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REPORT

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CITY OF
Portsmouth
NEW HAMPSHIRE

Pease Pilot Testing Program
FINAL

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EXECUTIVE SUMMARY

The City is currently working to install granular activated carbon filters to remove perfluoroalkyl substances (PFAS) from water supplied by the Smith, Harrison and Haven Wells. To facilitate an appropriate final design, Weston & Sampson and the City of Portsmouth (City) have implemented both pilot and demonstration testing using activated carbon filtration (Calgon Filtrasorb 400). The pilot testing was run with and without aeration pre-treatment. The primary purpose of the pilot study was to test general water chemistry prior to and following treatment to evaluate the corrosivity impacts to the distribution system and customer plumbing from any changes in water quality after filtration. In addition, we also reviewed head loss through the carbon filters and the removal of PFAS, during the initial five-week pilot testing period.

The five-week pilot testing demonstrated that the filtered water quality has similar water quality corrosivity parameters to the existing distribution system water quality after the media is conditioned onsite for several days. The media was conditioned by running the raw well water through it. The combination of pilot testing and water quality modeling confirm these results. Because of the initial increase in filtered water pH after the carbon media, we recommend that the City purchase pre-neutralized carbon media to avoid having to run the initial filtered water to waste for several days.

There is radon present in the well water which the carbon will adsorb without compromising the capacity to remove PFAS. The longer the carbon filter is in service, the more likely the carbon media may be classified as a low-level radioactive material. Carbon manufacturers will not accept radioactive media. It should be noted the effluent drinking water would be radon free. Because of this, it is our recommendation that aeration be installed prior to the carbon filters to remove the radon.

Under most circumstances, pretreatment aeration will slightly increase the pH and slightly decrease the corrosivity of the water entering the distribution system. Because there can and will be changes in the blend of Pease WTP and Portsmouth main service system water and also in the surface water and groundwater proportions of the Portsmouth main service system water, we recommend additional water quality sampling to help determine the range of potential water quality entering the distribution system relative to corrosivity.

The pilot test flow rate was equal to or greater than the maximum design flow of the full-scale system based on a calculation of total bed volumes per minute. There was no excessive pressure loss across the media during the five weeks of operation. Low levels of total organic carbon (TOC) in the Harrison and Smith well water may slightly reduce the longevity of the carbon media. The demonstration testing will provide more conclusive data relative to pressure loss and the effect of TOC on the media.

PFAS removal was confirmed during pilot testing. The run time at which PFAS breakthrough occurs could not be determined during the initial five-week pilot test. Determining the run time of the media is one of the goals of the demonstration testing. This will be particularly important for the City in determining the long-term operating parameters for the full treatment system and subsequent agreements with the Air Force to fund these costs.

1.0 INTRODUCTION

1.1 General

In April 2014, the United States Air Force (USAF) and its contractors conducted water quality sampling of several of the City of Portsmouth's drinking water supply wells after high levels of perfluoroalkyl substances (PFAS) were identified in the groundwater at the former Pease Air Force Base Fire Training Area. Testing results indicated that two of the PFAS, perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected above EPA's provisional health advisory levels of the Haven Well. In May 2014, the City of Portsmouth (City) was notified of these results and discontinued the use of the Haven Well from service. Monitoring of the City's water supply wells and nearby groundwater has been ongoing since that time. Since that time, in May 2016, the EPA established a lifetime health advisory of 0.07 parts per billion (ppb) for individual or combined levels of PFOS and PFOA. The City is currently working to return the Haven Well to service while ensuring that adequate treatment is in place to remove PFAS to below acceptable drinking water lifetime health advisory levels. It should be noted that EPA's health advisory levels are not enforceable drinking water limits, but are used to provide information on contaminants in drinking water that can cause human health effects.

In April 2016, the City, the Pease Development Authority (PDA) and the USAF announced the execution of an agreement to conduct pilot and demonstration testing of granular activated carbon (GAC) filters to remove PFAS from water supplied by the Smith, Harrison and Haven Wells at the Pease Tradeport water treatment plant (Pease WTP). Weston & Sampson was retained by the City to conduct the pilot and demonstration testing to obtain data for the final design. The purpose of the pilot testing was to test general water chemistry prior to and following treatment to evaluate the corrosivity impacts to the distribution system and customer plumbing from any changes in water quality after filtration. We also monitored head loss through carbon filters and confirmed the removal of PFAS. The purpose of the demonstration testing for the Harrison and Smith wells (to be conducted starting in September) is to review the effectiveness of the technology and the performance of the proposed system as well as establish final design parameters. This report summarizes the results of the pilot testing.

1.2 Pease Water System

The Pease International Tradeport (Tradeport) is home to commercial and industrial developments with over 250 companies and is continuing to grow. The near 10,000 employees in this area create a significant daytime water demand. The Tradeport and some abutting residential areas in Newington make up the Pease Pressure Zone. Current and future average day demands (ADD) and average day demands during the highest demand month for the Pease Pressure Zone system were estimated in the City's 2013 Water System Master Plan. The Plan's water use estimates for 2015 are 0.49 and 0.79 million gallons per day (mgd), for the ADD and ADD during the highest demand month, respectively, while 2030 demand projections are 0.60 mgd and 0.97 mgd, respectively. The City reports that the current maximum day demand is approximately 1.2 mgd. The 600,000-gallon Hobbs Hill tank with an overflow elevation of 230 feet is used as the controlling tank in the Pease Pressure Zone.

The City of Portsmouth's Harrison, Smith, and Haven municipal wells have historically provided drinking water to the Tradeport system. In addition, portions of Newington were connected to the Tradeport in 2014 at the Town's request to increase water pressure in their community. The Tradeport supply is supplemented through the Pease booster pumps, which are connected to the City's main pressure zone. All of these sources are piped through the Pease WTP. Since the PFAS contamination of the Haven Well was discovered in May 2014, the City has been using these booster pumps to blend water in the Pease Pressure Zone, combining water from the Harrison and Smith Wells at approximately 50% of flow with water from the City's other surface and groundwater sources at 50% of flow.

1.3 Source Water Quality

Raw well water is treated at the Pease WTP with chlorine, fluoride and an ortho/polyphosphate blend for corrosion control. The Harrison and Smith wells currently supply the Pease Pressure Zone with drinking water that meets federal and state drinking water regulatory standards. The Haven Well is currently offline. Prior to the detection of PFAS in this well, the Haven well also met all drinking water standards.

Background water quality data was collected and compiled in support of Weston & Sampson's February 2016 Conceptual Design Report evaluating the potential effectiveness of carbon filtration media. Table 1 summarizes the water quality for parameters of interest and concern.

Water quality testing has discovered the presence of PFAS in all three of these wells, with the Haven well exceeding the lifetime health advisory level set by the EPA for combined PFOS and PFOA at 0.07 ppb. The PFOS and PFOA levels in the Harrison and Smith wells have been consistently measured at levels below the lifetime health advisory level. Several other PFAS are also found in very low, estimated levels in all of the wells.

1.4 Scope of Services

The scope of services for this project included the following tasks:

1. Obtain the services of Blueleaf, Inc. to construct a pilot unit with the equipment necessary to perform testing.
2. Provide pilot start up, operational, sampling, and reporting services for a five-week period of piloting at the Pease WTP site for treatment of the Harrison and Smith Wells and as detailed below.
    a. Perform installation and mobilization of the pilot equipment including columns filled with carbon media, tanks, flow meters, valves, miscellaneous parts and materials as required.
    b. Initial backwash water was collected in containers and disposed of properly.
    c. Provide initial startup and operation of the pilot plant, including calibration.
    d. Perform daily field water quality sampling for conductivity, pH, dissolved oxygen, and temperature.
    e. Collect startup and weekly samples for laboratory analysis for arsenic, iron, manganese, apparent color, total organic carbon (TOC), turbidity, total dissolved solids (TDS), alkalinity, calcium, and sulfates.
    f. Collect startup and end of pilot study samples for radionuclides.
    g. Perform testing using raw well water from the sources and testing on aerated source water.
    h. Assist in the removal of pilot plant at the completion of the study and clean the area.

3. Prepare and submit the pilot report to the City. The report shall include:
    a. A summary of all tasks completed for the pilot testing.
    b. Results of all field and laboratory tests, data and calculations.
    c. Findings, conclusions, and analysis of the impact of carbon treated water on the City's general water chemistry.

Table 1
Existing Water Quality Parameters (2003-2015)*

		Harrison			Smith			Haven		
		Median		(Sample	Median		(Sample	Median		(Sample
Parameter	Units	Min.	Max.	Count)	Min.	Max.	Count)	Min.	Max.	Count)
Arsenic	mg/L	ND		(4)	0.0018		(3)	ND		(5)
		ND	ND		0.0011	0.011		ND	ND	
Calcium**	mg/L	39		(1)	54		(1)	No Data (0)		
		39	39		54	54				
Iron	mg/L	0.095		(5)	ND		(5)	ND		(5)
		0.06	0.13		ND	ND		ND	ND	
Manganese	mg/L	ND		(5)	0.0198		(2)	0.1593		(5)
		ND	ND		0.0067	0.0329		0.0189	0.192	
Alkalinity	mg/L (as CaCO3)	96		(7)	116		(2)	150		(2)
		84	104		105	127		148	152	
Hardness	mg/L (as CaCO3)	100		(11)	216.4		(5)	160.7		
		69	160		156	234.2		150.3	166.5	(5)
Nitrate	mg/L	2.1		(13)	2		(5)	1.24		(4)
		1.2	2.7		1.5	7.45		0.48	2.72	
Sulfate	mg/L	19		(4)	15		(5)	15		(5)
		16	21		13	17		12	20	
Radium (-226 and -228) ***	pCi/L	1.29		(2)	ND			ND		
		0.1	1.29		ND	ND		ND	ND	
Radon***	pCi/L	1126		(2)	821		(2)	1200		(1)
		1060	1191		742	900		1200	1200	
Uranium*** (Activity)	pCi/L	0.33		(1)	ND			ND		
		0.33	0.33		ND	ND		ND	ND	
Uranium*** (Mass)	ug/L	0.492		(1)	1.000		(1)	ND		(1)
		0.492	0.492		1.000	1.000		ND	ND	
TOC**	mg/L	<1		(1)	<1		(1)	No Data (0)		
		<1	<1		<1	<1				
VOC	mg/L	ND		(2)	ND		(2)	ND - trace amounts of DCE and TCE in sentry wells		
		ND	ND		ND	ND				
SOC	mg/L	ND		(2)	ND		(2)	ND		(2)
		ND	ND		ND	ND		ND	ND	
Dissolved Solids, Total	mg/L	340		(1)	No Data (0)			No Data (0)		
		340	340							
Suspended Solids, Total**	mg/L	<10		(1)	<10		(1)	No Data (0)		
		<10	<10		<10	<10				
Turbidity**	NTU	<1		(1)	<1		(1)	No Data (0)		
		<1	<1		<1	<1				
pH	std. units	7.38		(11)	7.7		(5)	7.4		(5)
		6.9	7.67		7.63	7.72		7.38	7.52	

* Water quality provided by City of Portsmouth and State of New Hampshire
** Water quality samples taken by City in December 2015
***Radionuclides are taken from state historical data between 1999 and 2011 and of an unknown data count. Sample counts are the number of positive counts only

2.0 PILOT TESTING PROGRAM

2.1 General

The pilot study was conducted from April to June 2016. As previously noted, the primary purpose of the pilot testing was to test general water chemistry prior to and following treatment to evaluate the corrosivity impacts to the distribution system and customer plumbing from any changes in water quality after filtration (e.g. changes in pH, alkalinity, etc.). In addition, secondary goals included evaluating the potential for head loss through the filter and removal of PFAS during the five-week testing period. Based on prior research and an understanding of the treatment methodology, Weston & Sampson expected no fouling of the media over the five-week pilot testing period, and no corresponding pressure buildup. General water chemistry of the 50/50 blend of Harrison and Smith raw water was not expected to change significantly as a result of the GAC-based filtration.

The pilot study kicked off on April 26th with the delivery of the pilot equipment by Blueleaf, Inc. Over the following two weeks, Blueleaf, Inc. installed the pilot system and backwashed the media in preparation for the start of the 5-week pilot test. The pilot test began on May 9th and terminated on June 14th. Water quality parameters were tested in the field daily (not including weekends and holidays) by Weston & Sampson staff and by the City's own water treatment operators. These measurements were verified and supplemented on a weekly basis by additional laboratory analyses.

