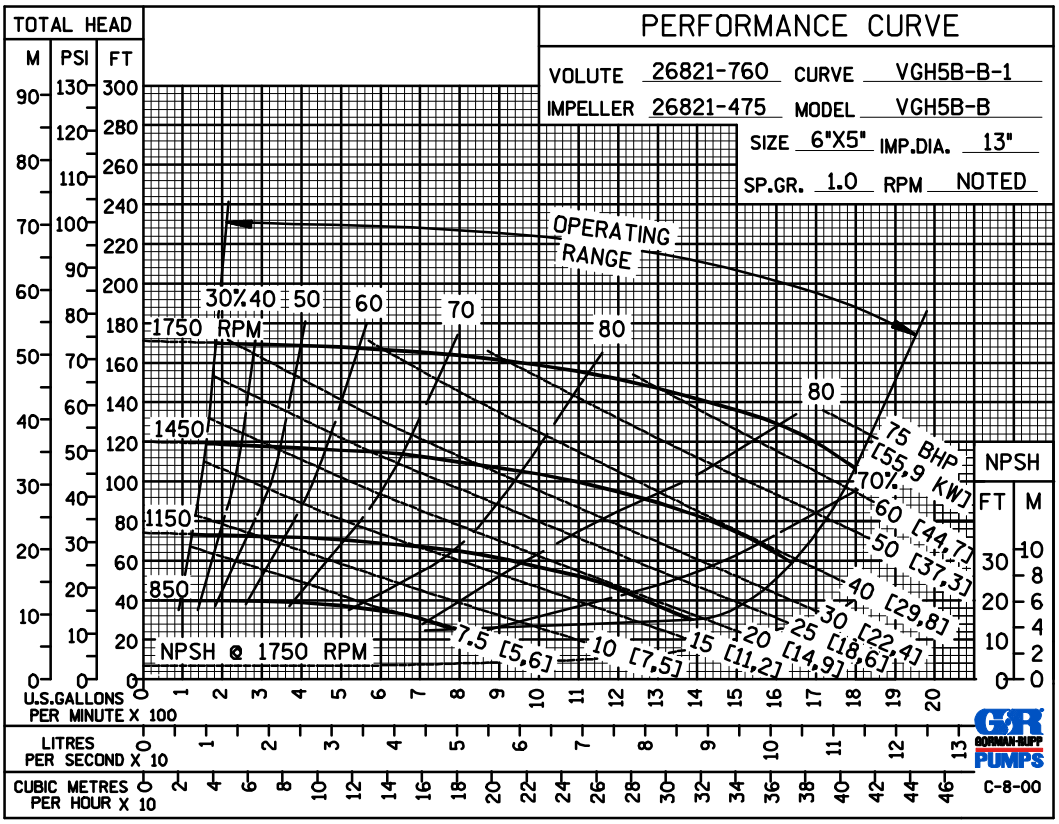
SECTION 70, PAGE 976

APPROXIMATE
DIMENSIONS and WEIGHTS

NET WEIGHT: 366 LBS. (166 KG.)
SHIPPING WEIGHT: 386 LBS. (175 KG.)
EXPORT CRATE: 17 CU. FT. (0,5 CU. M.)



PERFORMANCE BASED ON WATER



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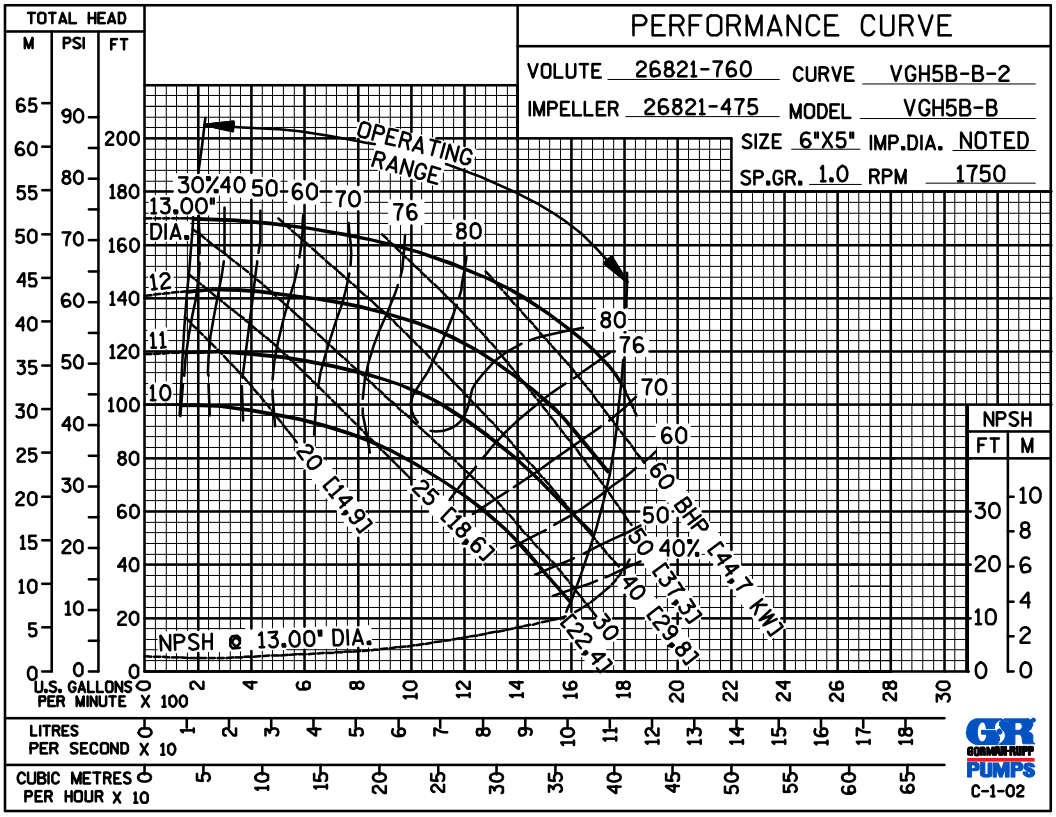

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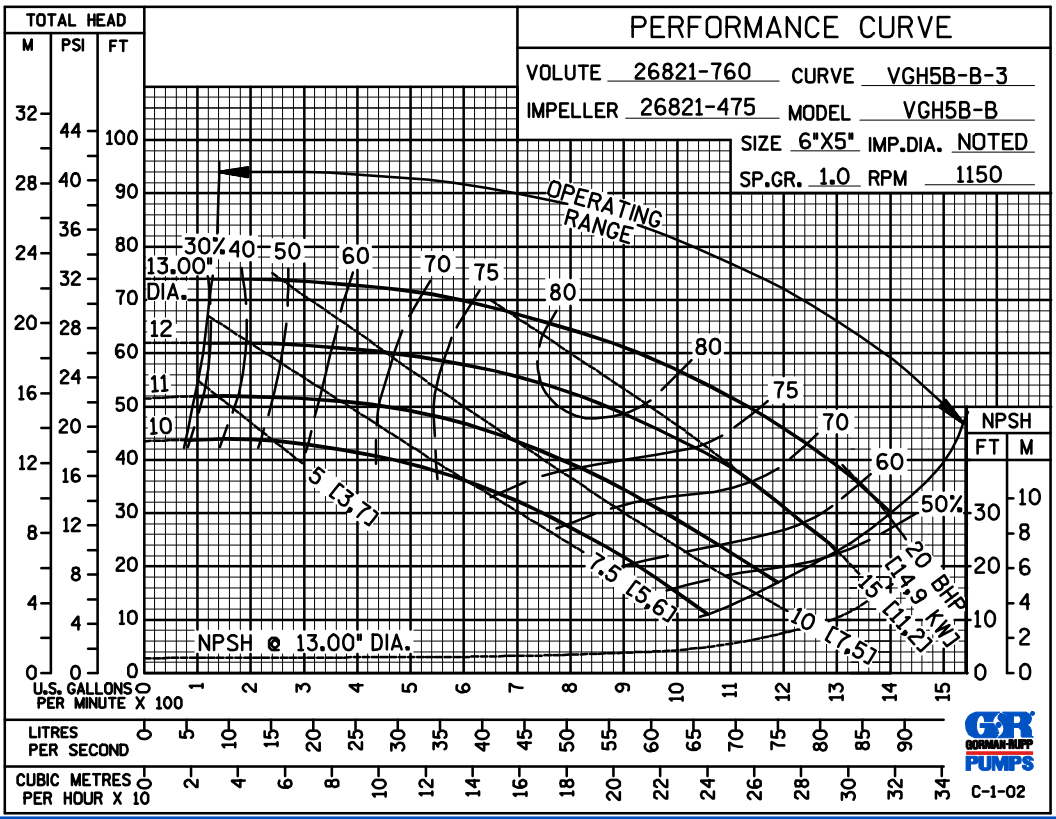