2.2 Pilot Description

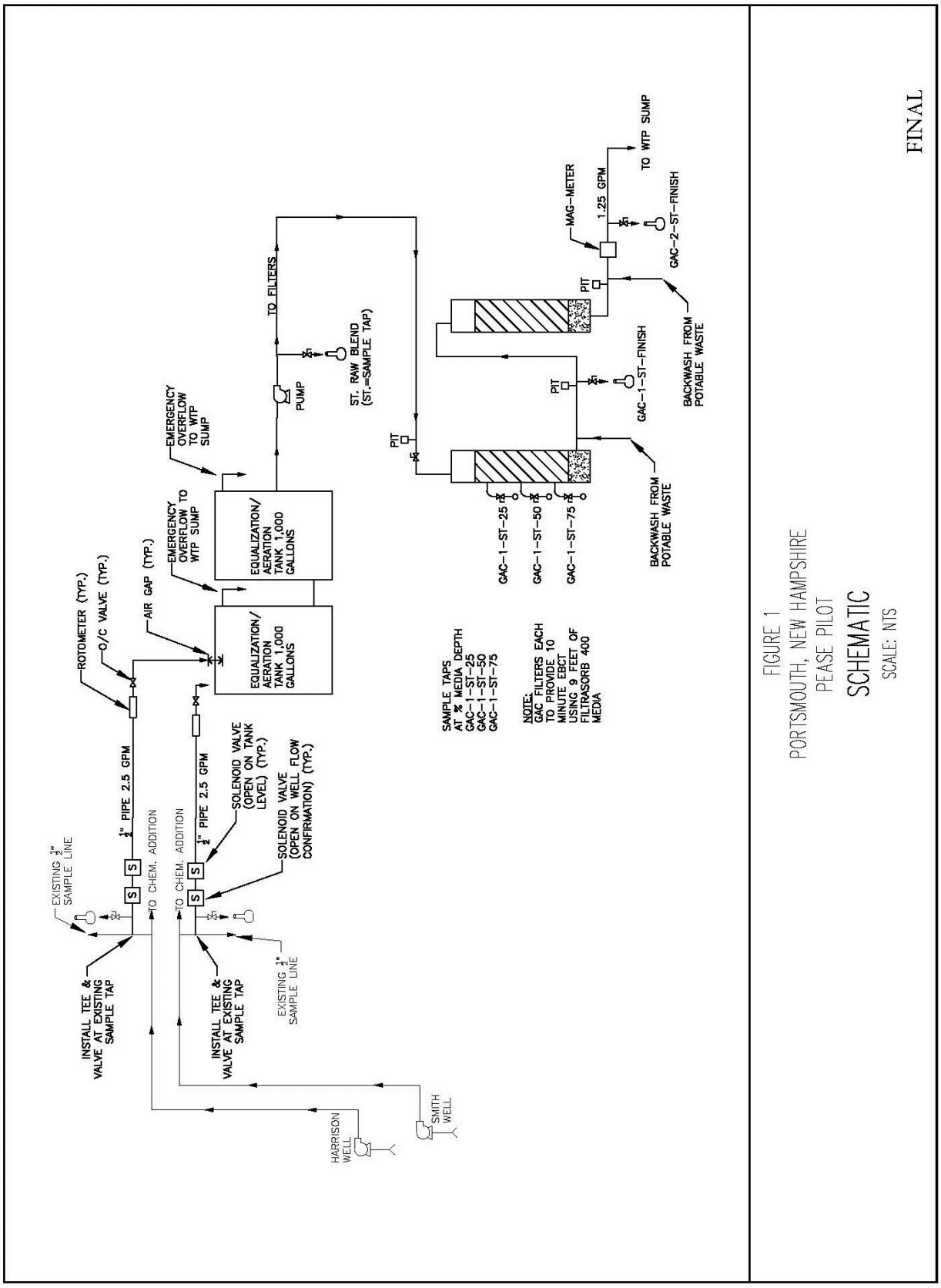
Weston & Sampson utilized Blueleaf Inc., piloting specialists, to install two carbon columns, 6 inches in diameter and 10 feet tall, to produce 10-minute empty bed contact times (EBCT) at 1 to 2 gpm. Two 1000-gallon aeration tanks were used to store and distribute both aerated and non-aerated water through the carbon columns. The tanks were filled by tapping into the City's existing sampling lines for both the Harrison and Smith wells. Valving and water level sensors ensured that the tanks were only filled while the wells were operating and that the filling ceased when the tanks were full. The tanks were filled with a 50/50 blend of raw water from the Harrison and Smith wells, approximately analogous to the expected mixing at the full-scale plant. Water was pumped from the tanks through flow rate and

turbidity meters to the top of the first 10-foot tall filter at a constant rate, approximately 1.25 gpm. Effluent from the bottom of Filter 1 was directed through a separate set of flow and turbidity meters before discharging into the top of the second filter. Effluent from the bottom of Filter 2 was again directed through separate flow and turbidity meters before discharging to the Pease WTP's sump pit. For the three weeks of the test prior to May 31st, the pilot system was run without pre-filtration aeration, while for the final two weeks, the combined raw water was aerated in the two storage tanks. A schematic of the pilot system is presented in Figure 1, and photos of the pilot system are included in Appendix A.

2.3 Pilot Testing Results

As noted in Section 2.1, water quality parameters were tested in the field daily and sometimes twice daily, not including weekends and holidays, throughout the five-week pilot test by Weston & Sampson staff and by the City's own water treatment operators. Appendix B contains operating data recorded during every site visit, including tank levels, flow rates, and pressures. Weston & Sampson employed a YSI 556 MPS to monitor levels of temperature, pH, conductance, specific conductance, dissolved oxygen, and oxidation-reduction potential. These daily measurements were taken from five locations: Harrison raw water, Smith raw water, Combined Raw water, Filter 1 effluent, and Filter 2 effluent. Additional measurements of pH were also taken daily over the final three weeks of the pilot test with a SelpHbalance stick meter to supplement and corroborate data taken with the YSI unit. Weston & Sampson also monitored carbon dioxide intermittently, primarily from the combined raw water, with an in-field Hach titration kit. The results of in-field sampling efforts are summarized in tabular form in Appendix C and in Figures 2 through 4 on the following pages.

Weston & Sampson's efforts to monitor changes in pH throughout the five-week test were supplemented by City water treatment operator's sampling of pH and alkalinity on a nearly daily basis. Their chemical-based field testing of pH produced more reliable and consistent pH data than those measured with the YSI 556 unit or the SelpHbalance stick meter. The operators' pH data and alkalinity data are presented in Figures 2 and 3, respectively. A table of the operator data is provided in Appendix C. Note that the combined raw sample represents the influent water quality into the filter; therefore, during the time that pretreatment aeration occurred the combined raw sample was aerated.


FINAL
FIGURE 1
PORTSMOUTH, NEW HAMPSHIRE
PEASE PILOT
SCHEMATIC
SCALE: NTS
HARRISON WELL
SMITH WELL
INSTALL TEE & VALVE AT EXISTING SAMPLE TAP
INSTALL TEE & VALVE AT EXISTING SAMPLE TAP
EXISTING 1" SAMPLE LINE
EXISTING 1" SAMPLE LINE
TO CHEM. ADDITION
TO CHEM. ADDITION
1" PIPE 2.5 GPM
1" PIPE 2.5 GPM
SOLENOID VALVE (OPEN ON TANK LEVEL) (TYP.)
SOLENOID VALVE (OPEN ON WELL FLOW CONFIRMATION) (TYP.)
ROTOMETER (TYP.)
O/C VALVE (TYP.)
AIR GAP (TYP.)
EMERGENCY OVERFLOW TO WTP SUMP
EMERGENCY OVERFLOW TO WTP SUMP
EQUALIZATION/ AERATION TANK 1,000 GALLONS
EQUALIZATION/ AERATION TANK 1,000 GALLONS
PUMP
ST. RAW BLEND (ST.=SAMPLE TAP)
TO FILTERS
PIT
PIT
PIT
GAC-1-ST-25
GAC-1-ST-50
GAC-1-ST-75
SAMPLE TAPS AT % MEDIA DEPTH GAC-1-ST-25 GAC-1-ST-50 GAC-1-ST-75
NOTE: GAC FILTERS EACH TO PROVIDE 10 MINUTE EBCT USING 9 FEET OF FILTRASORB 400 MEDIA
BACKWASH FROM POTABLE WASTE
BACKWASH FROM POTABLE WASTE
GAC-1-ST-FINISH
MAG-METER
1.25 GPM
GAC-2-ST-FINISH
TO WTP SUMP

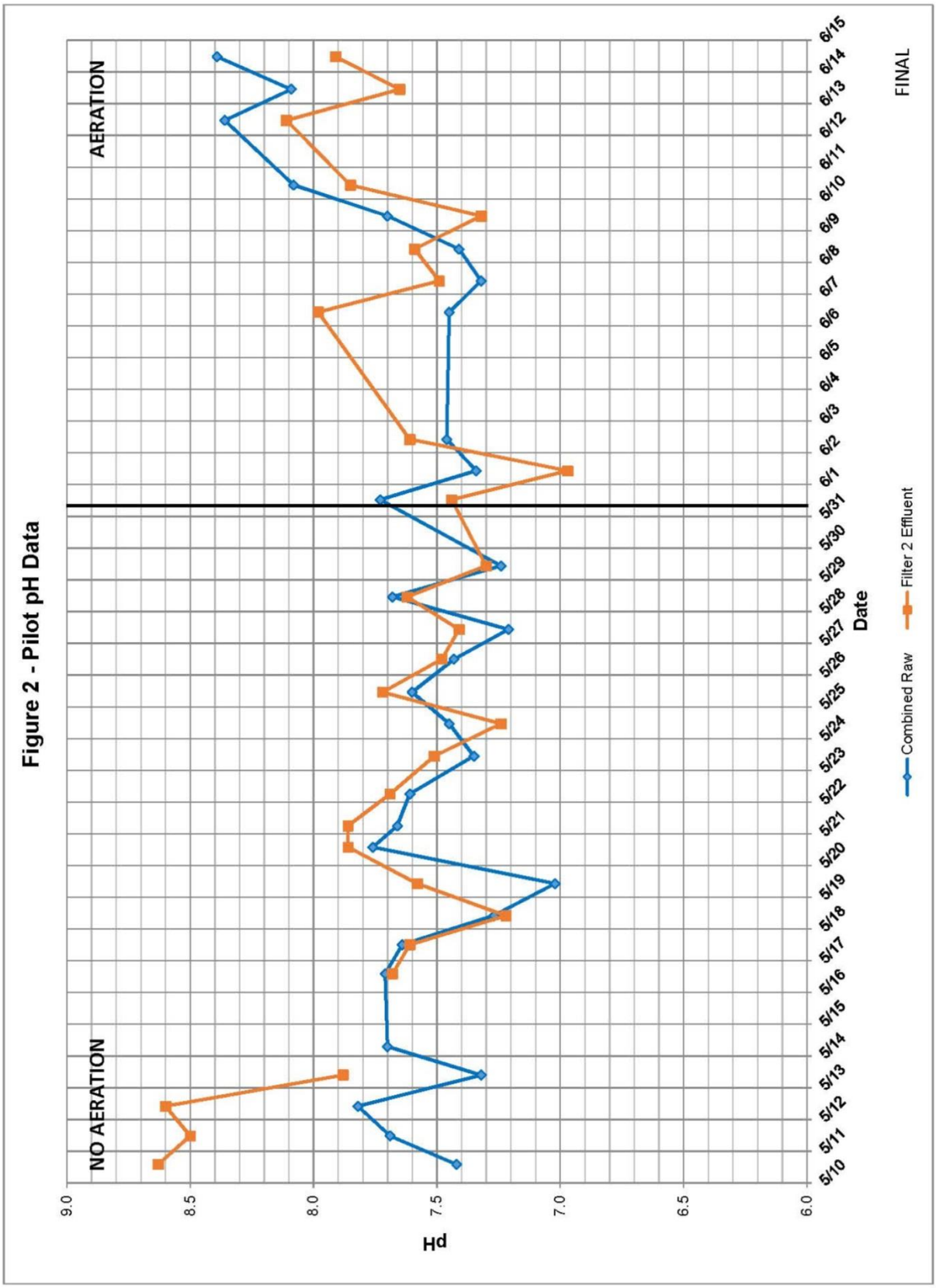


Figure 2 - Pilot pH Data
AERATION
NO AERATION
FINAL
Combined Raw
Filter 2 Effluent
Date
pH
9.0
8.5
8.0
7.5
7.0
6.5
6.0
6/15
6/14
6/13
6/12
6/11
6/10
6/9
6/8
6/7
6/6
6/5
6/4
6/3
6/2
6/1
5/31
5/30
5/29
5/28
5/27
5/26
5/25
5/24
5/23
5/22
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5/15
5/14
5/13
5/12
5/11
5/10

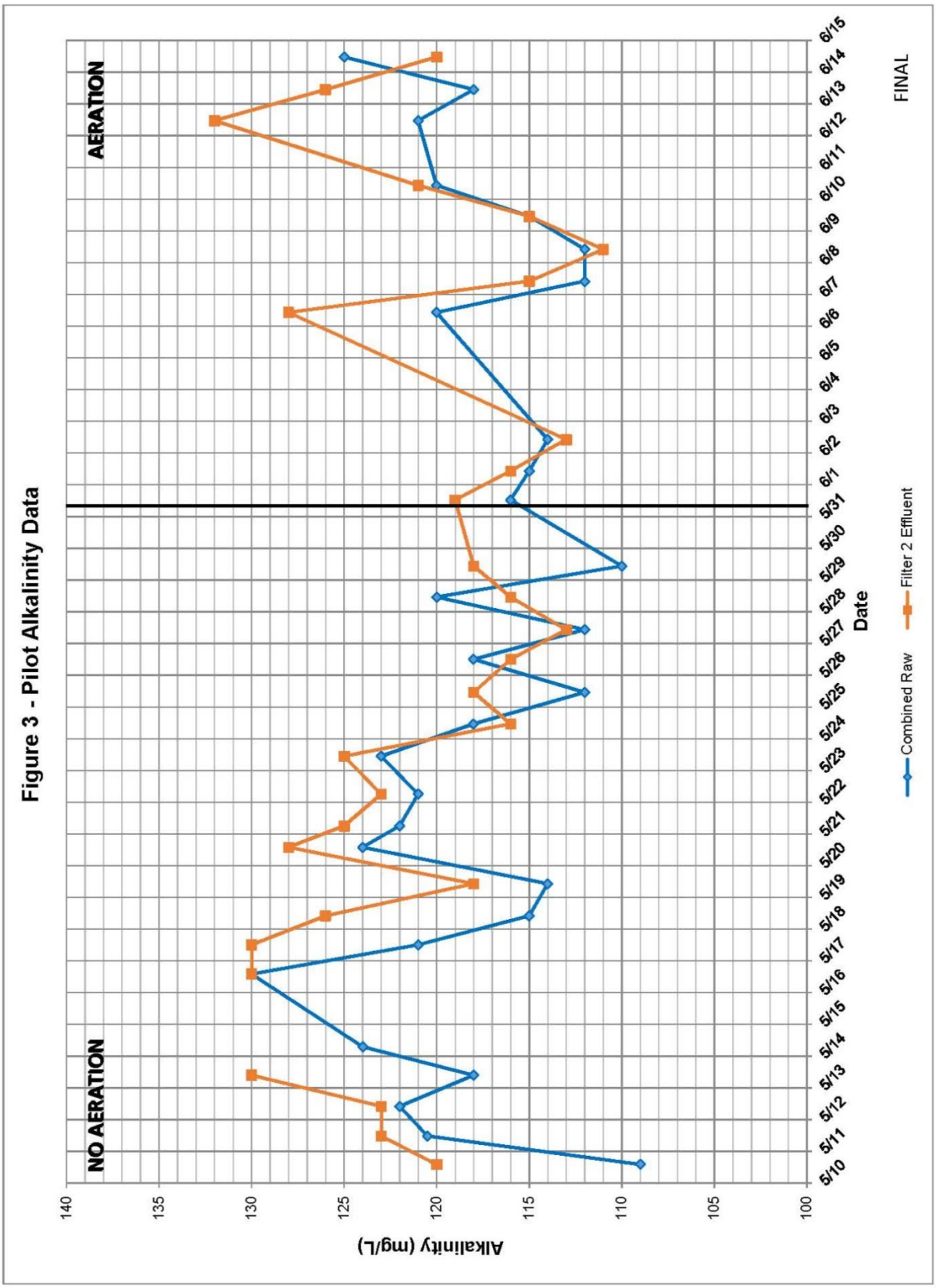
Figure 3 - Pilot Alkalinity Data
AERATION
NO AERATION
Alkalinity (mg/L)
140
135
130
125
120
115
110
105
100
Date
5/10
5/11
5/12
5/13
5/14
5/15
5/16
5/17
5/18
5/19
5/20
5/21
5/22
5/23
5/24
5/25
5/26
5/27
5/28
5/29
5/30
5/31
6/1
6/2
6/3
6/4
6/5
6/6
6/7
6/8
6/9
6/10
6/11
6/12
6/13
6/14
6/15
Combined Raw
Filter 2 Effluent
FINAL

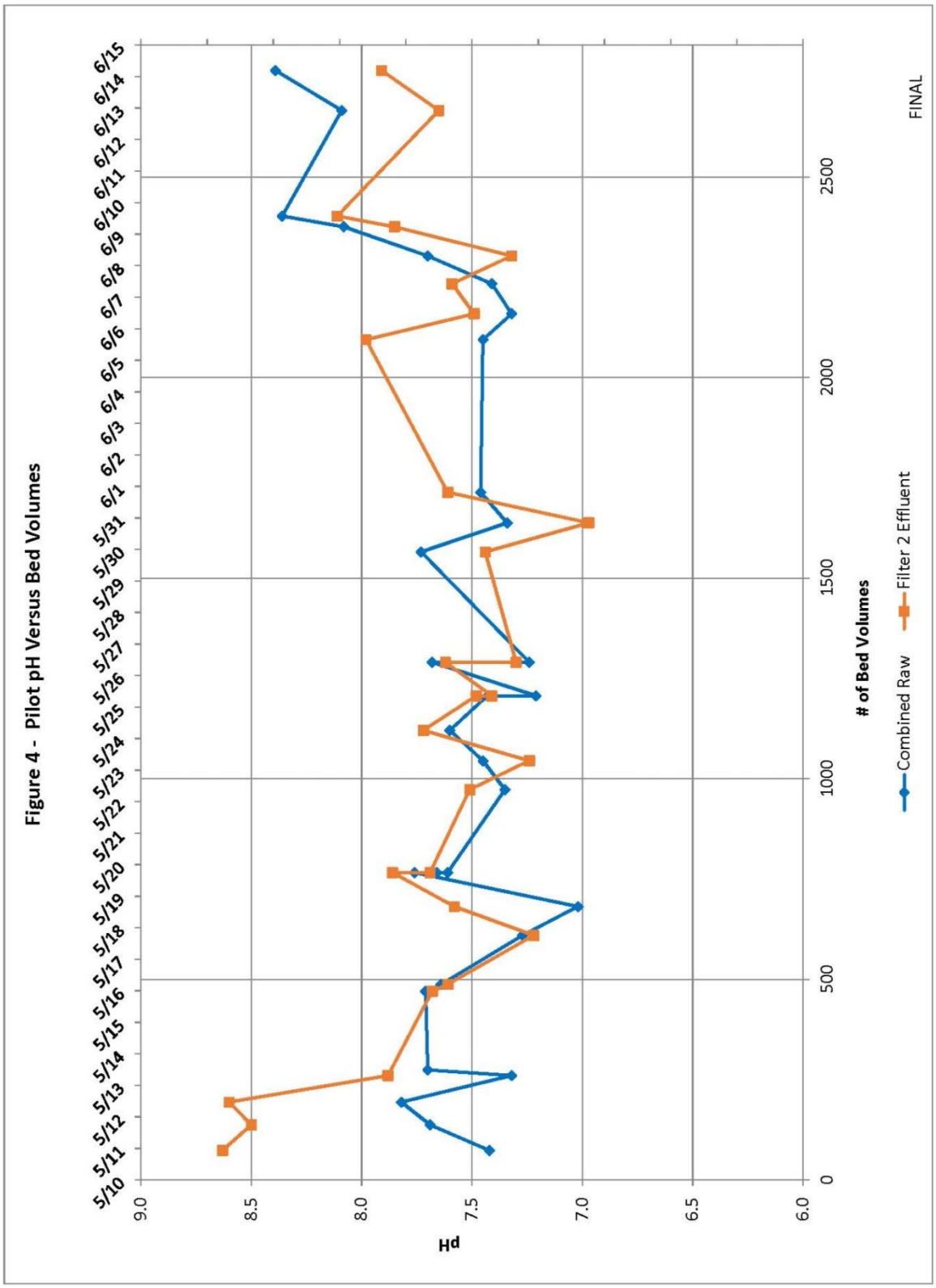
Figure 4 - Pilot pH Versus Bed Volumes
FINAL
pH
9.0
8.5
8.0
7.5
7.0
6.5
6.0
# of Bed Volumes
0
500
1000
1500
2000
2500
Combined Raw
Filter 2 Effluent
5/10
5/11
5/12
5/13
5/14
5/15
5/16
5/17
5/18
5/19
5/20
5/21
5/22
5/23
5/24
5/25
5/26
5/27
5/28
5/29
5/30
5/31
6/1
6/2
6/3
6/4
6/5
6/6
6/7
6/8
6/9
6/10
6/11
6/12
6/13
6/14
6/15

Field measurements were verified and supplemented on a weekly basis by additional laboratory analyses. Laboratory sampling, conducted by Absolute Resource Associates of Portsmouth, New Hampshire, included analyses for arsenic, calcium, iron, manganese, alkalinity, chloride, sulfate, turbidity, total organic carbon (TOC), carbon dioxide, apparent color, uranium, gross alpha, gross beta, radium-226, radium-228, and radon. Samples were taken once each from Harrison, Smith, and combined raw water, and five times from Filter 2 effluent over the course of the five-week test. Results of these laboratory analyses are presented in a summary table included at the top of Appendix D. The original laboratory results are also included in Appendix D.

The key water quality parameters in identifying corrosivity impacts to the distribution system and customer plumbing are alkalinity, pH, specific conductance, temperature, calcium, chloride, and sulfate. These parameters were input into the Rothberg Tamburini and Windsor (RTW) model (Appendix E) to determine the corrosivity of the water. Changes in carbon dioxide, alkalinity, and pH can also have a direct impact in the distribution system. A higher or lower pH can change the effectiveness of the ortho/polyphosphate blend in the system and cause the precipitation of metals or leaching of lead and/or copper in customer piping that may contain lead soldering and/or copper piping. A change in carbon dioxide or alkalinity can also affect the overall pH of the water.

The data collected during the pilot testing program for alkalinity and pH are presented in Figures 2 and 3. The remainder of the data is included in tabular form in Appendix C. The data demonstrates that there is an initial increase in the filtered water pH as the carbon media is equalized. The initial filtered water pH at the start of the pilot test was as high as 9.2. The pH gradually reduced to raw water levels after filtering the raw well water for several days. Figure 4 is a graph of the raw water pH and filtered water pH shown over time and also includes total filtered bed volumes. Total bed volume is an indication of the number of times the entire volume of media has been flushed.

All raw well water quality data obtained during the pilot testing matches the historical water quality data compiled during the conceptual design of the system. The radon sampling conducted during the pilot confirmed that there is an elevated level of radon in both wells between 750 to1,200 pCi/L. The carbon will adsorb radon from the water to its surface without compromising the capacity to remove PFAS. The longer the carbon filter is in service, the more likely the carbon media may be classified as a low-

level radioactive material. Carbon manufacturers will not accept radioactive media. It should be noted that the effluent drinking water would be radon free.

There are two reasonable solutions to this potential radioactive media issue. Aeration removes radon and an aeration system could be installed prior to the carbon filters. The other alternative is to allow the carbon media to be stored onsite prior to removal by the carbon manufacturer. This could be done by leaving the media in the filter vessel and taking the filter offline or the media could be stored in a separate container. The half-life of radon is 3.8 days. At this decay rate, the carbon manufacturer has estimated an on-site storage time of 7 to 10 days prior to being shipped back for regeneration to allow the media to return to an acceptable level for removal. Also, it is possible that if the radon is not removed with pre-aeration that the pressure vessels themselves may become radioactive over a long period of time. Therefore, it is our recommendation that aeration be installed prior to the carbon filters to remove the radon.

The pH of the blended water leaving the Pease WTP that is combined with the Portsmouth main service water is monitored and is typically ranges between 7.2 to 7.3 pH units. The RTW model was run under three scenarios where the Pease WTP water was blended with the Portsmouth main service system water to examine any potential change in the corrosivity of the water: 1) existing water quality, 2) filtered water quality after pH stabilization without aeration and 3) filtered water quality after pH stabilization with aeration. The RTW model is a spreadsheet that is used to measure water quality and corrosivity. This data is included in Appendix E and for all three scenarios Water A represents the Pease WTP effluent water and Water B represents the Portsmouth main service system water. The RTW model "blends" these two waters and presents the pH and corrosivity of the combined water. All three scenarios assume a 50/50 blend of Pease WTP effluent with Portsmouth main service system water. Scenarios 1 and 2 represent the same water quality. Scenarios 2 and 3 represent the blended water leaving the Pease WTP that has been filtered and combined with the Portsmouth main service water with and without aeration, respectively.