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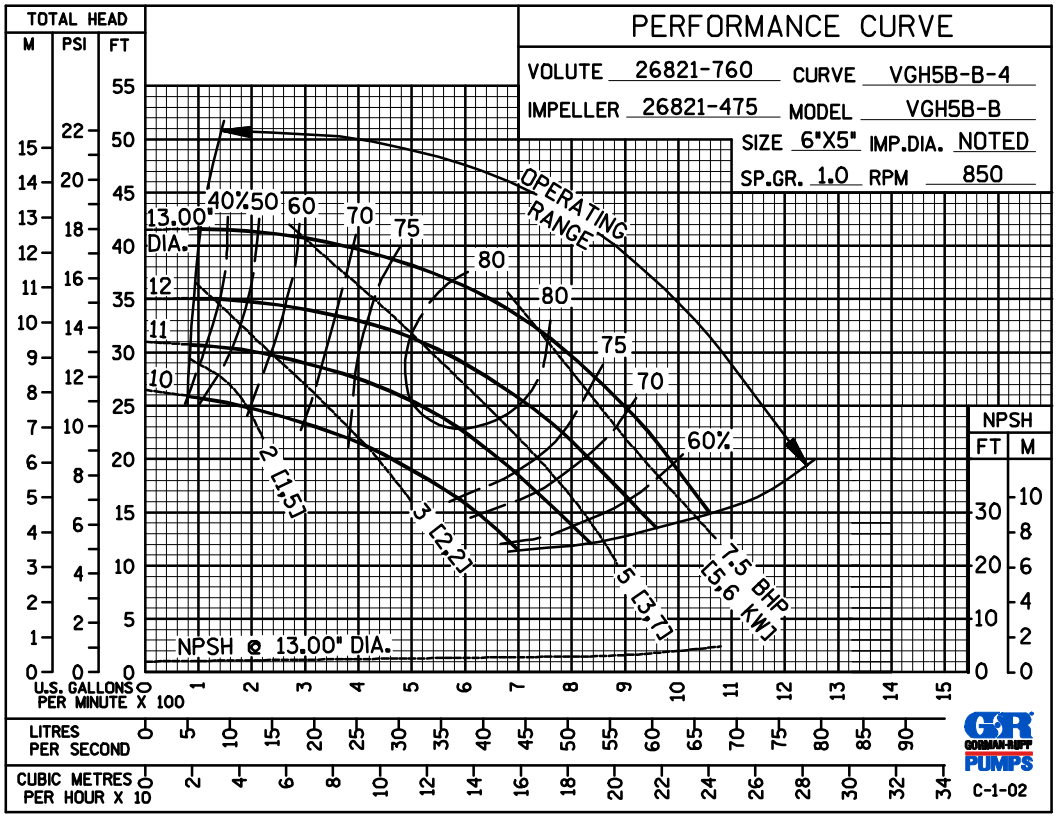
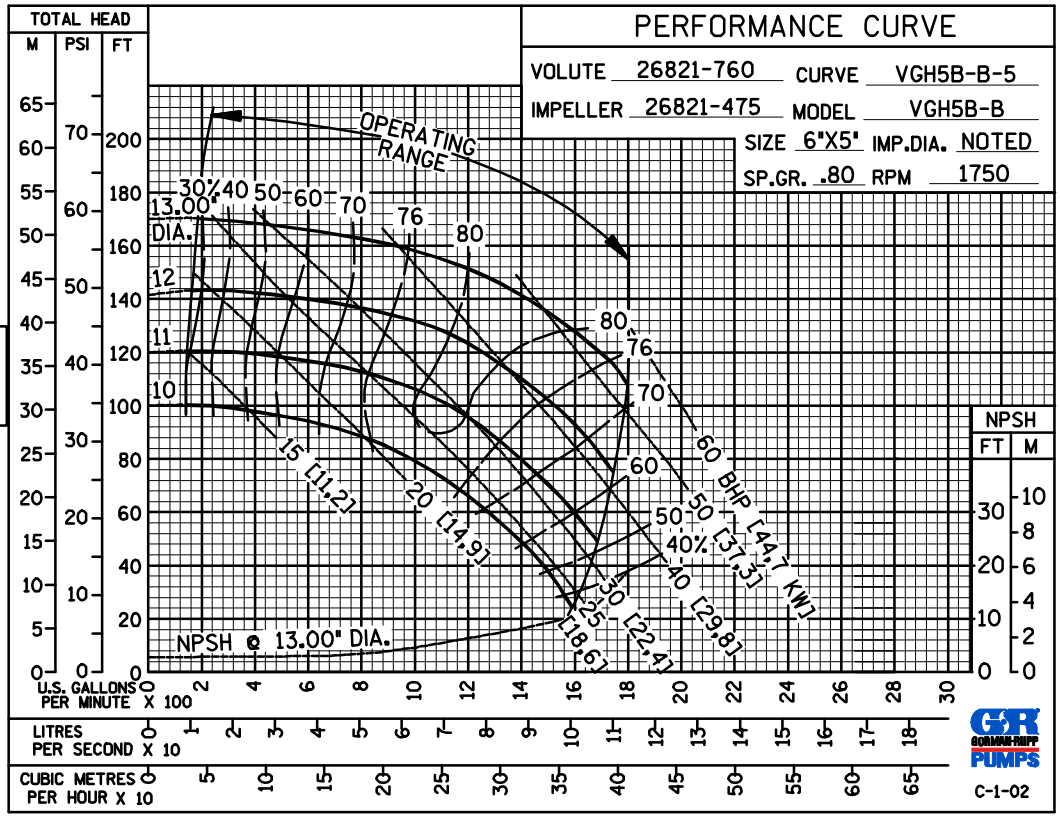
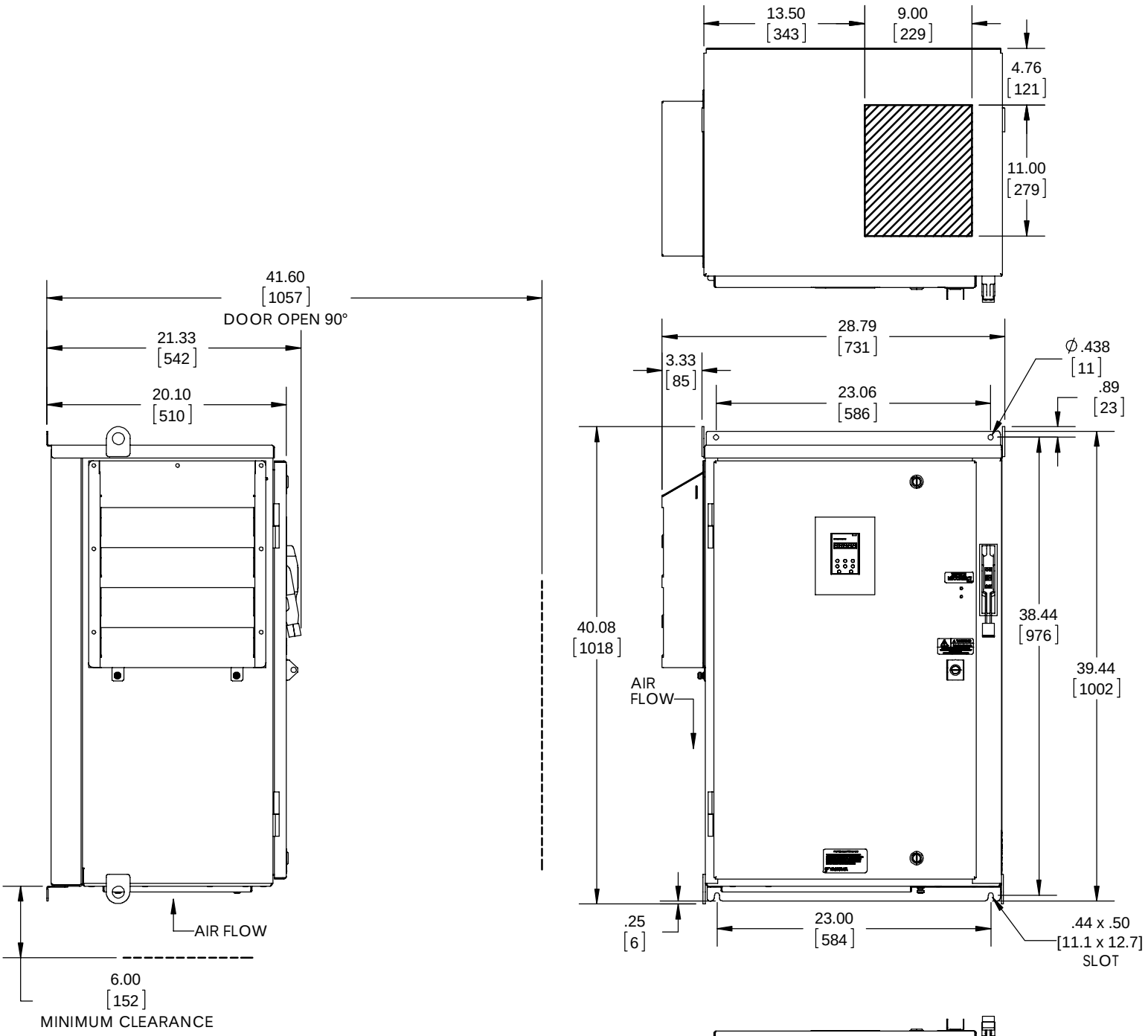


PERFORMANCE BASED ON PETROLEUM





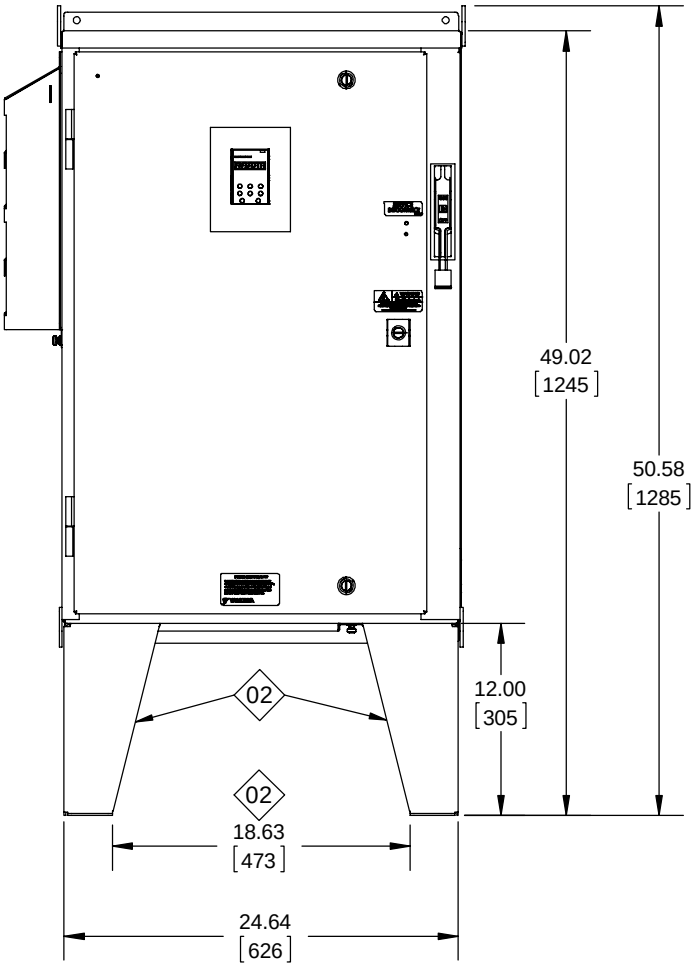
NOTES:
A. FOR REFERENCE ONLY UNLESS PROPERLY ENDORSED. FOR ADDITIONAL DETAILS AND SPECIFICATIONS, CONSULT FACTORY.
B. DIMENSIONS ARE IN INCHES [MILLIMETERS].
C. HATCHED AREA INDICATES PERMISSIBLE CONDUIT ENTRANCE AREA.
D. FANS, FILTERS, LEG STANDS OR CLOSING PLATES ARE SUPPLIED WHEN OPTION MIX NECESSITATES.
E. USE APPROPRIATE TYPE RATED HUBS OR FITTINGS TO MAINTAIN ENCLOSURE RATING.

REVISIONS				
REV.	DESCRIPTION	DRAWN BY	ECO	DATE
02	ADDED NEW 12" AND 30" LEG STANDS	JDE	4526	9/11/13
01	ADDED NEW 12" AND 30" LEG STANDS	JDE	4462	8/16/13
00	INITIAL RELEASE	JDE	-	4/25/13

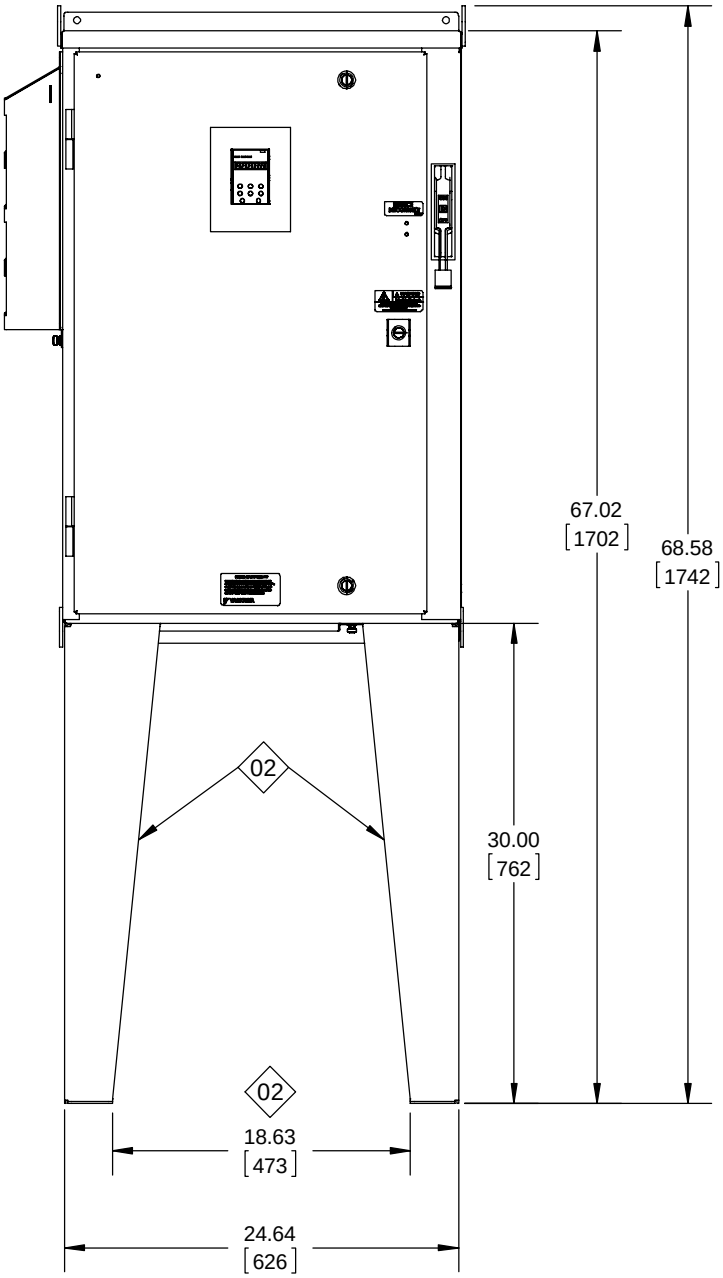
YASKAWA™

DRAWN: JDE	DATE 04/25/13	TITLE: DIMENSION DRAWING, Z1000 TYPE 3R, W3	
CHECKED: RKM	DATE 04/25/13		
TECH:	DATE	MATERIAL# ---	
APPROVED: BJJ	DATE 05/02/13	SIZE A / REVISION 02 / PAGE 1 OF 2	
ORIGINAL DESIGN: JDE	DATE 04/19/13	DRAWING #: DD.Z1.3R.W3.01	