For the water quality results from this pilot study, aeration raises the pH of the water, decreases the corrosivity of the water and decreases the level of carbon dioxide in the water. The Portsmouth main service system water may be a different blend of surface water and groundwater with some variation in pH and alkalinity. Also the proportion of the two waters will differ and during lower demand times there

will be less Portsmouth main service system water. All of these factors will slightly change the pH and the corrosivity of the blended Pease WTP and Portsmouth main service system. However, under most circumstances, pretreatment aeration will slightly increase the pH and slightly decrease the corrosivity of the water entering the distribution system.

We recommend additional water quality testing of the Portsmouth main service system water just prior to the point of blending with the Pease WTP water to obtain more information on the range of water quality from the Portsmouth main service system. The RTW model can then be run to better gauge the range of the blended water quality. If this information indicates that there are times that the water is more corrosive, then the City could consider increasing the ortho/polyphosphate dosage by 10 to 20 percent to offset the potential of a slight increase in corrosivity.

Weston & Sampson also sampled for the presence of PFAS to confirm that no breakthrough occurred during the pilot testing. Twice during the five-week pilot test, immediately prior to the onset of pre-filtration aeration and immediately prior to the completion of the test, samples of Filter 1 effluent were taken and submitted to Maxxam Analytics of Mississaugua, Ontario. The laboratory was directed to analyze 23 PFAs compounds, consistent with ongoing sampling efforts by the USAF and their contractors throughout the Pease Tradeport area. As expected, no breakthrough of PFAS was found; all 23 analyses resulted in non-detect findings.

The pilot test flow rate was set to obtain the 10 minute EBCT required during full-scale operation. The pilot tested flow rate between 1.2 and 1.4 gpm is equal to or greater than the maximum design flow of the full-scale system based on bed volumes per minute. 400 gpm for the full-scale system is 0.045 bed volumes per minute; the pilot was run between 0.046 and 0.052 bed volumes per minute. There was no discernable increase in pressure loss buildup in the media during the five weeks of operation. This matches our expectations presented in the conceptual design report. Information on flow, pressure, and turbidity are provided in Appendix B.

2.4 Pilot Testing Conclusions

1. Raw water quality data for the Harrison and Smith wells was similar to the historical data in the conceptual design report.
2. Because of the initial increase in filtered water pH after the carbon media, we recommend that the City purchase pre-neutralized carbon media to avoid having to run the initial filtered water to waste for several days.
3. During the demonstration testing, radon in the well water that is removed by the carbon media will require that the media be stored onsite prior to removal by the carbon manufacturer to allow for radioactive decay of the media.
4. Radon levels of the well water will be reduced with carbon filtration.
5. At the conclusion of the demonstration testing, the carbon media must be stored onsite during change out for an estimated period of 10 days. The storage could be in the filter vessel (if offline) or in a separate container. This allows the radon levels to decay to the point where the media is no longer considered radioactive.
6. We recommend that the City provide aeration prior to the carbon treatment to remove radon from the Harrison and Smith wells for the full-scale design, to prevent the carbon media from having elevated radon levels.
7. Under most circumstances, pretreatment aeration will slightly increase the pH and slightly decrease the corrosivity of the water entering the distribution system.
8. Low levels of total organic carbon in the Harrison and Smith well water may slightly reduce the longevity of the carbon media. The demonstration testing will provide more conclusive data.
9. There was no excessive pressure loss across the media during the five-week pilot testing. Based on this, we do not expect excessive pressure loss across the media during the demonstration testing. Therefore, backwashing the media prior to change out is not expected. The demonstration testing will confirm this over longer periods.
10. A 10-minute EBCT demonstrates removal of all PFAS to non-detect levels during the [eriod of pilot testing.

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APPENDIX A

Pilot Setup Photos

Complete pilot setup from above.

(2) 1000-gallon storage/aeration tanks.

(2) 10-inch diameter, 10-foot tall, GAC-filled filters.

Pressure gages to monitor influent and effluent pressures for each filter.


Left pump only was used to pump water from storage/aeration tanks to top of Filter 1.

In-stream flow and turbidity meters, and computer-control units for Combined Raw water (left), Filter 1 effluent (second from left), and Filter 2 effluent (second from right).

Flow meters to monitor relative inflow to tanks of Harrison and Smith raw water.

APPENDIX B

Field Operating Data

Field Operating Data

Date	Time	Date & Time	Sampler	Tanks			Pressure				Flow Rate	Turbidity			System Pressure	Harrison Flow	Smith Flow	Booster Flow	Hobbs Level	Notes
				Level	Smith In	Harrison In	F1 Influent	F1 Effluent	F2 Influent	F2 Effluent		Raw	Filter 1	Filter 2						
				(ft)*	(gpm)	(gpm)	(psi)**				(gpm)	(ntu)			(psi)	(gpm)	(gpm)	(gpm)	(ft)	
5/9/16	14:00	5/9/16 14:00	AWW	3.0	3.0	3.0	28.0	25.0	15.0	13.0	1.22									conducted field sampling, collected lab samples from Harrison & F2 (no TOC, CO2), delivered to lab
5/10/16	12:30	5/10/16 12:30	AWW	4.0	0.0	0.0	45.5	42.0	33.0	27.0	1.22									pressures have risen, called Fred L., result of calibration late 5/9, collected lab samples from Harrison & F2 (TOC, CO2), arranged pickup for PM
5/10/16	15:30	5/10/16 15:30	AWW	4.0	3.0	2.9	44.0	40.5	31.0	25.0	1.22									conducted field sampling
5/11/16	8:00	5/11/16 8:00	AWW	4.5	0.0	0.0	50.0	46.0	37.0	30.0	1.22									pressures have risen, spoke with Eric G., pressures are okay
5/11/16	11:30	5/11/16 11:30	AWW	4.8	3.0	2.9	50.0	46.5	37.0	30.5	1.22									
5/11/16	15:00	5/11/16 15:00	AWW	4.9	3.0	2.9	51.0	47.0	38.0	31.0	1.22	0.035	0.031	0.026						conducted field sampling, collected Alkalinity lab samples from F1 & F2, delivered to lab
5/12/16	8:00	5/12/16 8:00	AWW	5.1	3.0	2.9	56.0	52.5	43.0	36.5	1.22									extra water leaked onto floor, tried to rearrange tarp collection system
5/12/16	13:00	5/12/16 13:00	AWW	4.4	3.0	2.9	59.0	55.0	45.0	39.5	1.22	0.039	0.031	0.026						more leaking, higher pressures, tank level dropped - due to wells being offline, returned to 4.9 by 14:00
5/12/16	15:00	5/12/16 15:00	AWW	5.4	0.0	0.0	59.5	55.5	46.0	40.5	1.22	0.036	0.031	0.026						conducted 3-point pH calibration, began storing YSI probe in F2 effluent sample overnight
5/13/16	8:00	5/13/16 8:00	AWW	5.2	0.0	0.0	62.0	58.5	46.0	43.5	1.22	0.035	0.031	0.026						leaking now largely under control
5/13/16	13:00	5/13/16 13:00	AWW	4.1	3.0	2.9	62.0	58.0	45.0	43.0	1.22	0.033	0.031	0.026						pH recalibration, side by side test with Al P., still off, called Palms - will send better pH probe to Peabody
5/14/16	7:00	5/14/16 7:00	AWW	4.1	0.0	0.0	77.0	76.5	76.0	75.0	0.00									received call from Al P. that pilot had failed, operator on site, no outflow, high pressure leak from top of filter 1, data indicated failure at 20:30 and 2:00, stopped pilot
5/14/16	10:00	5/14/16 10:00	AWW	4.9	3.0	2.9	18.0	14.0	9.0	4.0	1.27	0.034	0.031	0.029						airbound b/w filter 1 and 2 effluents, degassed both filters with mallet, bled air from filter 1, bypassed filter 2 auto flow control (manual now), restarted pilot
5/15/16	9:00	5/15/16 9:00	AWW	4.3	0.0	0.0	19.0	15.0	9.5	4.0	1.29	0.035	0.032	0.026						
5/16/16	8:00	5/16/16 8:00	AWW	5.4	0.0	0.0	20.0	15.0	10.0	4.0	1.30	0.033	0.032	0.026						
5/16/16	14:30	5/16/16 14:30	AWW	4.6	3.0	2.9	14.5	10.5	7.0	3.0	1.10	0.034	0.032	0.026						new leak from fitting in filter 1 influent hose, reset fitting, leak stopped, flow and pressures returned to normal, leak developed 5 mins before I arrived
5/16/16	15:00	5/16/16 15:00	AWW	5.0	3.0	3.0	20.5	15.5	10.0	5.0	1.30	0.033	0.032	0.026						
5/17/16	14:30	5/17/16 14:30	AWW	5.4	3.0	2.9	20.0	15.0	10.0	4.5	1.31	0.034	0.032	0.026						
5/18/16	8:00	5/18/16 8:00	AWW	1.5	0.0	0.0	20.0	15.0	10.0	4.5	1.31	0.036	0.033	0.027						tank levels low, called Al P., wells turned on within 10 minutes
5/18/16	10:30	5/18/16 10:30	AWW	3.0	3.0	2.9	20.0	15.0	10.0	4.5	1.31	0.036	0.032	0.027						
5/18/16	15:00	5/18/16 15:00	AWW	5.4	0.0	0.0	20.5	15.5	10.0	5.0	1.32	0.033	0.032	0.027						
5/19/16	8:00	5/19/16 8:00	AWW	5.2	0.0	0.0	20.5	15.5	10.0	4.5	1.32	0.033	0.032	0.027						
5/19/16	11:00	5/19/16 11:00	AWW	5.3	3.0	2.9	20.5	15.5	10.0	4.5	1.32	0.033	0.032	0.027		308	287	449	222.8	
5/19/16	14:00	5/19/16 14:00	AWW	5.0	0.0	0.0	20.5	15.5	10.0	4.5	1.32	0.033	0.032	0.027		308	264	372	223.6	
5/20/16	8:00	5/20/16 8:00	AWW	4.4	0.0	0.0	20.5	15.5	10.0	4.5	1.33	0.033	0.032	0.028		0	0	0	223.9	calibrated F2 effluent flow --> 1.26 gpm w/digital reading 1.265 and manual gage 1.33
5/20/16	12:00	5/20/16 12:00	AWW	5.1	0.0	0.0	21.0	16.0	10.5	5.0	1.34	0.033	0.032	0.028		308	291	429	224.3	
5/23/16	8:00	5/23/16 8:00	AWW	4.3	0.0	0.0	21.0	15.5	10.0	5.0	1.34	0.034	0.033	0.027		0	0	0	223.4	
5/23/16	14:30	5/23/16 14:30	AWW	5.4	2.9	2.6	20.5	15.5	10.0	5.0	1.34	0.034	0.033	0.028		304	291	457	223.9	lower tank fill rate b/c taps are open
5/24/16	7:30	5/24/16 7:30	AWW	4.1	0.0	0.0	21.0	15.5	10.0	5.0	1.36	0.034	0.033	0.027		0	0	0	223.3	calibrated F2 effluent flow --> 1.28 gpm w/digital reading 1.29 and manual gage 1.36
5/24/16	14:00	5/24/16 14:00	AWW	5.4	0.0	0.0	21.0	16.0	10.5	5.0	1.36	0.034	0.033	0.027	79	304	256	365	226.8	
5/25/16	8:00	5/25/16 8:00	AWW	4.8	0.0	0.0	21.0	16.0	10.5	5.0	1.36	0.033	0.033	0.027	74	0	0	0	224.8	
5/25/16	14:30	5/25/16 14:30	AWW	5.6	0.0	0.0	21.0	16.0	10.5	5.0	1.36	0.032	0.033	0.027	79	308	261	352	226.9	
5/26/16	7:00	5/26/16 7:00	AWW	4.9	0.0	0.0	21.0	15.5	10.0	5.0	1.36	0.033	0.033	0.027	72	0	0	0	226.1	
5/26/16	12:00	5/26/16 12:00	AWW	5.3	0.0	0.0	21.0	15.5	10.0	5.0	1.36	0.033	0.033	0.027	74	306	258	393	224.9	
5/27/16	15:00	5/27/16 15:00	AWW	5.5	0.0	0.0	21.0	16.0	10.0	5.0	1.36	0.033	0.033	0.026	80	310	273	357	226.3	
5/31/16	7:30	5/31/16 7:30	AWW	4.7	0.0	0.0	19.0	14.0	9.5	5.0	1.37	0.034	0.037	0.026	72	0	0	0	224.6	installed aeration/bubbler in primary tank at 8:00am
5/31/16	14:30	5/31/16 14:30	AWW	5.3	3.0	3.0	19.5	14.5	9.5	4.0	1.30	0.047	0.037	0.027	76	306	274	388	255.9	flow calibrated --> 1.26gpm; aeration tank = 130psi, outlet = 9psi; turbidity unusual
6/1/16	8:00	6/1/16 8:00	AWW	4.8	3.0	2.4	20.0	15.0	10.0	4.5	1.31	0.034	0.037	0.027	79	304	274	423	223.5	low tank fill rates b/c taps open; turbidity back to normal; aeration tank = 115psi, outlet = 9psi
6/1/16	14:00	6/1/16 14:00	AWW	5.1	0.0	0.0	27.0	20.0	13.0	7.0	1.53	0.078	0.037	0.027						turned aerator outlet pressure up to 16 psi at 11:45; raw turbidity and flow rate are up
6/2/16	6:00	6/2/16 6:00	AWW	4.6	0.0	0.0	28.0	21.0	19.0	7.5	1.52	0.065	0.038	0.027						hose from air compressor disconnected overnight, reattached and restarted compressor
6/2/16	16:00	6/2/16 16:00	AWW	5.3	0.0	0.0	30.0	22.0	15.0	8.0	1.60	0.065	0.038	0.027						turned aerator outlet pressure up to 25 psi
6/3/16	7:00	6/3/16 7:00	AWW	5.4	0.0	0.0	32.0	23.0	15.5	8.5	1.61	0.069	0.038	0.028						turned aerator outlet pressure down to 16 psi b/c compressure reservoir pressure was low
6/6/16	10:00	6/6/16 10:00	BAR	4.1	0.0	0.0	35.0	26.0	17.0	10.0	1.70	0.172	0.040	0.031						hose from air compressor detached, reattached and restarted compressor
6/6/16	15:00	6/6/16 15:00	BAR	4.1	3.0	2.6	20.0	14.0	10.0	5.0	1.25	0.186	0.041	0.032						duct taped hose to compressor outlet port
6/7/16	8:30	6/7/16 8:30	AWW	4.5	0.0	0.0	20.5	14.0	9.5	4.0	1.27	0.275	0.042	0.033						found hose connected to wrong outlet port, turned compressor off, moved hose, re-taped, started compressor
6/7/16	15:00	6/7/16 15:00	AWW	3.7	3.0	2.6	35.0	26.0	17.0	10.0	1.71	0.248	0.041	0.033						
6/8/16	8:30	6/8/16 8:30	AWW	5.1	0.0	0.0	20.5	14.5	10.0	5.0	1.25	0.316	0.045	0.034						
6/8/16	14:00	6/8/16 14:00	AWW	3.8	0.0	0.0	20.5	14.0	9.5	4.0	1.26	0.312	0.046	0.035						
6/9/16	8:30	6/9/16 8:30	AWW	5.0	0.0	0.0	21.0	15.0	10.0	4.0	1.28	0.355	0.043	0.035						let two water dept. staff into plant to look for water meter that needed replacing, could not locate
6/9/16	13:30	6/9/16 13:30	AWW	4.7	0.0	0.0	21.0	15.0	10.0	4.0	1.28	0.347	0.043	0.035						installed aeration system in 2nd tank, on at 15:00
6/10/16	8:00	6/10/16 8:00	AWW	5.4	3.0	2.9	25.0	17.0	11.0	5.0	1.38	0.375	0.042	0.035						circuit blew w/2nd compressor; reset circuit, restarted original compressor with both blowers now
6/10/16	15:00	6/10/16 15:00	AWW	4.4	0.0	0.0	35.0	25.0	16.0	9.0	1.67	0.369	0.044	0.035						raw turbidity red light off although value still high
6/13/16	7:30	6/13/16 7:30	AWW	5.0	0.0	0.0	41.0	29.0	19.0	11.0	1.80	22.457	0.042	0.035						
6/13/16	14:00	6/13/16 14:00	AWW	5.0	0.0	0.0	40.0	29.0	19.0	11.0	1.79	21.556	0.043	0.036						
6/14/16	8:00	6/14/16 8:00	AWW	5.0	0.0	0.0	41.0	28.5	19.0	11.0	1.79	16.801	0.043	0.036						
6/14/16	12:30	6/14/16 12:30	AWW	3.5	0.0	0.0	40.0	28.5	19.0	11.0	1.75	15.288	0.043	0.036						

* feet above pad, pad is 0.5 ft. above floor
** pressure gages are 5.0 feet above floor
estimated

APPENDIX C

Water Quality Field Testing Data

City Operator Data

Date	Time	Date & Time	Sampler	Combined Raw		Filter 1 Effluent		Filter 2 Effluent	
				pH	Alkalinity	pH	Alkalinity	pH	Alkalinity
					(mEq/L)		*(mEq/L)*		*(mEq/L)*
5/10/16	14:00	5/10/16 14:00	Operator	7.42	109	8.68	118	8.63	120
5/11/16	11:30	5/11/16 11:30	Operator	7.69	121	7.66	124	8.50	123
5/12/16	10:00	5/12/16 10:00	Operator	7.82	122	7.64	120	8.60	123
5/13/16	9:30	5/13/16 9:30	Pratt	7.32	118	7.47	124	7.88	130
5/14/16	7:00	5/14/16 7:00	AB	7.70	124	7.79	126		
5/16/16	14:00	5/16/16 14:00	Operator	7.71	130	7.78	126	7.68	130
5/17/16	12:00	5/17/16 12:00	AB	7.64	121	7.78	126	7.61	130
5/18/16	10:00	5/18/16 10:00	AB	7.27	115	7.60	122	7.22	126
5/19/16	10:15	5/19/16 10:15	AB	7.02	114	7.31	115	7.58	118
5/20/16	13:50	5/20/16 13:50	AB	7.76	124	7.67	124	7.86	128
5/21/16	6:00	5/21/16 6:00	Operator	7.66	122	7.41	124	7.86	125
5/22/16	6:00	5/22/16 6:00	Operator	7.61	121	7.63	120	7.69	123
5/23/16	10:40	5/23/16 10:40	BS	7.35	123	7.59	120	7.51	125
5/24/16	11:09	5/24/16 11:09	Operator	7.45	118	7.07	120	7.24	116
5/25/16	11:00	5/25/16 11:00	AB	7.60	112	7.52	114	7.72	118
5/26/16	12:00	5/26/16 12:00	AB	7.43	118	7.24	114	7.48	116
5/27/16	10:30	5/27/16 10:30	AB	7.21	112	7.26	112	7.41	113
5/28/16	11:00	5/28/16 11:00	MY	7.68	120	7.60	115	7.62	116
5/29/16	10:30	5/29/16 10:30	MY	7.24	110	7.31	111	7.30	118
5/31/16	12:30	5/31/16 12:30	Operator	7.73	116	7.47	118	7.44	119
6/1/16	10:25	6/1/16 10:25	Operator	7.34	115	7.25	115	6.97	116
6/2/16	10:10	6/2/16 10:10	AB	7.46	114	7.21	110	7.61	113
6/6/16	10:17	6/6/16 10:17	Operator	7.45	120	7.51	122	7.98	128
6/7/16	9:50	6/7/16 9:50	AB	7.32	112	7.51	115	7.49	115
6/8/16	10:00	6/8/16 10:00	AB	7.41	112	7.57	110	7.59	111
6/9/16	11:00	6/9/16 11:00	BS	7.70	115	7.46	113	7.32	115
6/10/16	10:21	6/10/16 10:21	BS	8.08	120	7.78	118	7.85	121
6/12/16	11:20	6/12/16 11:20	AB	8.36	121	7.07	120	8.11	132
6/13/16	10:49	6/13/16 10:49	AB	8.09	118	7.43	116	7.65	126
6/14/16	11:25	6/14/16 11:25	AB	8.39	125	8.08	119	7.91	120

Weston & Sampson Field Data

Date & Time		Harrison Raw Water								
		Temp	pH	pH2	Sp. Cond.	Cond.	DO	DO	ORP	CO2
		(°C)			*(mS/cm)*	*(mS/cm)*	*(%)*	*(mg/L)*	*(mV)*	*(mg/L)*
5/9/16 14:00	Non-aerated	10.94	8.84		0.010	0.012	87.0	9.61		
5/10/16 8:15										52
5/10/16 15:00		8.89	6.26		0.321	0.221	41.0	4.74		
5/11/16 15:00		8.70	5.90		0.315	0.217	41.7	4.85	330.3	
5/12/16 13:00		12.82	7.40		0.318	0.244	39.0	4.12	290.3	
5/13/16 13:00		8.01	5.75		0.318	0.215	35.7	4.23	306.1	
5/14/16 10:00		8.83	5.75		0.325	0.225	38.8	4.46	233.8	
5/16/16 14:30		8.29	5.76		0.317	0.216	36.1	4.24	227.0	
5/17/16 15:00		9.72	5.79		0.329	0.233	62.3	6.97	217.8	
5/18/16 15:00		13.11	6.69		0.316	0.244	45.3	4.74	194.7	
5/19/16 14:00		8.47	6.01		0.332	0.227	47.0	5.49	222.3	
5/20/16 12:00		8.46	5.69		0.328	0.225	47.1	5.51	227.6	
5/21/16 14:30		8.42	6.00		0.326	0.223	44.1	5.16	212.3	
5/24/16 7:30		8.89	6.44		0.585	0.405	50.1	5.77	898.2	
5/25/16 14:30		8.33	7.31		0.414	0.282	57.2	6.69	732.2	
5/26/16 12:00		8.47	7.03	7.22	0.330	0.226	50.1	5.83	300.5	
5/27/16 15:00		8.62	5.97	6.52	0.333	0.229	62.1	7.20	275.7	
5/31/16 7:30		9.05	6.66	7.16	0.560	0.390	49.0	5.63	811.9	
6/1/16 8:30	Aerated	8.27	6.49		0.329	0.224	54.4	6.37	344.2	50
6/1/16 14:00		8.64	6.72	7.06	0.328	0.226	49.7	5.76	281.6	60
6/2/16 6:00		8.72	7.12	7.00	0.567	0.391	50.9	5.89	822.4	
6/2/16 16:00		8.69	6.46	6.88	0.321	0.221	49.3	5.72	814.6	
6/3/16 7:00		8.65	6.29	6.88	0.325	0.224	46.2	5.37	369.3	50
6/6/16 10:10		11.78	6.72		0.465	0.338	79.5	8.60	854.6	
6/6/16 15:00		10.86	7.48		0.314	0.229	77.7	8.57	420.2	
6/7/16 8:45		9.26	7.41	7.47	0.548	0.384	78.7	5.56	798.4	
6/7/16 15:00		8.47	5.82	7.07	0.308	0.211	47.2	5.49	874.0	
6/8/16 8:30		8.74	6.41	7.00	0.310	0.214	75.1	8.63	362.5	50
6/8/16 14:00		10.78	6.22	7.00	0.318	0.231	67.5	7.63	293.0	
6/9/16 8:30		8.36	5.37	7.02	0.362	0.247	73.6	8.59	634.0	
6/9/16 13:30		9.34	6.65	7.08	0.373	0.262	45.7	5.22	668.4	
6/10/16 8:30		8.35	6.65	7.07	0.324	0.221	48.6	5.68	765.9	
6/10/16 15:00		9.04	6.85	7.02	0.454	0.316	63.0	7.20	822.8	
6/13/16 7:30		8.23	6.53	7.01	0.357	0.243	59.7	7.00	764.8	
6/13/16 14:00		8.49	6.91		0.341	0.233	55.4	6.45	407.3	
6/14/16 8:00		8.06	6.42	7.00	0.322	0.218	58.0	6.81	324.0	
6/14/16 12:30		10.05	7.74	7.00	0.338	0.242	63.4	7.12	589.0	