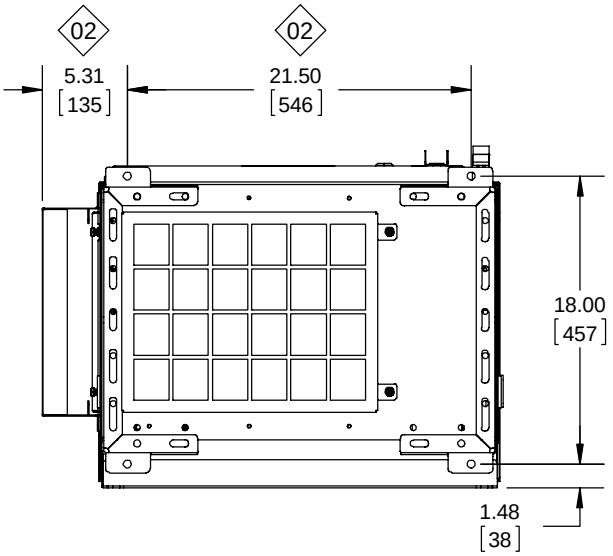
LEG STAND MOUNTING OPTION DIMENSIONS



12.0" HIGH LEGS



30.0" HIGH LEGS



NOTE: DRILL PATTERN SAME
FOR 12" AND 30" HIGH LEGS

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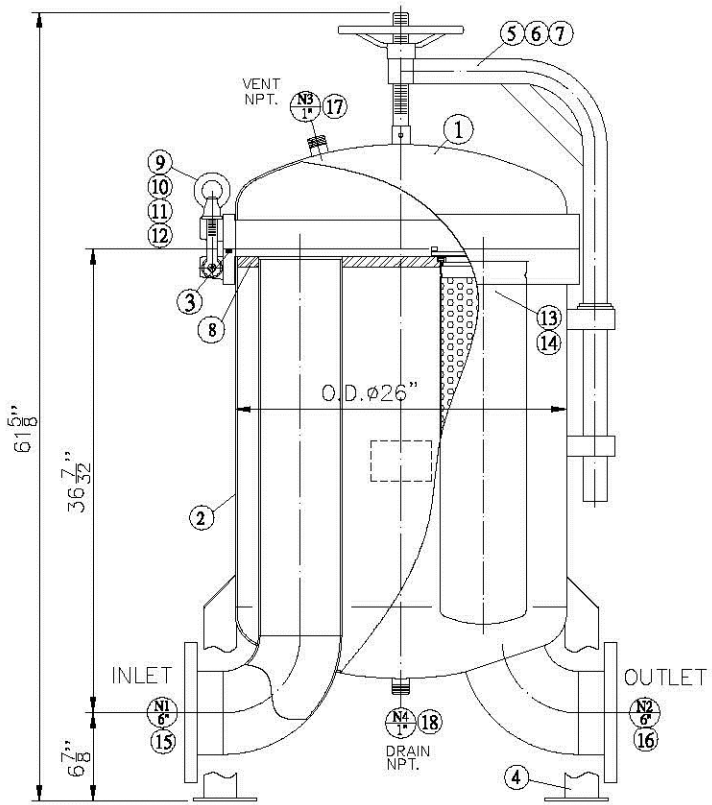
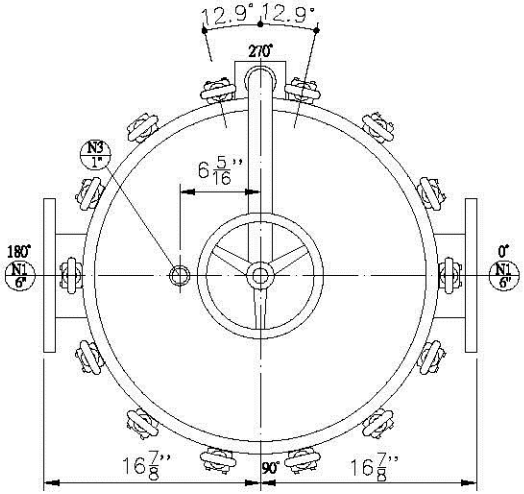
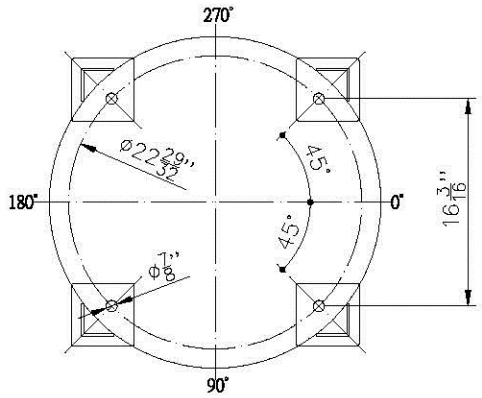
	CHECKED: RKM	DATE 04/25/13	
	TECH:	DATE	MATERIAL# ---
	APPROVED: BJJ	DATE 05/02/13	SIZE A / REVISION 02 / PAGE 2 OF 2
	ORIGINAL DESIGN: JDE	DATE 04/19/13	DRAWING #: DD.Z1.3R.W3.01



SIDE VIEW



TOP VIEW



ANCHOR

BILL OF MATERIALS
(QUANTITY PER UNIT)

PROD ORDER_____S.O_____ MFG. SERIAL NO._____

CUSTOMER_____ DESIGN __150__ PSIG __90__ °C

DESTINATION_____ MAX. A.W.P._150__ PSIG __90__ °C

CUST. P.O._____ HYDROSTATIC TESTED _225_ PSIG

CUST.EQUIP_____ CODE _____

CODE STAMP_____ N.B._____

NO OF UNITS _____ SCH SHIP DATE _____

WEIGHT EMPTY _____ KG. FULL _____ KG

NO.	DESCRIPTION	MATERIAL	UNIT	QUAN.	PART NO.
1	FILTER COVER	304		1	
2	FILTER SHELL	304		1	
3	GASKET	EPDM		1	
4	LEG WELDMENT	304		4	
5	DAVIT HANDWHEEL	304		1	
6	DAVIT SCREW	304		1	
7	DAVIT ARM	304		1	
8	SEPARATE PLATE	304		1	
9	EYENUT	304		14	
10	WASHER	304		14	
11	EYEBOLT	304		14	
12	BOLT SUPPORT	304		14	
13	BASKET	304		6	
14	BAG-LOCK DEVICE	304		6	
15	INLET 6" ANSI 150B RF	304		1	
16	OUTLET 6" ANSI 150B RF	304		1	
17	VENT NPT 1"	304		1	
18	DRAIN NPT 1"	304		1	

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA

NAME	REV: A
Multi-Bag Filter Vessel	SCALE: NONE

PROJECT NO.	ORDER NO.	ITEM NO.

DATE: UNIT: INCH

Polyester Liquid Filter Bag

Features

* Polyester liquid bag filter are available with a carbon steel ring, stainless steel ring or plastic flanges.
* Heavy-duty handle eases installation and removal
* Metal ring sewn into bag top for increased durability and positive sealing
* Wide array of media fibers to meet needed temperature and micron specifications

Applications

Polyester liquid filter bags can be used in the filtering of a wide array of industrial and commercial process fluids

Sizes

Our liquid filter bags are available for all common liquid bag housings. Dimensions range from 4.12" diameter X 8" length thru 9" diameter X 32" length.

Micron Ratings

Available fibers range from 1 to 1500 microns

Options

* Bag finish or covers for strict migration requirements.
* Plastic top O.E.M. replacements
* Multi-layered filtering capabilities for higher dirt holding capacities

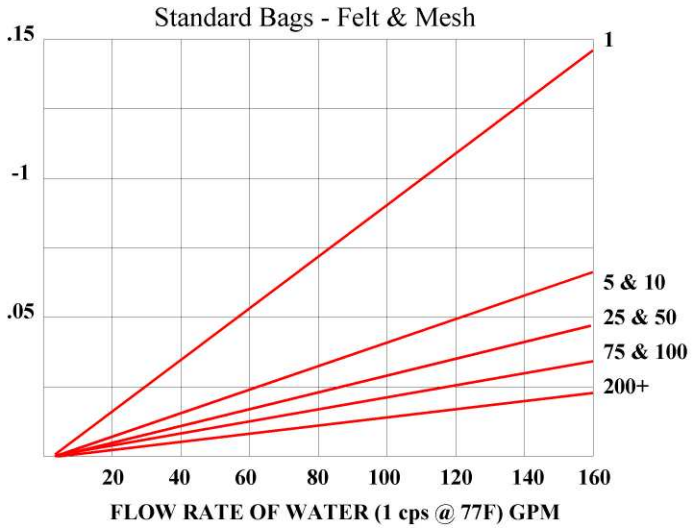
Optional Filter Media

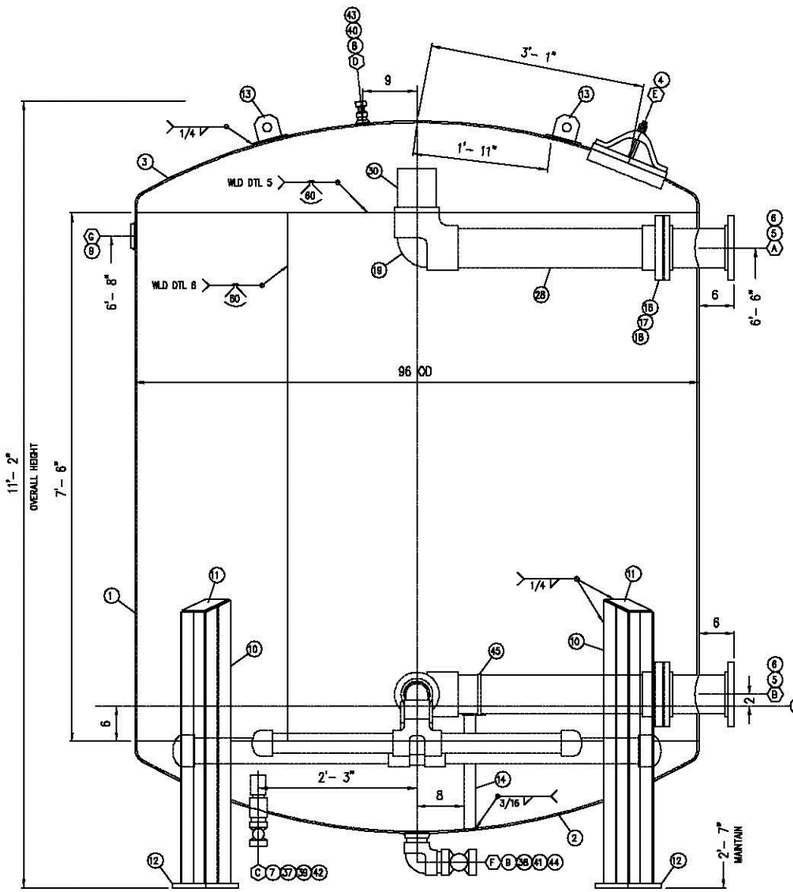
Felt: Nomex, Polyester, Polypropylene

Monofilament: Nylon, Polyester, Polypropylene

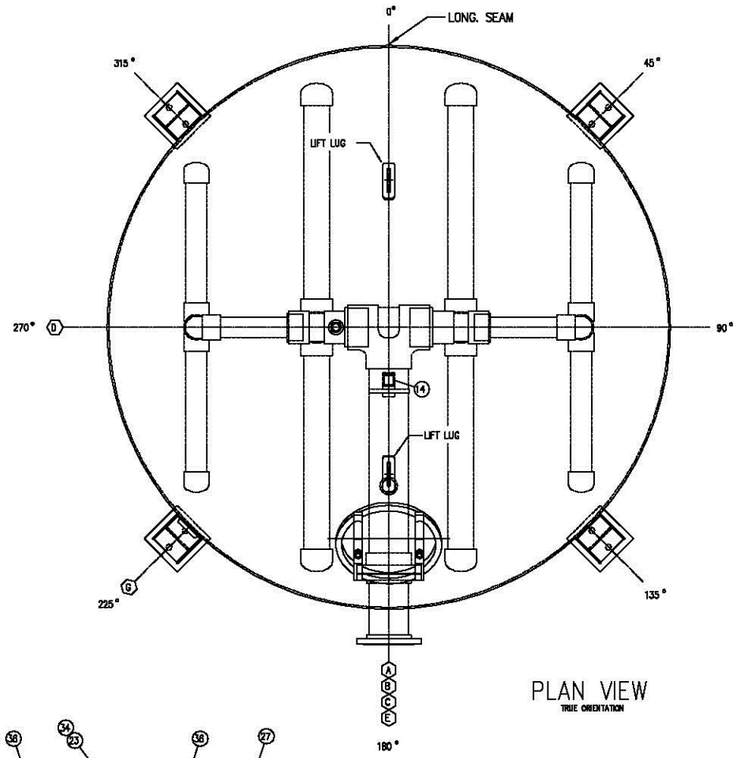
Multifilament: Nylon, Polyester

Polypropylene: Oil Removal

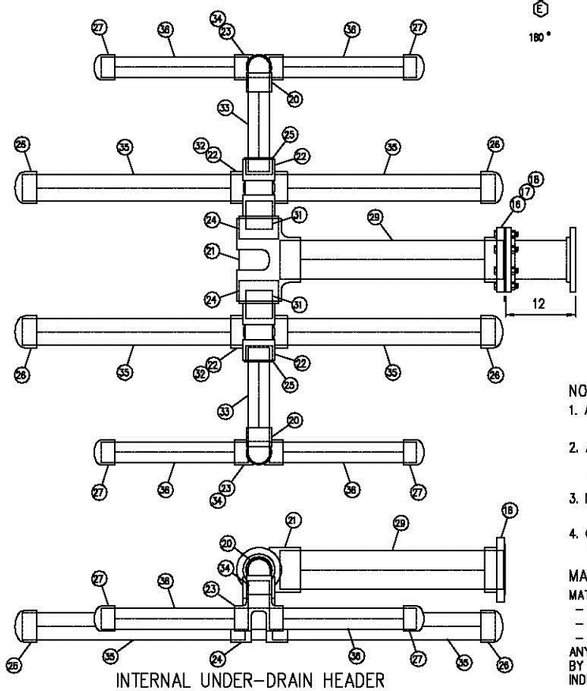




ELEVATION VIEW
NOT TRUE ORIENTATION



PLAN VIEW
TRUE ORIENTATION



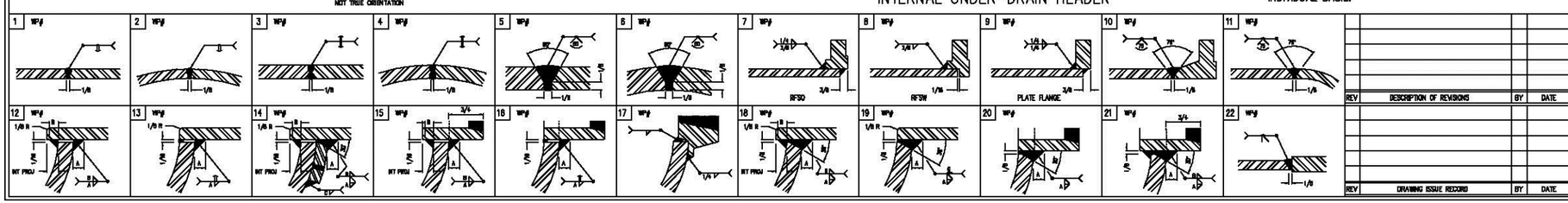
INTERNAL UNDER-DRAIN HEADER

NOTES:
1. ALL FLANGE BOLT HOLES TO STRADDLE VESSEL MAJOR CENTERLINES
2. A ROOT GAP OF 1/8" HAS BEEN ALLOWED AT ALL B.W. JOINTS TO PRODUCE PIPE LENGTHS SHOWN AND DIMENSIONED
3. NOZZLE REINFORCING PADS SHALL HAVE 1/4" – NPT TELL TALE HOLE
4. COUPLINGS SHALL HAVE 3/4" EXTERNAL PROJECTION UNLESS SHOWN OTHERWISE

MATERIAL SUBSTITUTION NOTE:

MATERIALS CONSTITUTE ACCEPTABLE ALTERNATES:
- USE OF SA-106-B IN PLACE OF SA-53-B
- USE OF SA-350-LF2 IN PLACE OF SA-105
- USE OF SA-420-WPL6 IN PLACE OF SA-234-WPB

ANY OTHER MATERIAL SUBSTITUTION MUST BE APPROVED BY ENGINEERING / Q.C.M. & A.I. IN WRITING ON AN INDIVIDUAL BASIS.



BILL OF MATERIAL

ITEM	REQ'D	PART REF	DESCRIPTION	MATERIAL SPEC	WEIGHT
1	1	SHELL	5/16" PLATE x 23'– 0 5/8" LG x 7'– 8" WIDE CAN (ROLL TO 96" OD)	HRCQ	2344
2	1	BTM HEAD	72" OD x 5/16" Nom t. NON–ASME F&D HEAD c/w 2" SF	HRCQ	731
3	1	TOP HEAD	72" OD x 5/16" Nom t. NON–ASME F&D HEAD c/w 2" SF	HRCQ	731
4	1	MANWAY	12" x 16" x 3/4" t. x 3" DEEP NECK ELLIP HATCH Cl# ___–___–___	HRCQ	38
5	4	NOZ A&B	6" – 150# RFSO FLANGE	SA–105	76
6	2	NOZ A&B	6" – STD WALL SMLS PIPE x 11 1/4" LG (PBE)	SA–53–B	34
7	1	NOZZLE C	2" – 3000# F.S. SCRD FULL COUPLING	SA–105	2
8	1	NOZZLE D	1" – NPT SERIES 250 F.S. WELD FLANGE (FLAT TYPE WITH PILOT)	SA–181	1
9	2	NOZ F&G	3" – NPT SERIES 250 F.S. WELD FLANGE (FLAT TYPE WITH PILOT)	SA–181	4
10	4	VESL LEG	6" WF @ 15 #/FT x 4'– 0 1/4" LG (SEE DETAIL)	SA–36	240
11	4	VESL LEG	1/4" x 8" FLATBAR x 5 1/2" LG (LEG TOP CAP)	SA–36	8
12	4	BASE PLT	3/4" x 8" FLATBAR x 8" LG	SA–36	52
13	2	LIFT LUG	1/2" x 4" FLATBAR x 4" LG	SA–36	4
14	1	HDR SUPT	2" x 2" x 3/16"t SQ HSS x 1'– 7 1/2" LG (SEE DETAIL)	SA–36	9
15	1	HDR SUPT	3/16" x 2" FLATBAR x 4" LG	SA–36	1
16	2	INTERNALS	6" – 150# SCH 80 PVC1 LOOSE RING VAN STONE SOCKET FLANGE	COLONIAL	
17	2	INTERNALS	6" – 150# GASKET	TREATED FIBER	
18	16	INTERNALS	3/4" DIA x 3 1/2" LG HEX HEAD MACH BOLT c/w HEX NUTS	ZINC PLATED	6
19	1	INTERNALS	6" – SCH 80 PVC1 ALL SOCKET 90 Deg ELBOW	COLONIAL	
20	2	INTERNALS	3" – SCH 80 PVC1 ALL SOCKET 90 Deg ELBOW	COLONIAL	
21	1	INTERNALS	6" – SCH 80 PVC1 ALL SOCKET TEE	COLONIAL	
22	4	INTERNALS	4" – SCH 80 PVC1 ALL SOCKET TEE	COLONIAL	
23	2	INTERNALS	3" – SCH 80 PVC1 ALL SOCKET TEE	COLONIAL	
24	2	INTERNALS	6" x 4" – SCH 80 PVC1 ALL SOCKET REDUCER BUSHING	COLONIAL	
25	2	INTERNALS	4" x 3" – SCH 80 PVC1 ALL SOCKET REDUCER BUSHING	COLONIAL	
26	4	INTERNALS	4" – SCH 80 PVC1 SOCKET CAP	COLONIAL	
27	4	INTERNALS	3" – SCH 80 PVC1 SOCKET CAP	COLONIAL	
28	1	INTERNALS	6" – SCH 80 PVC PIPE x 3'– 2 3/16" LG	PVC PLASTIC	
29	1	INTERNALS	6" – SCH 80 PVC PIPE x 3'– 2 3/16" LG	PVC PLASTIC	
30	1	INTERNALS	6" – SCH 80 PVC PIPE x 10" LG	PVC PLASTIC	
31	2	INTERNALS	4" – SCH 80 PVC PIPE x 4 13/16" LG	PVC PLASTIC	
32	2	INTERNALS	4" – SCH 80 PVC PIPE x 5" LG	PVC PLASTIC	
33	2	INTERNALS	3" – SCH 80 PVC PIPE x 1'– 4" LG	PVC PLASTIC	
34	1	INTERNALS	3" – SCH 80 PVC PIPE x 4 11/16" LG	PVC PLASTIC	
35	4	INTERNALS	4" – SCH 40 PVC (.010) WELL SCREEN SLOTTED PIPE x 3'– 2" LG	PVC PLASTIC	
36	4	INTERNALS	3" – SCH 40 PVC (.010) WELL SCREEN SLOTTED PIPE x 2'– 1" LG	PVC PLASTIC	
37	1	INTERNALS	ORTHOS LIQ SYS MODEL R2 FILTER NOZZLE c/w 0.3 mm SLOTS & 2" MPT CONN	PLASTIC	
38	1	SLURY VLV	3" – FEMALE NPT FULL PORT BALL VALVE (RUB #S82)	FORGED BRASS	
39	1	DRAIN VLV	2" – FEMALE NPT FULL PORT BALL VALVE (RUB #S82)	FORGED BRASS	
40	1	VENT VLV	1" – FEMALE NPT FULL PORT BALL VALVE (RUB #S82)	FORGED BRASS	
41	2	SLURY VLV	3" – STD WALL CLOSE NIPPLE	SA–53–B	
42	1	DRAIN VLV	2" – STD WALL CLOSE NIPPLE	SA–53–B	
43	1	VENT VLV	1" – XH WALL CLOSE NIPPLE	SA–53–B	
44	1	SLURY VLV	3" – STD MERCHANT F.S. SCRD 90 Deg ELBOW	SA–197	
45	1	INTERNALS	6" – BAND TYPE PIPE STRAP	STAINLESS	