Weston & Sampson Field Data

Date & Time		Smith Raw Water								
		Temp	pH	pH2	Sp. Cond.	Cond.	DO	DO	ORP	CO2
		(°C)			*(mS/cm)*	*(mS/cm)*	*(%)*	*(mg/L)*	*(mV)*	*(mg/L)*
5/9/16 14:00	Non-aerated	13.32	9.47		0.011	0.009	78.2	8.18		
5/10/16 8:15										
5/10/16 15:00		13.63	7.62		0.536	0.419	50.7	4.27	294.3	
5/11/16 15:00		8.23	6.34		0.528	0.359	54.3	6.38	309.8	
5/12/16 13:00		10.36	7.16		0.531	0.382	50.0	5.58	304.8	
5/13/16 13:00		8.52	6.22		0.530	0.363	57.3	6.67	275.8	
5/14/16 10:00		10.11	6.69		0.534	0.382	51.4	5.78	184.6	
5/16/16 14:30		8.60	6.52		0.523	0.359	47.7	5.54	195.7	
5/17/16 15:00		12.96	7.28		0.527	0.406	49.1	5.15	155.0	
5/18/16 15:00		14.73	7.42		0.524	0.421	49.2	4.98	161.6	46
5/19/16 14:00		9.07	6.25		0.531	0.369	70.9	8.16	196.7	
5/20/16 12:00		8.97	5.96		0.530	0.368	49.9	5.75	210.3	
5/21/16 14:30		8.89	6.64		0.529	0.367	55.2	6.38	175.9	
5/24/16 7:30		9.54	6.26		0.532	0.375	65.6	7.46	207.5	
5/25/16 14:30		9.25	7.42		0.584	0.409	76.6	8.74	717.6	
5/26/16 12:00		9.26	7.68	7.46	0.531	0.372	56.2	6.43	284.9	
5/27/16 15:00		9.13	6.37	6.78	0.534	0.372	72.5	8.32	250.1	
5/31/16 7:30		9.74	6.89	7.09	0.528	0.374	57.3	6.49	199.0	
6/1/16 8:30	Aerated	9.40	6.87		0.532	0.374	56.5	6.42	372.9	70
6/1/16 14:00		9.64	7.05	7.35	0.535	0.378	57.8	6.56	260.5	40
6/2/16 6:00		9.62	6.81	7.25	0.532	0.376	59.1	6.70	249.3	
6/2/16 16:00		9.31	6.10	7.23	0.533	0.373	72.8	8.30	781.7	
6/3/16 7:00		9.52	6.27	7.06	0.530	0.374	60.6	6.88	333.9	40
6/6/16 10:10		11.61	6.71		0.532	0.397	74.3	8.03	815.3	
6/6/16 15:00		11.21	7.66		0.528	0.389	84.0	9.20	398.3	
6/7/16 8:45		10.30	7.04	7.36	0.530	0.380	56.8	6.35	294.4	
6/7/16 15:00		9.85	7.30	7.23	0.539	0.382	71.7	8.09	839.7	
6/8/16 8:30		8.95	6.22	7.17	0.522	0.362	81.1	9.33	375.5	48
6/8/16 14:00		10.06	6.39	7.21	0.517	0.369	72.3	8.10	343.6	
6/9/16 8:30		8.93	6.10	7.08	0.534	0.370	68.2	7.86	680.8	
6/9/16 13:30		9.71	7.16	7.27	0.532	0.377	58.5	6.80	296.9	
6/10/16 8:30		9.75	6.19	7.13	0.539	0.383	57.6	6.18	751.0	
6/10/16 15:00		10.03	7.54	7.07	0.530	0.379	72.8	8.16	388.2	
6/13/16 7:30		8.94	6.80	7.17	0.530	0.368	72.2	8.33	767.7	
6/13/16 14:00		9.56	7.00		0.531	0.374	75.1	8.52	350.3	
6/14/16 8:00		8.84	6.61	7.18	0.530	0.366	71.4	8.26	316.2	
6/14/16 12:30		9.63	7.09	7.17	0.525	0.371	70.6	8.01	639.6	

Weston & Sampson Field Data

Date & Time		Combined Raw Water								
		Temp	pH	pH2	Sp. Cond.	Cond.	DO	DO	ORP	CO2
		(°C)			*(mS/cm)*	*(mS/cm)*	*(%)*	*(mg/L)*	*(mV)*	*(mg/L)*
5/9/16 14:00	Non-aerated	9.40			0.015	0.011	81.6	9.35		
5/10/16 8:15										
5/10/16 15:00		9.09	6.94		0.479	0.334	56.9	6.54		
5/11/16 15:00		9.08	6.22		0.425	0.295	70.6	8.14	300.2	
5/12/16 13:00		9.53	6.86		0.426	0.300	71.8	8.15	316.5	
5/13/16 13:00		8.96	6.10		0.421	0.292	50.4	5.81	272.3	
5/14/16 10:00		9.61	6.02		0.434	0.307	55.8	6.32	182.6	
5/16/16 14:30		9.59	6.40		0.425	0.300	76.2	8.64	126.3	
5/17/16 15:00		9.39	6.26		0.425	0.299	54.2	6.17	209.3	
5/18/16 15:00		8.73	5.60		0.423	0.292	72.2	8.36	205.5	
5/19/16 14:00		9.24	6.26		0.424	0.296	74.8	8.57	178.2	
5/20/16 12:00		9.54	5.87		0.422	0.298	60.9	6.92	198.8	
5/21/16 14:30		9.30	6.83		0.423	0.296	57.6	6.58	155.1	54
5/24/16 7:30		11.70	6.16		0.421	0.314	74.0	7.98	178.4	
5/25/16 14:30		10.43	7.38		0.459	0.331	75.8	8.42	739.4	
5/26/16 12:00		10.79	7.67	7.45	0.422	0.308	57.5	6.35	273.8	
5/27/16 15:00		10.77	6.40	6.64	0.422	0.307	73.3	8.08	249.7	
5/31/16 7:30		11.32	6.15	6.31	0.420	0.310	57.3	6.25	186.1	
6/1/16 8:30	Aerated	10.33	6.59		0.418	0.301	74.7	8.34	355.5	60
6/1/16 14:00		12.28	7.23	7.68	0.418	0.317	71.7	7.65	273.3	34
6/2/16 6:00		11.58	6.61	7.28	0.418	0.311	65.3	7.08	245.3	64
6/2/16 16:00		10.42	6.29	7.41	0.419	0.302	90.0	10.03	785.1	30
6/3/16 7:00		10.43	6.53	7.35	0.418	0.302	88.5	9.85	332.4	28
6/6/16 10:10		10.43	7.05		0.425	0.307	79.5	8.85	801.0	28
6/6/16 15:00		10.88	7.79		0.422	0.308	76.4	8.39	393.0	32
6/7/16 8:45		13.22	6.90	6.94	0.417	0.323	62.0	6.46	285.8	
6/7/16 15:00		12.00	6.93	7.29	0.417	0.314	79.2	8.50	865.0	40
6/8/16 8:30		13.03	7.41	7.22	0.420	0.324	84.8	8.89	315.4	26
6/8/16 14:00		11.64	7.06	7.31	0.420	0.313	83.2	9.01	314.5	30
6/9/16 8:30		10.51	6.47	7.16	0.418	0.300	74.8	8.32	613.6	28
6/9/16 13:30		11.60	7.04	7.17	0.416	0.310	72.1	7.82	312.9	26
6/10/16 8:30		12.31	6.80	7.20	0.417	0.316	64.0	6.84	792.9	
6/10/16 15:00		13.51	7.07	7.31	0.414	0.323	81.8	8.49	416.4	28
6/13/16 7:30		11.48	7.12	7.34	0.416	0.309	90.2	9.82	762.3	8
6/13/16 14:00		12.07	7.34		0.415	0.313	81.9	8.80	368.0	16
6/14/16 8:00		10.12	7.01	7.35	0.418	0.299	90.7	10.16	292.5	14
6/14/16 12:30		10.76	7.20	7.37	0.420	0.306	86.3	9.25	616.6	14

Weston & Sampson Field Data

Date & Time		Filter 1 Effluent								
		Temp	pH	pH2	Sp. Cond.	Cond.	DO	DO	ORP	CO2
		(°C)			*(mS/cm)*	*(mS/cm)*	*(%)*	*(mg/L)*	*(mV)*	*(mg/L)*
5/9/16 14:00	Non-aerated	8.77	9.42		0.013	0.009	78.6	9.14		
5/10/16 8:15										
5/10/16 15:00		9.59	8.45		0.399	0.281	88.5	10.08		
5/11/16 15:00		8.96	6.47		0.430	0.298	43.6	5.04	289.3	
5/12/16 13:00		9.22	6.94		0.430	0.301	56.8	6.52	306.0	
5/13/16 13:00		9.51	6.34		0.429	0.302	86.1	9.80	263.1	
5/14/16 10:00		10.52	5.95		0.431	0.312	49.0	5.45	184.4	
5/16/16 14:30		9.16	6.52		0.430	0.300	56.1	6.42	125.1	
5/17/16 15:00		9.09	6.43		0.425	0.296	53.3	6.11	192.1	
5/18/16 15:00		9.85	5.92		0.425	0.302	72.9	8.21	178.5	
5/19/16 14:00		9.63	6.43		0.428	0.303	77.2	8.77	171.5	
5/20/16 12:00		9.80	6.17		0.424	0.301	71.6	8.05	181.0	
5/21/16 14:30		11.21	5.91		0.420	0.309	78.0	8.50	187.4	
5/24/16 7:30		11.06	6.16		0.421	0.309	69.6	7.63	190.2	
5/25/16 14:30		10.93	7.15		0.447	0.327	72.7	8.01	776.0	
5/26/16 12:00		11.49	7.21	7.53	0.420	0.311	53.9	5.87	297.2	
5/27/16 15:00		10.24	6.83	7.53	0.423	0.304	75.3	8.35	244.4	
5/31/16 7:30		10.73	5.71	6.02	0.419	0.305	*107.7*	*11.88*	*136.6*	
6/1/16 8:30	Aerated	11.59	6.28		0.416	0.310	68.0	7.34	355.6	
6/1/16 14:00		11.24	7.06	7.30	0.419	0.309	73.8	8.04	263.2	
6/2/16 6:00		11.19	6.20	7.26	0.419	0.309	67.8	7.42	230.9	
6/2/16 16:00		10.70	6.98	7.32	0.421	0.306	90.5	10.02	892.2	
6/3/16 7:00		10.35	6.74	7.35	0.419	0.301	87.3	9.72	339.4	
6/6/16 10:10		10.59	6.76		0.420	0.304	70.5	7.83	788.6	
6/6/16 15:00		11.36	7.32		0.420	0.311	56.5	6.14	362.0	
6/7/16 8:45		12.27	7.03	6.87	0.413	0.316	57.3	6.11	312.2	
6/7/16 15:00		11.28	6.81	7.13	0.420	0.310	82.0	8.94	874.5	
6/8/16 8:30		11.83	6.84	7.07	0.416	0.311	71.2	7.68	282.1	
6/8/16 14:00		12.62	7.02	7.03	0.416	0.318	69.2	7.32	291.2	
6/9/16 8:30		10.59	7.06	7.15	0.416	0.302	69.6	7.72	608.6	
6/9/16 13:30		10.98	6.97	7.15	0.417	0.305	70.5	7.75	308.4	
6/10/16 8:30		10.48	6.78	7.10	0.417	0.301	55.2	6.12	791.9	
6/10/16 15:00		12.42	7.13	7.14	0.416	0.316	85.6	9.09	401.9	
6/13/16 7:30		10.56	7.06	7.56	0.417	0.302	88.3	9.80	754.8	
6/13/16 14:00		10.90	7.30		0.416	0.304	83.6	9.20	368.3	
6/14/16 8:00		10.96	7.18	7.25	0.416	0.305	88.1	9.64	281.3	
6/14/16 12:30		10.96	7.11	7.20	0.417	0.305	77.9	8.58	600.5	

Weston & Sampson Field Data

Date & Time		Filter 2 Effluent								
		Temp	pH	pH2	Sp. Cond.	Cond.	DO	DO	ORP	CO2
		(°C)			*(mS/cm)*	*(mS/cm)*	*(%)*	*(mg/L)*	*(mV)*	*(mg/L)*
5/9/16 14:00	Non-aerated	8.92	9.24		0.014	0.010	80.1	9.27		
5/10/16 8:15										21
5/10/16 15:00		9.32	8.23		0.393	0.275	21.8	2.49	275.8	
5/11/16 15:00		9.17	7.37		0.396	0.276	26.8	3.08	258.3	
5/12/16 13:00		9.41	7.97		0.402	0.283	44.0	5.01	266.3	
5/13/16 13:00		10.31	6.63		0.429	0.309	65.0	7.26	254.2	
5/14/16 10:00		11.05	6.09		0.446	0.327	48.6	5.30	187.9	
5/16/16 14:30		9.17	6.48		0.432	0.302	48.6	5.56	134.0	
5/17/16 15:00		9.25	6.52		0.427	0.299	47.3	5.41	192.7	
5/18/16 15:00		9.98	6.49		0.432	0.308	106.8	11.90	160.3	36
5/19/16 14:00		10.24	7.56		0.454	0.326	86.8	9.55	154.3	
5/20/16 12:00		10.96	6.23		0.427	0.313	69.6	7.59	166.6	
5/21/16 14:30		10.48	5.96		0.427	0.309	68.1	7.59	189.8	58
5/24/16 7:30		11.72	6.13		0.422	0.315	71.5	7.71	185.7	
5/25/16 14:30		10.06	7.50		0.438	0.313	80.1	8.97	789.6	
5/26/16 12:00		10.50	7.47	7.72	0.423	0.306	52.9	5.85	286.2	
5/27/16 15:00		10.49	7.07	7.72	0.423	0.306	80.5	8.92	216.8	
5/31/16 7:30		11.10	6.18	6.25	0.421	0.310	62.6	6.85	167.1	
6/1/16 8:30	Aerated	10.97	6.50		0.417	0.305	59.5	6.51	386.8	
6/1/16 14:00		11.34	7.36	7.37	0.420	0.310	70.5	7.68	253.8	
6/2/16 6:00		10.98	6.81	7.26	0.419	0.307	59.4	6.50	259.3	
6/2/16 16:00		10.87	6.28	7.35	0.420	0.307	75.9	8.36	806.3	
6/3/16 7:00		10.40	7.15	7.28	0.421	0.303	81.6	9.08	344.2	
6/6/16 10:10		10.87	6.72		0.417	0.304	60.1	6.64	787.7	
6/6/16 15:00		11.38	6.70		0.418	0.309	48.0	5.22	361.8	
6/7/16 8:45		11.57	6.44	6.97	0.419	0.311	55.4	6.01	276.5	
6/7/16 15:00		12.29	7.42	7.10	0.427	0.324	74.9	7.97	827.2	
6/8/16 8:30		11.12	7.46	7.07	0.418	0.307	76.1	8.32	290.0	
6/8/16 14:00		11.85	6.37	7.00	0.417	0.313	66.3	7.14	289.6	
6/9/16 8:30		10.75	7.05	7.07	0.417	0.303	62.0	6.84	603.6	
6/9/16 13:30		11.18	6.47	7.13	0.419	0.308	67.2	7.35	281.7	
6/10/16 8:30		10.63	7.61	7.20	0.419	0.303	50.5	5.53	777.8	
6/10/16 15:00		12.25	7.59	7.22	0.416	0.315	81.5	8.69	376.1	
6/13/16 7:30		10.73	7.83	7.33	0.423	0.307	90.0	9.95	758.7	
6/13/16 14:00		10.98	8.01		0.418	0.306	84.7	9.29	337.7	
6/14/16 8:00		10.87	7.79	7.28	0.417	0.304	88.7	9.73	239.7	
6/14/16 12:30		10.83	7.00	7.20	0.417	0.304	67.6	7.45	595.6	