SCHEDULE OF OPENINGS

MARK	SIZE	QTY	RATING	TYPE	DESCRIPTION	INT PROJ	WELD DETAIL	A	B	D
A	6"	1	150#	RFSO	INLET	AS SHOWN	7 & 12	1/4	1/4	
B	6"	1	150#	RFSO	OUTLET	AS SHOWN	7 & 12	1/4	1/4	
C	2"	1	3000#	CPLG	LIQUID DRAIN	1 7/16"	16	1/4	3/16	
D	1"	1	FNPT	WLD FLG	VENT	SEE WLD DTL	17			
E	18"	1	N/A	FF FLGNK	MANWAY c/w BLIND	1 11/16"	12	1/4	1/4	
F	3"	1	FNPT	WLD FLG	GAC DISCHARGE	SEE WLD DTL	17			
G	3"	1	FNPT	WLD FLG	GAC INLET	SEE WLD DTL	17			
H										
J										
K										
L										
M										

DESIGN DATA

Registration	NOT APPLICABLE	Year Built	2000
Construction	NOT APPLICABLE	Serial No.	00–____
Design Pressure	75 PSIG	Capacity (Vol.)	451.3 cu. ft.
Design Temperature	140 Deg F (LIMITED BY INTERNALS)	Shipping Wt. (Empty)	4380 POUNDS
External Pressure	NOT APPLICABLE	Wt. full of water	_____ POUNDS
Min. Des. Metal Temp	–20 Deg F AT 75 PSIG	Gaskets	TREATED FIBER
MAWP (New & Cold)	75 PSIG (LIMITED BY HEAD)	Studs & Nuts	MILD STEEL (ZINC PLATED)
MAWP (Hot & Corr'd)	75 PSIG (LIMITED BY HEAD)	Internal Surface Prep	SANDBLAST TO SSPC–SP6
Hydro Test Pressure	5 PSIG SOAP TEST /Medium: AIR	External Surface Prep	EXTERNAL POWER CLEAN
Corrosion Allowance	NONE	Internal Coating	SERIES 120 POTAPOX PLUS 10–16 mils DFT
Radiography	NONE	External Coating	MAB PLYMASTIC (Lt GRAY) 5–7 mils DFT

REV	DESCRIPTION OF REVISIONS	BY	DATE

REV	DRAWING ISSUE RECORD	BY	DATE

89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

CUSTOMER: UNKNOWN
PROJECT: UNKNOWN

GENERAL ASSEMBLY LAYOUT – ELEVATION AND ORIENTATION
FOR
MODEL AF–10,000 FILTER 96" OD x 7' – 6" SEAM – SEAM

DRN BY	CHK'D BY	APP'D BY	DATE	SCALE	JOB No.	DRAWING No.	REV
DB (TF)	TB (TF)	EP (TF)	MAR 31/00	1" = 1'–0"	UNKNOWN	AF10000–STD	0

89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

FILTRATION MEDIA :
8x30 RE-ACTIVATED CARBON
4x10 RE-ACTIVATED CARBON

GENERAL DESCRIPTION

Select Re-Activated carbon from domestic sources is quality screened during our purchasing process for activity, density and fines. The use of re-activated carbon is recommended as a lower cost alternative for most sites where drinking water quality is not necessary. In many cases our re-activated carbon meets and exceeds imported virgin carbon. In addition all carbon either sold by itself or installed in our filtration units traced by lot number to the installation or sale.

8x30 (Liquid Phase) Standard Specifications:	Standard	Value
Iodine Number	ASTM D-4607	800 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	8x30 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

4*10 (Vapor Phase) Standard Specifications:	Standard	Value
Carbon Tetrachloride Activity Level	ASTM D-3467	40 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	4x10 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

Hydrosil International LTD.
125 Prairie Lake Road - East Dundee, IL 60118
Phone: 847-844-0680
Emergency Phone: 847-844-0680
Fax: 847-844-0799

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HS-200

Media to Remove Oil, Heavy Metals and Similar Organics from Water Safety Data Sheet

Revision date : 2017

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 - Product Identifier

Product Name: HS-200

1.2 - Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Filtration

1.3 - Details of the supplier of the safety data sheet

Hydrosil International Ltd.
125 Prairie Lake Rd
East Dundee, IL 60118

T 847-844-0680 - F 847-844-0799
www.hydrosilintl.com

1.4 - Emergency telephone number

Emergency number : 1-847-844-0680

Section 2: Hazards Identification

2.1 - Classification of the substance or mixture

GHS-US classification
Eye Dam. 1 H318
STOT SE 3 H335

2.2 - Label Elements

GHS-US labeling
Hazard pictograms (GHS-US) :

Signal word (GHS-US) : Danger
Hazard statements (GHS-US) :

H318 - Causes serious eye damage
H335 - May cause respiratory irritation

Precautionary statements (GHS-US) :

P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER/doctor/…
P312 - Call a POISON CENTER/doctor/…/if you feel unwell
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container to ...

2.3 - Other Hazards

No additional information available

2.4 - Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients

3.1 - Substances

Not applicable

3.2 - Mixture

Name	Product Identifier	%	GHS-US Classification
Zeolite	(CAS No.) 1318-02-1	85.2 - 86.2	STOT SE 3, H335
Water	(CAS No.) 7732-18-5	8.4 - 11.4	Not classified
N,N,N-Trimethyl-1-hexadecanaminium chloride	(CAS No.) 112-02-7	3.4 - 5.4	Skin Irrit. 2, H315 Eye Dam. 1, H318 Aquatic Acute 1, H400

SECTION 4: First aid measures

4.1 - Description of first aid measures

First-aid measures after inhalation : Remove person to fresh air. If not breathing, administer CPR or artificial respiration. Get immediate medical attention.
First-aid measures after skin contact : If skin reddening or irritation develops, seek medical attention.
First-aid measures after eye contact : Immediately flush eyes with plenty of water for at least 15 minutes. If irritation persists get medical attention.
First-aid measures after ingestion : If the material is swallowed, get immediate medical attention or advice. DO NOT induce vomiting unless directed to do so by medical personnel.

4.2 - Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : May cause respiratory irritation.
Symptoms/injuries after skin contact : Causes skin irritation.
Symptoms/injuries after eye contact : Causes serious eye irritation.
Symptoms/injuries after ingestion : May be harmful if swallowed.

4.3 - Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1 - Extinguishing media

Suitable extinguishing media : If involved with fire, flood with plenty of water.
Unsuitable extinguishing media : None.

5.2 - Special hazards arising from the substance or mixture

Fire hazard : None known.
Explosion hazard : None known.

5.3 - Advice for firefighters

Protection during firefighting : Firefighters should wear full protective gear.

SECTION 6: Accidental release measures

6.1 - Personal precautions, protective equipment and emergency procedures

General measures : Avoid contact with the skin and the eyes.
For non-emergency personnel : No additional information available
For emergency responders : No additional information available

6.2 - Environmental precautions

None.

6.3 - Methods and material for containment and cleaning up

For containment : If possible, stop flow of product.
Methods for cleaning up : Shovel or sweep up and put in a closed container for disposal.

6.4 - Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1 - Precautions for safe handling

Precautions for safe handling : Wet carbon/coal removes oxygen from air causing a severe hazard to workers inside carbon vessels or confined spaces.

7.2 - Conditions for safe storage, including any incompatibilities

Storage conditions : Protect containers from physical damage. Store in dry, cool, well-ventilated area.

7.3 - Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1 - Control parameters

No additional information available

8.2 - Exposure controls

Appropriate engineering controls : Local exhaust and general ventilation must be adequate to meet exposure standards.
Hand protection : Use impervious gloves.
Eye protection : Safety glasses.
Skin and body protection : Wear suitable working clothes.
Respiratory protection : If airborne concentrations are above the applicable exposure limits, use NIOSH approved respiratory protection.

SECTION 9: Physical and chemical properties

9.1 - Information on basic physical and chemical properties

Physical state : Solid
Appearance : Irregular shaped.
Color : White
Odor : No data available
Odor threshold : No data available
pH : No data available
Relative evaporation rate (butyl acetate=1) : No data available
Melting point : No data available
Freezing point : No data available
Boiling point : No data available
Flash point : No data available
Self ignition temperature : No data available
Decomposition temperature : No data available
Flammability (solid, gas) : No data available
Vapor pressure : No data available
Relative vapor density at 20 °C : No data available
Relative density : 57-59 lb/ft3
Solubility : No data available
Log Pow : No data available
Log Kow : No data available
Viscosity, kinematics : No data available
Viscosity, dynamic : No data available
Explosive properties : No data available
Oxidizing properties : No data available
Explosive limits : No data available

9.1 - Other information

No additional information available

SECTION 10: Stability and Reactivity

10.1 - Reactivity

No additional information available

10.2 - Chemical stability

Stable under normal conditions.

10.3 - Possibility of hazardous reactions

Will not occur

10.4 - Conditions to avoid

None

10.5 - Incompatible materials

Strong oxidizing and reducing agents.

10.6 - Hazardous decomposition products

Organic chlorides, amines, hydrogen chloride may be produced.

SECTION 11: Toxicological information

11.1 - Information on toxicological effects

Acute toxicity : Not classified

Zeolite (1318-02-1)	
LD50 oral rat	5000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat (mg/l)	2.4 mg/l (Exposure time: 1 h)
ATE (oral)	5000 mg/kg

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Causes serious eye damage.
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

Zeolite (1318-02-1)	
IARC group	3

Reproductive toxicity : Not classified
Specific target organ toxicity (single exposure) : May cause respiratory irritation.
Specific target organ toxicity (repeated exposure) : Not classified
Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1 - Toxicity

Zeolite (1318-02-1)	
LC50 fishes 1	1800 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [semi-static])
EC50 Daphnia 1	1000 - 1800 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 other aquatic organisms 1	18 mg/l (Exposure time: 96 h - Species: Desmodesmus subspicatus)
LC50 fish 2	3200 - 5600 mg/l (Exposure time: 96 h - Species: Oryzias latipes [semi-static])

12.2 - Persistence and degradability

No additional information available

12.3 - Bioaccumulative potential

No additional information available

12.4 - Mobility in soil

No additional information available

12.5 - Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1 - Waste treatment methods

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations.

SECTION 14: Transport information

In accordance with DOT / ADR / RID / ADNR / IMDG / ICAO / IATA

14.1 - UN number

Not applicable

14.2 - UN proper shipping name

Not applicable

SECTION 15: Regulatory information

15.1 - US Federal regulations

15.2 - US State regulations

No additional information available

SECTION 16: Other information

Full text of H-phrases:

Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Skin Irrit. 2	skin corrosion/irritation Category 2
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H315	Causes skin irritation
H318	Causes serious eye damage
H335	May cause respiratory irritation
H400	Very toxic to aquatic life

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt
medical attention is given.
NFPA fire hazard : 0 - Materials that will not burn.
NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water

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SBG1

ANION EXCHANGE RESIN TYPE ONE GEL Cl OR OH FORM

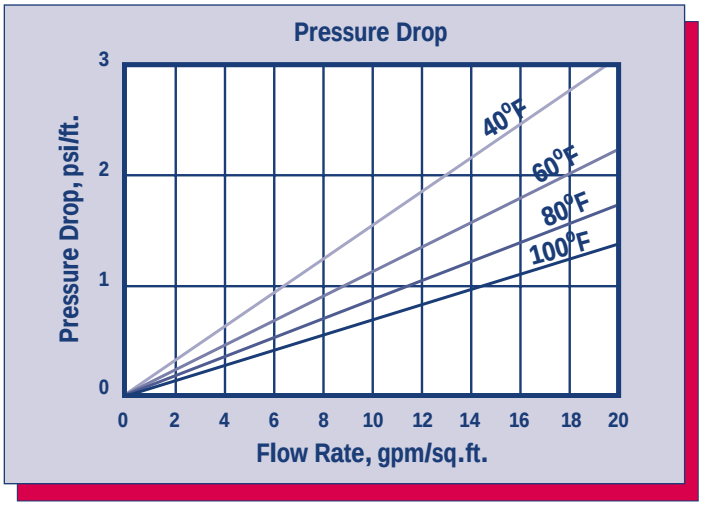
ResinTech SBG1 is a high capacity, shock resistant, gelular, Type 1, strongly basic anion exchange resin supplied in the chloride or hydroxide form as moist, tough, uniform, spherical beads. *ResinTech SBG1* is intended for use in all types of deionization systems and chemical processing applications. It is similar to *ResinTech SBG1P* but has a higher volumetric capacity and exhibits lower TOC leach rates. This makes it the better performer in single use applications such as in cartridge deionization and when high levels of regeneration are used such as in polishing mixed beds. On the other hand, *ResinTech SBG1P* is more resistant to organic fouling and gives higher operating capacities at low regeneration levels such as those used in make up demineralizers.

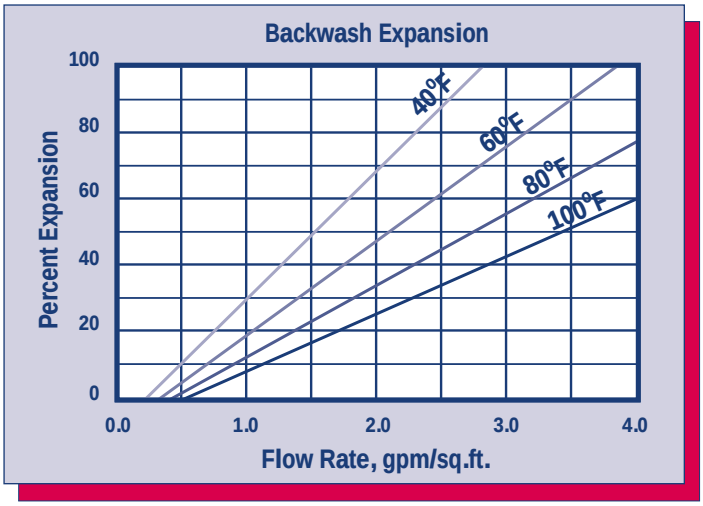
FEATURES & BENEFITS

- **COMPLIES WITH FDA REGULATIONS FOR POTABLE WATER APPLICATIONS.**
  Conforms to paragraph 21CFR173.125 of the Food Additives Regulations of the F.D.A.*
- **HIGH TOTAL CAPACITY**
  Provides longer run lengths in single use applications or where high levels of regeneration are used such as in mixed bed polishers, cartridge demineralizers.
- **UNIFORM PARTICLE SIZE**
  16 to plus 50 mesh range; gives a LOWER PRESSURE DROP while maintaining SUPERIOR KINETICS.
- **SUPERIOR PHYSICAL STABILITY**
- **LOWER TOC LEACH RATE**
  Makes it ideal for polishing mixed beds in wafer washing and other high purity water polishing applications.

*For potable water applications, the resin must be properly pre-treated, usually by multiple exhaustion and regeneration cycles, to ensure compliance with extractable levels.

HYDRAULIC PROPERTIES





PRESSURE DROP

The graph above shows the expected pressure loss per foot of bed depth as a function of flow rate, at various temperatures.

BACKWASH

After each cycle the resin bed should be backwashed at a rate that expands the bed 50 to 75 percent. This will remove any foreign matter and reclassify the bed. The graph above shows the expansion characteristics of *ResinTech SBG1* in the sodium form.

RESINTECH® SBG1

PHYSICAL PROPERTIES

Polymer Structure	Styrene Crosslinked with DVB
Functional Group	R-N-$(CH_3)_3^+Cl^-$
Ionic Form, as shipped	Chloride or Hydroxide
Physical Form	Tough, Spherical Beads
Screen Size Distribution	16 to 50
+16 mesh (U.S. Std)	< 5 percent
-50 mesh (U.S. Std)	< 1 percent
pH Range	0 to14
Sphericity	> 93 percent
Uniformity Coefficient	Approx. 1.6
Water Retention	
Chloride Form	43 to 50 percent
Hydroxide Form	Approx. 53 to 60 percent
Solubility	Insoluble
Approximate Shipping Weight	
Cl Form	44 lbs/cu.ft.
OH Form	41 lbs/cu.ft.
Swelling Cl- to OH-	18 to 25 percent
Total Capacity	
Cl Form	1.45 meq/ml min
OH Form	1.15 meq/ml min

SUGGESTED OPERATING CONDITIONS

Maximum Continuous Temperature	
Hydroxide Form	140°F
alt Form	170°F
Minimum Bed Depth	24 inches
Backwash Rate	50 to 75 percent Bed Expansion
Regenerant Concentration*	2 to 6 percent
Regenerant Flow Rate	0.25 to 1.0 gpm/cu.ft.
Regenerant Contact Time	At least 40 Minutes
Regenerant Level	4 to 10 pounds/cu.ft.
Displacement Rinse Rate	Same as Regenerant Flow Rate
Displacement Rinse Volume	10 to 15 gals/cu.ft.
Fast Rinse Rate	Same as Service Flow Rate
Fast Rinse Volume	35 to 60 gals/cu.ft.
Service Flow Rates	
Polishing Mixed Beds	3 to 15 gpm/cu.ft.
Non-Polishing Apps.	2 to 4 gpm/cu.ft.

OPERATING CAPACITY

The operating capacity of *RESINTECH SBG1* for a variety of acids at various regeneration levels when treating an influent with a concentration 500 ppm, expressed as $CaCO_3$ is shown in the following table:

Pounds NaOH/ft³	Capacity Kilograms per cubic foot			
	HCl	H_2SO_4	H_2SiO_3	H_2CO_3
4	11.3	14.0	14.7	18.6
6	12.8	16.3	17.3	19.8
8	14.3	13.3	19.5	21.6
10	15.5	20.0	22.2	22.2

APPLICATIONS

DEMINERALIZATION – *RESINTECH SBG1* is highly recommended for use in mixed bed demineralizers, wherever complete ion removal; superior physical and osmotic stability and low TOC leachables are required such as in wafer fabrication and other ultrapure applications.

RESINTECH SBG1 has high total capacity and low swelling on regeneration and provides maximum operating capacity in cartridge deionization applications. It is ideal for single use applications such as precious metal recovery, radwaste disposal and purification of toxic waste streams.

Highly crosslinked Type 1, styrenic anion exchangers have greater thermal and oxidation resistance than other types of strong base resins. They can be operated and regenerated at higher temperatures. The combination of lower porosity, high total capacity and Type 1 functionality make *RESINTECH SBG1* the resin of choice when water temperatures exceed 85°F and where the combination of carbon dioxide, borate and silica exceed 40% of the total anions.

RESINTECH SBG1P and *RESINTECH SBG1* are quite similar; the difference between them is the degree of porosity. *RESINTECH SBG1P* has greater porosity that gives it faster kinetics, and greater ability to reversibly sorb slow moving ions such as Naturally occurring Organic Matter (NOM). At lower regeneration levels and where chlorides make up a substantial portion of the anion load, or where the removal and elution of naturally occurring organics is of concern *RESINTECH SBG1P*, SBACR or SBG2 should be considered. At the higher regeneration levels used in mixed bed polishers *RESINTECH SBG1* provides higher capacity, and the lowest possible TOC leach rates.

***CAUTION:DO NOT MIX ION EXCHANGE RESIN WITH STRONG OXIDIZING AGENTS.** Nitric acid and other strong oxidizing agents can cause explosive reactions when mixed with organic materials,such as ion exchange resins.

Material Safety Data Sheets (MSDS) are available for all ResinTech Inc.products.To obtain a copy,contact your local ResinTech sales representative or our corporate headquarters. They contain important health and safety information.That information may be needed to protect your employees and customers from any known health and safety hazards associated with our products.We recommend that you secure and study the pertinent MSDS for our products and any other products being used These suggestions and data are based on information we believe to be reliable.They are offered in good faith.However we do not make any guarantee or warranty. We caution against using these products in an unsafe manner or in violation of any patents;further we assume no liability for the consequences of any such actions.

Safety Data Sheet

Product Names: SBG1, SBG1-HP, SBG1-UPS, SBG1-C, SBG1-F, SBMP1, SBMP1-UPS, GP-SBA, SBG1P, SBG1P-UPS

(Type I Strong Base Anion Exchange Resin Chloride Form)

Effective date 31 March 2015

Section 1: Identification

1a	Product Names	ResinTech SBG1, SBG1-HP, SBG1-UPS, SBG1-C, SBG1-F, SBMP1, SBMP1-UPS, GP-SBA, SBG1P, SBG1P-UPS
1b	Common Name	Type I Strong base anion resin in the chloride form.
1c	Intended use	All general purpose anion exchanges for general use including salt form and demineralization.
1d	Manufacturer Address	ResinTech, Inc. 160 Cooper Road, West Berlin, NJ 08091 USA
	Phone Email	856-768-9600 ixresin@resintech.com

Section 2: Hazard Identification

2a Hazard classification — Not hazardous or dangerous

Product Hazard Rating	Scale
Health = 0	0 = Negligible
Fire = 1	1 = Slight
Reactivity = 0	2 = Moderate
Special – N/A	3 = High
	4 = Extreme

2b Product description — White, yellow, or orange colored solid beads approximately 0.6 mm diameter with little or no odor.

2c Precautions for use — Safety glasses and gloves recommended. Slipping hazard if spilled.

2c Potential health effects — Will cause eye irritation. Will cause skin skin irritation. Ingestion is not likely to pose a health risk.

2d Environmental effects — This product may alter the pH of any water that contacts it.

Section 2A: Hazard classification UN OSHA globally harmonized system

WARNING

(contains ion exchange resin)

H320: Causes eye irritation

Precautionary Statements

P264: Wash hands thoroughly after handling.

P280: Wear protective gloves/protective clothing/eye protection/face protection

P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.

P333+313: If skin irritation or a rash occurs: Get medical advice/attention.

P337+313: If eye irritation persists get medical advice/attention.