APPENDIX D

Water Quality Lab Testing Data

Lab Sampling Results

Date & Time Sampled	Source	Analysis																	
		(mg/L)	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*NTU*	*(mg/L)*	*(mg/L)*	*(CPU)*	*(ug/L)*	*(pCi/L)*	*(pCi/L)*	*(pCi/L)*	*(pCi/L)*	*(pCi/L)*	*(pCi/L)*
		Arsenic	**Calcium**	**Iron**	**Manganese**	**Alkalinity**	**Chloride**	**Sulfate**	**Turbidity**	**TOC**	**CO2**	**Color**	**Uranium**	**Gross Alpha**	**Gross Beta**	**Rad-226**	**Rad-228**	**Rad-226+228**	**Radon**
Reporting Limit		*0.005*	*1.0*	*0.01*	*0.01*	*5*	*0.5*	*0.5*	*1.0*	*0.5*/1.0*	*1*	*5*	*1.00*	*3.00*	*4.00*	*1.00*	*1.00*	*5*	*100*
Detection Limit		*0.0002*	*0.038*	*0.0009*	*0.00004*	*0.47*				*NA*/0.074*			*0.23*	*2.54*	*1.08*	*0.0567*	*0.316*	*0.316*	
5/9/16 13:00	Filter 2	0.007	28	0.01	BDL	110	47	6.5	BDL			BDL	1.1	BDL	1.71	0.104	BDL	BDL	BDL
5/9/16 13:00	Harrison	BDL	33	0.03	BDL	92	32	17	BDL			BDL	0.71	BDL	1.53	0.0684	BDL	BDL	1043
5/9/16 13:00	Raw					110													
5/9/16 13:00	Filter 1					99													
5/9/16 15:00	Filter 2									0.4*									
5/9/16 15:00	Harrison									0.21*									
5/10/16 8:30	Harrison										5								
5/10/16 8:30	Filter 2										BDL								
5/11/16 15:00	Filter 1					120													
5/11/16 15:00	Filter 2					120													
5/13/16 13:00	Filter 1					130													
5/13/16 13:00	Filter 2					120													
5/16/16 14:30	Filter 1					110													
5/16/16 14:30	Filter 2					110													
5/17/16 15:00	Smith	BDL	53	BDL	BDL	130	76	15	BDL			BDL	0.79	BDL	2.83	0.0693	BDL	BDL	769
5/17/16 15:00	Filter 2	BDL	46	0.02	BDL	120	51	16	BDL			BDL	BDL	BDL	1.16	0.137	BDL	BDL	189
5/18/16 10:30	Smith									0.6	4								
5/18/16 10:30	Filter 2					110				0.5	3								
5/19/16 14:00	Filter 1					110													
5/19/16 14:00	Filter 2					120													
5/23/16 14:30	Raw	BDL	44	0.02	BDL	120	53	16	BDL	0.5		BDL							
5/23/16 14:30	Filter 2	BDL	46	0.03	BDL	120	53	16	BDL	0.3		BDL							
5/23/16 14:30	Filter 1					120													
5/31/16 8:00	Raw					110				0.6									
5/31/16 8:00	Filter 2					120				0.3									
6/1/16 14:30	Filter 1					110													
6/1/16 14:30	Filter 2	0.001	43	0.03	0.002	110	51	15	BDL	0.3		BDL							
6/9/16 14:00	Filter 1					110													
6/9/16 14:00	Filter 2	0.001	43	0.008	0.0005	110	51	16	BDL	0.3		BDL							

GRANITE STATE ANALYTICAL SERVICES, LLC

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http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 05/11/2016

CLIENT NAME: Absolute Resource Associates

CLIENT ADDRESS: 124 Heritage Avenue, Suite 10
Portsmouth, NH 03801

Legend

Passes ✓

Fails EPA Primary ⊗

Fails EPA Secondary ▽

Fails EPA Proposed Limit ✕

SAMPLE ID#: 1605-01158-001

SAMPLED BY: Client-Customer

SAMPLE ADDRESS: F-2

LOCATION:

DATE AND TIME COLLECTED: 05/09/2016 1:00 PM

DATE AND TIME RECEIVED: 05/11/2016 10:49 AM

ANALYSIS PACKAGE: Color

RECEIPT TEMPERATURE: ON ICE 2.6 CELSIUS

CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	EPA Limit	Method	Analyst	Date-Time Analyzed
Color	<5	CPU	✓		5	15 CPU	SM 2120B	ST-NH	05/11/16 11:31 AM

The results presented in this report relate to the samples listed above in the condition in which they were received.
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

*** NELAC Accredited Analysis**

ACCREDITED IN ACCORDANCE WITH nelac

Donald J. D'Anjou, Ph. D.
Laboratory Director

This analysis meets NELAC requirements except as noted.
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |

GRANITE STATE ANALYTICAL SERVICES, LLC

22 Manchester Road, Unit 2, Derry, NH 03038

Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837

http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 05/11/2016

CLIENT NAME: Absolute Resource Associates

CLIENT ADDRESS: 124 Heritage Avenue, Suite 10
Portsmouth, NH 03801

Legend

- Passes ✓
- Fails EPA Primary ⊗
- Fails EPA Secondary ▼
- Fails EPA Proposed Limit ✕

SAMPLE ID#: 1605-01158-002

SAMPLED BY: Client-Customer

SAMPLE ADDRESS: Harrison-1

LOCATION:

DATE AND TIME COLLECTED: 05/09/2016 1:00 PM

DATE AND TIME RECEIVED: 05/11/2016 10:49 AM

ANALYSIS PACKAGE: Color

RECEIPT TEMPERATURE: ON ICE 2.6 CELSIUS

CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	EPA Limit	Method	Analyst	Date-Time Analyzed
Color	<5	CPU	✓		5	15 CPU	SM 2120B	ST-NH	05/11/16 11:37 AM

The results presented in this report relate to the samples listed above in the condition in which they were received.
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

*** NELAC Accredited Analysis**

ACCREDITED IN ACCORDANCE WITH nelac

Donald J. D'Anjou, Ph. D.
Laboratory Director

This analysis meets NELAC requirements except as noted.
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17389-1
Client Project/Site: 36464

For:
Absolute Resource Associates
124 Heritage Ave
Unit 16
Portsmouth, New Hampshire 03801

Attn: Aaron DeWees

Elizabeth M. Hoerchler

Authorized for release by:
6/13/2016 1:33:27 PM

Elizabeth Hoerchler, Project Mgmt. Assistant
(314)298-8566
elizabeth.hoerchler@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Job ID: 160-17389-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Absolute Resource Associates

Project: 36464

Report Number: 160-17389-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 05/13/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 7.9º C.

Receipt Exceptions

The following samples were received with insufficient preservation: 36464-01 (160-17389-1) and 36464-02 (160-17389-2). the laboratory added 6mL of nitric acid preservative, and the samples pH was adjusted to < 2 SU.

METALS (ICP/MS)

Samples 36464-01 (160-17389-1) and 36464-02 (160-17389-2) were analyzed for Metals (ICP/MS) in accordance with EPA Method 200.8. The samples were prepared on 06/02/2016 and analyzed on 06/07/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Job ID: 160-17389-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

Samples 36464-01 (160-17389-1) and 36464-02 (160-17389-2) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with USEPA Method 900.0. The samples were prepared on 06/06/2016 and analyzed on 06/10/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 (GFPC)

Samples 36464-01 (160-17389-1) and 36464-02 (160-17389-2) were analyzed for Radium-226 (GFPC) in accordance with EPA Method 903.0. The samples were prepared on 05/17/2016 and analyzed on 06/08/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-228 (GFPC)

Samples 36464-01 (160-17389-1) and 36464-02 (160-17389-2) were analyzed for Radium-228 (GFPC) in accordance with EPA 904. The samples were prepared on 05/17/2016 and analyzed on 05/25/2016.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

COMBINED RADIUM-226 AND RADIUM-228

Samples 36464-01 (160-17389-1) and 36464-02 (160-17389-2) were analyzed for Combined Radium-226 and Radium-228 in accordance with EPA 903 Radium 226/EPA 904 Radium 228. The samples were analyzed on 06/08/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Absolute Resource associates

SUBCONTRACT CHAIN OF CUSTODY DOCUMENTATION

Client:	Absolute Resource Associates	Contact: Aaron DeWees	Phone: 603-436-2001 Fax:	Page 1 of 1
Report to: ,	Aaron DeWees/Jane Stratton	Address: 124 Heritage Ave, #16	Project Name/Number: 36464	
Invoice to:	cathyd@absoluteresourceassociates.com	Portsmouth, NH 03801	Project State: NH MA ME VT	
PO#:	Quote #:		Protocol: RCRA SDWA NPDES MCP NHDES Other	

Lab Number: (assigned by laboratory)	Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Soil W=Water	Analyses Requested: Special Instructions:
	36464-01	5/9/16	13:00		1L	G	None	W	Gross Alpha, Uranium, and Rad 226/228
	-02	5/9/16	13:00		1L	G	None	W	

160-17389 Chain of Custody

Subcontract Laboratory: Test America - Missouri

Relinquished by:		Date: 5/11/16	Time: 14:06	Received by:	UPS	Date: 5/11/16	Time: 14:06
Relinquished by:		Date:	Time:	Received by:		Date:	Time:
Relinquished by:	UPS	Date:	Time:	Received by:	Jill Clarke	Date: 5.13.16	Time: 0830

Reporting Instructions: PDF (Email Address: aarond@absoluteresourceassociates.com; janes@absoluteresourceassociates.com)

Received on ice? (Y) N

Excel File: Y / N

Temp:

TAT Requested: Priority (24hr) Expedited (48hr) 10 Business days Date needed:

Comments: Run Gross Alpha, Uranium, and Rad 226/228 for both samples. Bottles for 36464-01 are labeled as F2-8 and F2-9, and 36464-02 are labeled as Harrison-9 and Harrison-10, and are the same samples, despite having different IDs. Go by the job number.