P403+233: Store in a well-ventilated place. Keep container tightly closed.

P411: Store at temperatures not exceeding 50 °C/ 122 °F.

Please refer to the safety data sheet for additional information regarding this product

ResinTech, Inc.
160 Cooper Road
West Berlin, NJ 08091-9234
856 768-9600
lxresin@resintech.com

Section 3: Composition/ Information on Ingredients

3a	Chemical name	Trimethylamine functionalized chloromethylated copolymer of polystyrene in the chloride form.
3b	Ingredients Trimethylamine functionalized Chloromethlyated copolymer of Styrene and divinylbenzene in the Chloride form	CAS# 60177-39-1 (35 - 65%)
	Water	CAS# 7732-18-5 (35 – 65%)

Section 4: First Aid Measures

4a	Inhalation	No adverse effects expected- normal use of product does not produce odors or vapors.
4b	Skin	Wash with soap and water- seek medical attention if a rash develops.
4c	Eye contact	Wash immediately with water-seek attention if discomfort continues.
4d	Ingestion	No adverse effects expected for small amounts, larger amounts can cause stomach irritation. Seek medical attention if discomfort occurs.

Section 5: Fire Fighting Measures

5a	Flammability	NFPA Fire rating = 1
5b	Extinguishing media	Water, CO2, foam, dry powder.
5c	Fire fighting Procedures	Follow general fire fighting procedures indicated in the work place. Seek medical attention if discomfort continues.
5d	Protective Equipment	MSHA/NIOSH approved self-contained breathing gear, full protective clothing.
5e	Combustion Products	Carbon oxides and other toxic gasses and vapors.
5f	Unusual Hazards	Product is not combustible until moisture is removed. Resin begins to burn at approximately 230º C. Auto ignition can occur above 500º C.

Section 6: Accidental Release Measures

6a	Personal Precautions	Keep people away, spilled resin can be a slipping hazard, wear gloves and safety glasses to minimize skin or eye contact.
6b	Incompatible Chemicals	Strong oxidants can create risk of combustion products similar to burning, exposure to strong bases can cause a rapid temperature increase.
6c	Environmental Precautions	Keep out of public sewers and waterways.
6d	Containment Materials	Use plastic or paper containers, unlined metal containers not recommended.
6e	Methods of Clean-up	Sweep up material and transfer to containers.

Section 7: Handling and Storage

7a	Handling	Avoid prolonged skin contact. Keep resin moist and avoid allowing resin to completely dry.
7b	Storage	Store in a cool dry place (0º to 45º C) in the original shipping container. This product is thermally sensitive and will have reduced shelf life if subjected to extended periods of time at temperatures exceeding 50º C. Although freezing does not usually damage ion exchange resins, avoid repeated freeze thaw cycles.
7c	TSCA considerations	Ion exchange resins should be listed on the TSCA Inventory in compliance with State and Federal Regulations.

Section 8: Exposure Controls/Personal Protection

8a	OSHA exposure limits	None noted.
8b	Engineering Controls	Provide adequate ventilation.
8c	Personal Protection Measures	
	Eye Protection	Safety glasses or goggles.
	Respiratory Protection	Not required for normal use.
	Protective Gloves	Not required for limited exposure but recommended for extended contact.

Section 9: Physical and Chemical Properties

Appearance	Amber, yellow, or red beads approx. 0.6 mm diameter.
Flammability or explosive limits	Flammable above 500º C
Odor	Little or no odor
Physical State	Solid
Vapor pressure	Not available
Odor threshold	Not available
Vapor density	Not available
pH	Near neutral (6 to 8 typical)
Relative density	Approx 710 grams/Liter
Melting point/freezing point	Does not melt, freezes at approx. 0 C
Solubility	Insoluble in water and most solvents
Boiling point	Does not boil
Flash point	Approx 500º C
Evaporation rate	Does not evaporate
Partition Coefficient (n-octonol/water)	Not applicable
Auto-ignition temperature	Approx 500º C
Decomposition temperature	Above 230º C
Viscosity	Not applicable

Section 10: Stability and Reactivity

10a Stability	Stable under normal conditions.
10b Conditions to Avoid	Heat, exposure to strong oxidants.
10c Hazardous by-products	Trimethylamine, charred polystyrene, aromatic acids and hydrocarbons, organic amines, nitrogen oxides, carbon oxides, chlorinated hydrocarbons.
10d Incompatible materials	Strong oxidizing agents, e.g. nitric acid (such as HNO_3)
10e Hazardous Polymerization	Does not occur

Section 11: Toxicological Information

11a Likely Routes of Exposure	Oral, skin or eye contact.
11b Effects of exposure	
Delayed	None known.
Immediate (acute)	None known.
Chronic	None known.
11c Toxicity Measures	
Skin Adsorption	Unlikely, some transfer of acidity is possible.
Ingestion	Oral toxicity believed to be low but no LD50 has been established.
Inhalation	Unknown, vapors are very unlikely due to physical properties (insoluble solid).
11d Toxicity Symptoms	
Skin Adsorption	Mild Rash.
Ingestion	Indigestion or general malaise.
Inhalation	Unknown.
11e Carcinogenicity	None known

Section 12: Ecological information

12a Eco toxicity	Not acutely harmful to plant or animal life.
12b Mobility	Insoluble, acidity or causticity may escape if wet.
12c Biodegradability	Not biodegradable.
12d Bioaccumulation	Insignificant.
12e Other adverse effects	Not Harmful to the environment.

Section 13: Disposal Considerations

13a General considerations	Material is non-hazardous. However, unused material can cause a pH change when wetted.
13b Disposal Containers	Most plastic and paper containers are suitable. Avoid use of unlined metal containers.
13c Disposal methods	No specific method necessary.
13d Sewage Disposal	Not recommended.

13e	Precautions for incineration	May release trimethylamine and toxic vapors when burned.
13f	Precautions for landfills	Resins used to remove hazardous materials may then become hazardous mixtures

Section 14: Transportation Information

14a	Transportation Class	Not classified as a dangerous good for transport by land, sea, or air.
14b	TDG	Not regulated.
14c	IATA	Not regulated.
14d	DOT (49 CFR 172.101)	Not Regulated.

Section 15: Regulatory Information

15a	CERCLA	Not regulated
15b	SARA Title III	Not regulated
15c	Clean Air act	Not regulated
15d	Clean Water Act	Not regulated
15e	TSCA	Not regulated
15f	Canadian Regulations	
	WHMIS	Not a controlled product
	TDG	Not regulated
15g	Mexican Regulations	Not Dangerous

Section 16: Other Information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features. Regulatory requirements are subject to change and may differ from one location to another. It is the buyer's responsibility to ensure that their activities comply with federal, state, and local laws.

16a Date of Revision 31 March 2015

ZENNER PERFORMANCE
Cast Iron Turbine Meters
Sizes 2” through 12”

INTRODUCTION: ZENNER PERFORMANCE Turbine Meters are designed for applications where flows are usually moderate to high and occasionally low. They are used in measurement of potable cold water in commercial and industrial services where flows are in one direction.

OPERATION: Water flows through the turbine section which causes the rotor to turn proportionately to the quantity of water flowing through the meter. A drive magnet transmits the motion of the rotor to a driven magnet located within the hermetically sealed register. The magnet is connected to a gear train which translates the rotations into volume totalization displayed on the register dial face. The only moving parts in the meter are the rotor assembly and vertical shaft .

CONSTRUCTION: ZENNER PERFORMANCE Turbine Meters consist of three basic components: Cast Iron Epoxy Coated main case, measuring element, and sealed register. The measuring element assembly includes the rotor assembly, vertical shaft and a calibration vane which eliminates the need for calibration change gears.

MAINTENANCE: ZENNER PERFORMANCE Turbine Meters are engineered and manufactured to provide long-term service and operate virtually maintenance free. If necessary the universal measuring element (UME) can be removed from the main case for maintenance. Interchangeability of certain parts between like sized meters minimizes spare parts inventory.

CONFORMANCE: ZENNER PERFORMANCE Turbine Meters are tested and comply with AWWA C701 Class II performance standards.

STRAINERS: ZENNER PERFORMANCE recommends the use of a separate strainer upstream from the turbine meter. Strainers reduce the chance of damage to the rotor as well as the frequency in which it must be removed for inspection. The lack of a strainer may void the warranty of the turbine meter.

CONNECTIONS: Companion flanges for installation of meters on various pipe types and sizes are available in bronze or cast iron.

PMT04

PMT06

ZENNER PERFORMANCE
15280 Addison Rd #340, Addison, TX 75001, (972) 386-6611, Fax (972) 386-1814
www.zennerusa.com

MODEL		PMT02	PMT03	PMT04	PMT06	PMT08	PMT10	PMT12
SIZE		2"	3"	4"	6"	8"	10"	12"
Flow rate maximum intermittent	USGPM	400	550	1250	2500	4500	7000	8800
Maximum continuous	USGPM	200	450	1000	2000	3500	5500	6200
Optimum operating flow range	USGPM	3 - 200	5 - 550	10 - 1250	20 - 2500	30 - 4500	50 - 7000	90 - 8800
Low flow rate	USGPM	2	2-1/2	5	12	20	45	65
Start-up flow rate	USGPM	7/8	1-1/8	1-3/8	7-1/2	8	15	15
Maximum Working Pressure	P.S.I.	160	160	160	160	160	160	160
Maximum Temperature	Deg. F	140	140	140	140	140	140	140
Length	Inches	7-7/8	8-7/8	9-7/8	11-7/8	13-3/4	17-3/4	19-5/8
Height	Inches	9-1/2	10-1/4	11	12-7/8	14-1/4	19	20-1/4
Width	Inches	7	7-1/2	9	11	13-1/2	16	19
Weight	Pounds	24	32	38	84	126	225	255
Number of holes per flange		4	4	8	8	8	12	12

ZENNER PERFORMANCE
15280 Addison Rd #340, Addison, TX 75001, (972) 386-6611, Fax (972) 386-1814
www.zennerusa.com

Appendix D

Supplemental Information

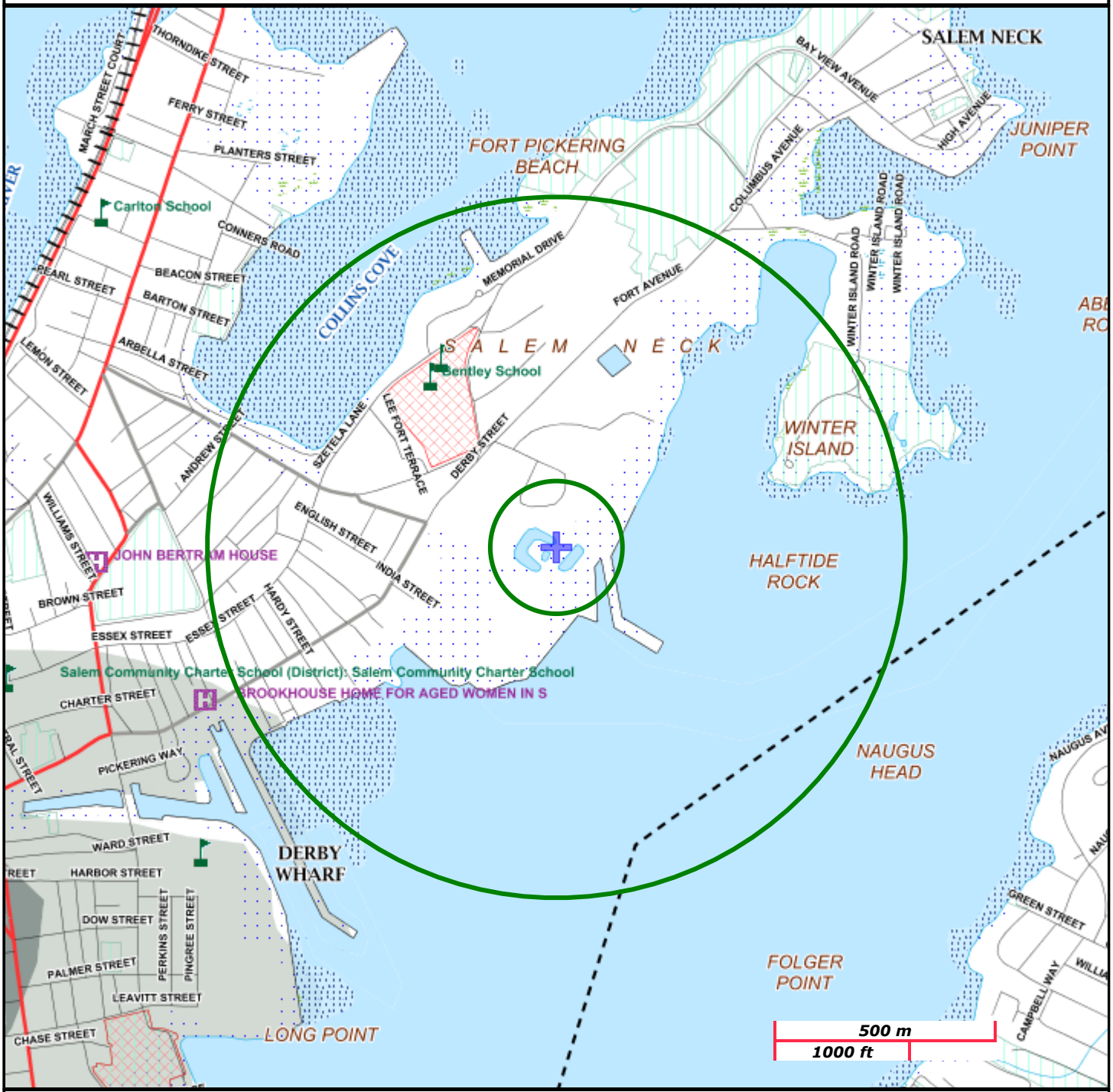
MassDEP - Bureau of Waste Site Cleanup

Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
SALEM POWER PLANT
25 DERBY STREET SALEM, MA
3-000021283
NAD83 UTM Meters:
4709728mN , 345782mE (Zone: 19)
August 3, 2018

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct
Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam
Aquifers: Medium Yield, High Yield, EPA Sole Source
Non Potential Drinking Water Source Area: Medium, High (Yield)
PWS Protection Areas: Zone II, IWPA, Zone A
Hydrography: Open Water, PWS Reservoir, Tidal Flat
Wetlands: Freshwater, Saltwater, Cranberry Bog
FEMA 100yr Floodplain; Protected Open Space; ACEC
Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential
Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

Documentation of the Results of the ESA Eligibility Determination:

Using information in Appendix IV of the NPDES DGP, the project located at 25 Derby Street, Salem, MA is eligible for coverage under this general permit under FWS Criterion C. This project is located in Essex County. No designated critical habitats were listed in the project area.

An Endangered Species Consultation was conducted on the U.S. Fish & Wildlife Service New England Field Office ECOS IPaC webpage for the Site:

- The Northern long-eared bat was listed as "Threatened" wherever it is found;
- The Roseate Tern was listed as "Endangered" in the Northeast and may occur within the boundary of the project area;

Based upon a discussion with the U.S. Fish & Wildlife Service (USFWS), temporary dewatering activities at the site are not expected to impact the Northern Long-eared Bat or the Red-Knot.

Northern long-eared bats spend winter hibernating in caves and mines. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). There are no caves and mines located at the site. There are trees in the immediate vicinity of the site; however, tree removal is not part of the scope of work related to this Notice of Intent. Therefore, temporary dewatering activities will have "no impact" to the Northern Long-eared Bat.

Roseate Terns are predominately tropical seabirds, breeding on small islands and protected beaches in tropical oceans across the world. Roseate Terns are exclusively marine, and they usually breed on small islands or on sand dunes at the end of barrier beaches. Roseate Terns arrive on their breeding grounds in late spring and are generally present in the northeastern United States through the early fall. There are no critical habitats within the project area.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2018-SLI-2606
Event Code: 05E1NE00-2018-E-06090
Project Name: Salem Power Plant

August 03, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2606

Event Code: 05E1NE00-2018-E-06090

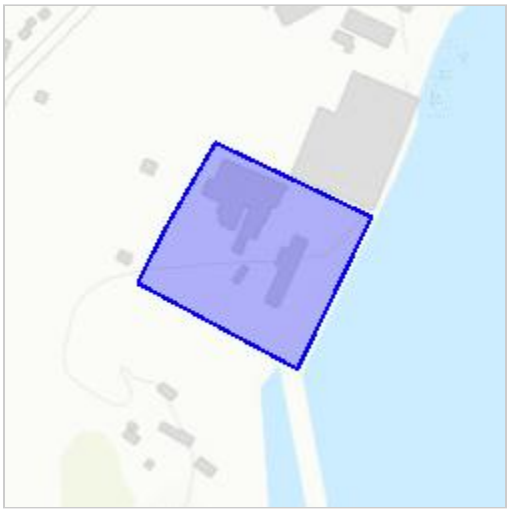
Project Name: Salem Power Plant

Project Type: ** OTHER **

Project Description: Construction Dewatering

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.5252797786971N70.87673225928044W



Counties: Essex, MA

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Roseate Tern *Sterna dougallii dougallii* Population: northeast U.S. nesting pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2083	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Documentation of the National Historic Preservation Act Eligibility Determination:

As part of this permit, a determination was made as to whether there were any historic properties or places listed on the national register in the path of the discharge or in the vicinity of the construction of treatment systems or BMPs related to the discharge. A search on the Massachusetts Cultural Resource Information System Database did not list any potential properties on or near the project site in the database. Therefore, the proposed discharge will not have the potential to cause effects on historical properties.

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Salem; Street No: 25; Street Name: Derby St; Resource Type(s): Area, Building, Burial Ground, Object, Structure;

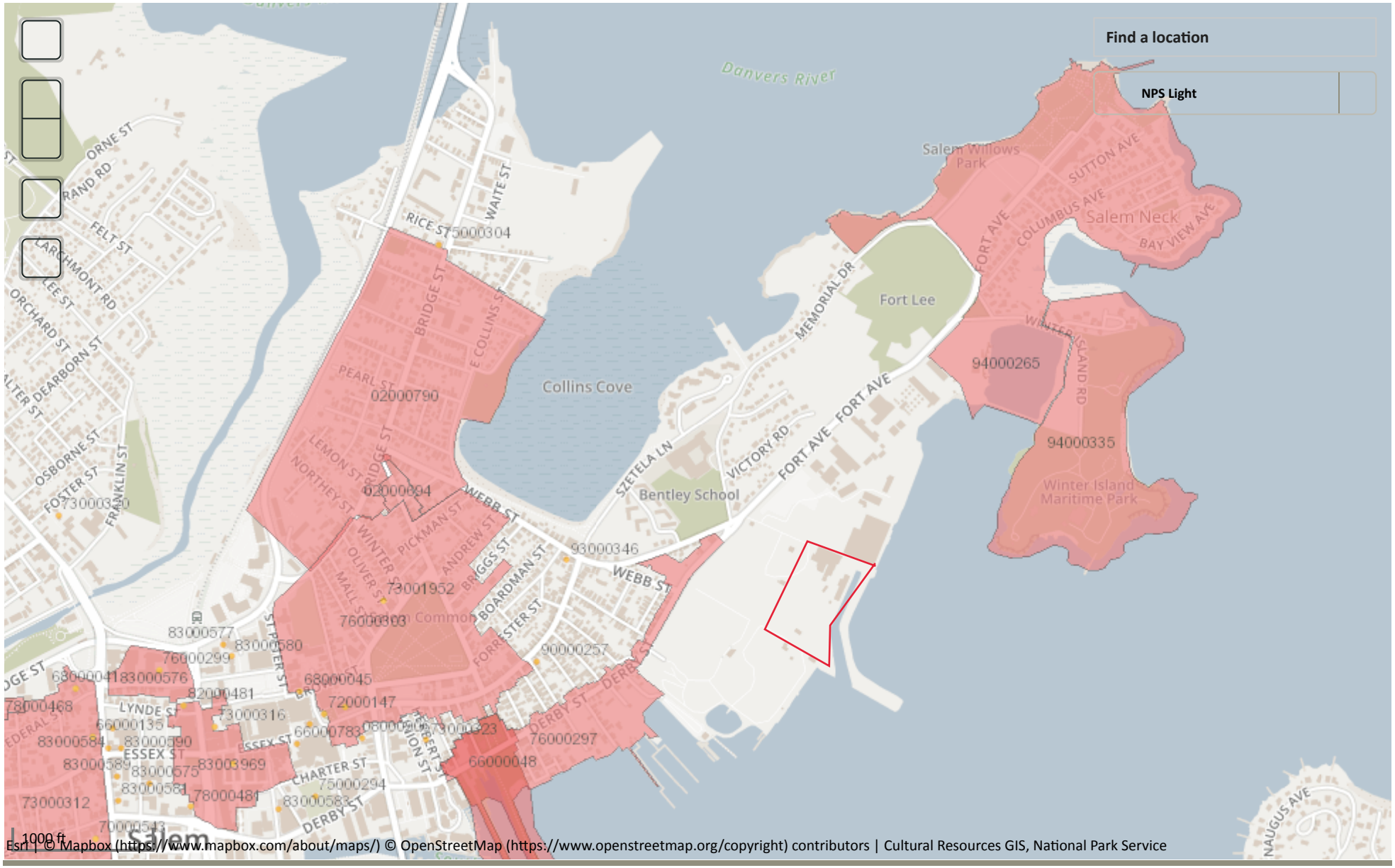
Inv. No.	Property Name	Street	Town	Year

National Register of Historic Places

Public, non-restricted data depicting National Register spatial data processed by the Cultural Resources GIS facility. ...

National Park Service
U.S. Department of the Interior

= Site Boundary



Contact Us (https://www.nps.gov/contacts.htm)

Appendix E

Public Notification

89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

August 22, 2018

Mayor Kimberly Driscoll
Salem City Hall
93 Washington Street
Salem, Massachusetts 01970

Reference: **Notification of Filing of Notice of Intent - Remediation General Permit**
Salem Power Plant
25 Derby Street
Salem, Massachusetts

Dear Mayor Driscoll:

On behalf of United Civil, Inc. (United Civil), Lockwood Remediation Technologies, LLC (LRT) is providing notification that a Notice of Intent (NOI) has been filed with the United States Environmental Protection Agency (EPA) requesting coverage under the EPA's Remediation General Permit (RGP) for the above-reference project. The NOI is specific to the discharge of treated water that will be generated during construction dewatering activities related to the installation of subsurface utilities. The treated water will be discharged to Salem Harbor, and work is anticipated to begin in September 2018. A copy of the NOI can be provided upon request.

Please contact me at 774-450-7177 if you have any questions or require additional information.

Sincerely,
Lockwood Remediation Technologies, LLC

John Henry

John J. Henry, PE
Senior Project Manager

cc: Shauna Little – EPA
Jeff Schena and Fred Carriglio – United Civil
Scott Silverstein – Footprint Power