QSD-21 4/15/16 Rev0 ajd (pg 1/1)

6/13/2016

Login Sample Receipt Checklist

Client: Absolute Resource Associates

Job Number: 160-17389-1

Login Number: 17389
List Number: 1
Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	Samples 160-17389-1 and -2 were received unpreserved. Nitric was added to adjust
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	pH to < 2 SU.
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Absolute Resource Associates
Project/Site: 36464

TestAmerica Job ID: 160-17389-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Absolute Resource Associates
Project/Site: 36464

TestAmerica Job ID: 160-17389-1

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL SL
900.0	Gross Alpha and Gross Beta Radioactivity	EPA	TAL SL
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL

Protocol References:

EPA = US Environmental Protection Agency

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Absolute Resource Associates
Project/Site: 36464

TestAmerica Job ID: 160-17389-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17389-1	36464-01	Water	05/09/16 13:00	05/13/16 08:30
160-17389-2	36464-02	Water	05/09/16 13:00	05/13/16 08:30

Client Sample ID: 36464-01

Date Collected: 05/09/16 13:00
Date Received: 05/13/16 08:30

Lab Sample ID: 160-17389-1

Matrix: Water

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	**1.1**		1.0	0.23	ug/L		06/02/16 15:33	06/07/16 19:29	2

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	1.78	U	1.67	1.68	3.00	2.63	pCi/L	06/06/16 15:14	06/10/16 10:40	1
Gross Beta	1.71	U	1.13	1.14	4.00	1.73	pCi/L	06/06/16 15:14	06/10/16 10:40	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.104**		0.0484	0.0493	1.00	0.0567	pCi/L	05/17/16 10:19	06/08/16 07:19	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.5*		*40 - 110*	*05/17/16 10:19*	*06/08/16 07:19*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0563	U	0.180	0.180	1.00	0.316	pCi/L	05/17/16 10:43	05/25/16 11:38	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.5*		*40 - 110*	*05/17/16 10:43*	*05/25/16 11:38*	*1*
Y Carrier	*93.5*		*40 - 110*	*05/17/16 10:43*	*05/25/16 11:38*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.160	U	0.187	0.187	5.00	0.316	pCi/L		06/08/16 18:42	1

Client Sample ID: 36464-02

Date Collected: 05/09/16 13:00
Date Received: 05/13/16 08:30

Lab Sample ID: 160-17389-2

Matrix: Water

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	**0.71**	**J**	1.0	0.23	ug/L		06/02/16 15:33	06/07/16 20:00	2

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.475	U	1.41	1.41	3.00	2.54	pCi/L	06/06/16 15:14	06/10/16 10:40	1
Gross Beta	**1.53**		0.736	0.751	4.00	1.08	pCi/L	06/06/16 15:14	06/10/16 10:40	1

Client Sample Results

Client: Absolute Resource Associates
Project/Site: 36464

TestAmerica Job ID: 160-17389-1

Client Sample ID: 36464-02
Date Collected: 05/09/16 13:00
Date Received: 05/13/16 08:30

Lab Sample ID: 160-17389-2
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0684	U	0.0498	0.0502	1.00	0.0737	pCi/L	05/17/16 10:19	06/08/16 07:19	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.7*		*40 - 110*	*05/17/16 10:19*	*06/08/16 07:19*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.0257	U	0.222	0.222	1.00	0.398	pCi/L	05/17/16 10:43	05/25/16 11:38	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*89.7*		*40 - 110*	*05/17/16 10:43*	*05/25/16 11:38*	*1*
Y Carrier	*91.2*		*40 - 110*	*05/17/16 10:43*	*05/25/16 11:38*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.0426	U	0.227	0.227	5.00	0.398	pCi/L		06/08/16 18:42	1

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 160-254519/1-A
Matrix: Water
Analysis Batch: 255285

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 254519

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	ND		1.0	0.23	ug/L		06/02/16 15:33	06/07/16 19:21	2

Lab Sample ID: LCS 160-254519/2-A
Matrix: Water
Analysis Batch: 255285

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 254519

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	1000	980		ug/L		98	85 - 115

Lab Sample ID: 160-17389-1 MS
Matrix: Water
Analysis Batch: 255285

Client Sample ID: 36464-01
Prep Type: Total/NA
Prep Batch: 254519

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	1.1		1000	1000		ug/L		100	70 - 130

Lab Sample ID: 160-17389-1 MSD
Matrix: Water
Analysis Batch: 255285

Client Sample ID: 36464-01
Prep Type: Total/NA
Prep Batch: 254519

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Uranium	1.1		1000	1000		ug/L		100	70 - 130	0	20

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Lab Sample ID: MB 160-254946/1-A
Matrix: Water
Analysis Batch: 255898

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 254946

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.08066	U	0.465	0.465	3.00	0.887	pCi/L	06/06/16 15:14	06/10/16 07:17	1
Gross Beta	0.2966	U	0.538	0.538	4.00	0.910	pCi/L	06/06/16 15:14	06/10/16 07:17	1

Lab Sample ID: LCS 160-254946/2-A
Matrix: Water
Analysis Batch: 255898

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 254946

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	50.0	36.79		5.56	3.00	1.31	pCi/L	74	73 - 133

Lab Sample ID: LCSB 160-254946/3-A
Matrix: Water
Analysis Batch: 255898

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 254946

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	92.7	86.14		9.15	4.00	1.09	pCi/L	93	75 - 125

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-251447/1-A
Matrix: Water
Analysis Batch: 255465

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 251447

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03293	U	0.0407	0.0408	1.00	0.0674	pCi/L	05/17/16 10:19	06/08/16 07:19	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.5*		*40 - 110*	*05/17/16 10:19*	*06/08/16 07:19*	*1*

Lab Sample ID: LCS 160-251447/2-A
Matrix: Water
Analysis Batch: 255465

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 251447

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.2	14.30		1.37	1.00	0.0734	pCi/L	128	68 - 137		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*93.2*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-251452/1-A
Matrix: Water
Analysis Batch: 253018

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 251452

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.07204	U	0.180	0.180	1.00	0.338	pCi/L	05/17/16 10:43	05/25/16 11:38	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.5*		*40 - 110*	*05/17/16 10:43*	*05/25/16 11:38*	*1*
Y Carrier	*93.8*		*40 - 110*	*05/17/16 10:43*	*05/25/16 11:38*	*1*

Lab Sample ID: LCS 160-251452/2-A
Matrix: Water
Analysis Batch: 253018

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 251452

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			15.1	17.56		1.82	1.00	0.330	pCi/L	116	56 - 140		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*93.2*		*40 - 110*
Y Carrier	*92.3*		*40 - 110*

QC Association Summary

Client: Absolute Resource Associates
Project/Site: 36464

TestAmerica Job ID: 160-17389-1

Metals

Prep Batch: 254519

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17389-1	36464-01	Total/NA	Water	200.7/200.8	
160-17389-1 MS	36464-01	Total/NA	Water	200.7/200.8	
160-17389-1 MSD	36464-01	Total/NA	Water	200.7/200.8	
160-17389-2	36464-02	Total/NA	Water	200.7/200.8	
LCS 160-254519/2-A	Lab Control Sample	Total/NA	Water	200.7/200.8	
MB 160-254519/1-A	Method Blank	Total/NA	Water	200.7/200.8	

Analysis Batch: 255285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17389-1	36464-01	Total/NA	Water	200.8	254519
160-17389-1 MS	36464-01	Total/NA	Water	200.8	254519
160-17389-1 MSD	36464-01	Total/NA	Water	200.8	254519
160-17389-2	36464-02	Total/NA	Water	200.8	254519
LCS 160-254519/2-A	Lab Control Sample	Total/NA	Water	200.8	254519
MB 160-254519/1-A	Method Blank	Total/NA	Water	200.8	254519

Rad

Prep Batch: 251447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17389-1	36464-01	Total/NA	Water	PrecSep-21	
160-17389-2	36464-02	Total/NA	Water	PrecSep-21	
LCS 160-251447/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
MB 160-251447/1-A	Method Blank	Total/NA	Water	PrecSep-21	

Prep Batch: 251452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17389-1	36464-01	Total/NA	Water	PrecSep_0	
160-17389-2	36464-02	Total/NA	Water	PrecSep_0	
LCS 160-251452/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
MB 160-251452/1-A	Method Blank	Total/NA	Water	PrecSep_0	

Prep Batch: 254946

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17389-1	36464-01	Total/NA	Water	Evaporation	
160-17389-2	36464-02	Total/NA	Water	Evaporation	
LCS 160-254946/2-A	Lab Control Sample	Total/NA	Water	Evaporation	
LCSB 160-254946/3-A	Lab Control Sample	Total/NA	Water	Evaporation	
MB 160-254946/1-A	Method Blank	Total/NA	Water	Evaporation	

Tracer/Carrier Summary

Client: Absolute Resource Associates
Project/Site: 36464

TestAmerica Job ID: 160-17389-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Ba							
Lab Sample ID	Client Sample ID	(40-110)							
160-17389-1	36464-01	89.5							
160-17389-2	36464-02	89.7							
LCS 160-251447/2-A	Lab Control Sample	93.2							
MB 160-251447/1-A	Method Blank	87.5							

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Ba	Y						
Lab Sample ID	Client Sample ID	(40-110)	(40-110)						
160-17389-1	36464-01	89.5	93.5						
160-17389-2	36464-02	89.7	91.2						
LCS 160-251452/2-A	Lab Control Sample	93.2	92.3						
MB 160-251452/1-A	Method Blank	87.5	93.8						

Tracer/Carrier Legend

Ba = Ba Carrier
Y = Y Carrier

NH DIVISION OF
Public Health Services

Tuesday, May 17, 2016

JANE STRATTON
ABSOLUTE RESOURCE
124 HERITAGE AVENUE #16
PORTSMOUTH NH 03801

RE: Workorder: B602712 - SPECIAL
Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Dear JANE STRATTON:

Enclosed are the analytical results for the sample(s) received by the laboratory on Wednesday, May 11, 2016. Unless indicated as exceptions, the sample(s) met EPA requirements for hold times, preservation techniques, container types and other receipt conditions. Please contact us if you need measurement uncertainty values associated with radiological parameters. Results reported conform to the most current NELAC standard, where applicable, unless otherwise narrated in the body of the report. Any results reported for samples subcontracted to another laboratory are indicated on the report. Please refer to http://www2.des.nh.gov/CertifiedLabs/Certified-Method.aspx for a copy of our current NELAP certificate and accredited parameters.

We appreciate the opportunity to provide this analytical service for you. If you have any questions regarding this report or your results, please feel free to contact us.

The following signature indicates technical review and acceptance of the data.

Sincerely,

Lucio S. Barinelli, Ph.D.

Authorized Signature

Enclosures

NH DIVISION OF
Public Health Services
Improving health, preventing disease, reducing costs for all

New Hampshire Public Health Laboratories
Department of Health and Human Services
29 Hazen Dr., Concord NH 03301
Phone: (603) 271-3445
Fax: (603) 271-2997

DATA QUALIFIER DESCRIPTIONS

Workorder: B602712 - SPECIAL

Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

The following are a list of some column headers and abbreviations with their meanings as used throughout the analysis report. Referring to them will assist you in interpreting your report.

RDL= The lowest value the laboratory calibrates its instrumentation for this parameter. Any instrumental estimate of results below the Report Limit is reported as Not Detected (ND).

DF= For some heavily contaminated samples, the laboratory must dilute samples to keep the final number within its calibration scale. This is referred to as the Dilution Factor. Final results and reporting limits are adjusted relative to the DF used.

QUAL= Indicates that the result has been qualified. Refer to the Analytical Report Comments and Qualifiers page for details.

LIMIT= Reflects the Maximum Contamination Level (MCL), if one exists, a secondary or recommended level or another State or Federal action level.

Surrogates = For some analyses, the laboratory adds a number of compounds to monitor analytical performance. These results are provided for your information.

> = Greater than	< = Less than
mg/L = milligrams per Liter	ug/L = micrograms per Liter
mg/kg = milligrams per kilogram	ug/kg = micrograms per kilogram
P-A = Present/Absent	CTS/100 mL = Counts per 100 milliliters
CFU = Colony forming unit	MPN = Most Probable Number
pCi/L = picoCuries per Liter	

J = Estimated value; analyte detected at less than the Reporting Limit but greater than the laboratory's Method Detection Limit.

B = Analyte detected in the method blank for the batch of samples. Its presence in the sample may be suspect.

E = Estimated value; result exceeded the upper calibration level for the parameter.

Radiological results are expressed as a number + an uncertainty factor. Uncertainty is a calculated measure of the precision around the reported value.

All results for pH and residual chlorine samples analyzed more than 15 minutes after time of collection shall be considered QUALIFIED.

For assistance in interpreting your lab results and obtaining information regarding water treatment; go to www.des.nh.gov and search "Be Well Informed." Or go to http://xml2.des.state.nh.us/DWITool/.

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New Hampshire Public Health Laboratories
Department of Health and Human Services
29 Hazen Dr., Concord NH 03301
Phone: (603) 271-3445
Fax: (603) 271-2997

SAMPLE SUMMARY

Workorder: B602712 - SPECIAL

Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Lab ID	Sample ID	Ref ID	Matrix	Date Collected	Date Received	Misc Info
B602712001	36464-01	F2-11/12	WATER	5/9/2016 13:00	5/11/2016	
B602712002	36464-02	HARRISON 11/12	WATER	5/9/2016 13:00	5/11/2016	

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Phone: (603) 271-3445
Fax: (603) 271-2997

ANALYTICAL REPORT COMMENTS AND QUALIFIERS

Workorder: B602712 - SPECIAL

Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Receiving Codes

B2 - Small air bubble present in sample

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ANALYTICAL RESULTS

Workorder: B602712 - SPECIAL

Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Lab ID:	**B602712001**	Matrix:	WATER
Sample ID:	**36464-01**	Sample Type:	SAMPLE
Description:	F2-11/12	Collector :	AARON DEWEES

Parameters	Results	Units	RDL	DF	Prepared	Analyzed	Limit	Qual
Radiochemistry								
Analytical Method: SM 7500B								
Radon	ND	pCi/L	100	1		5/12/2016 16:47		

REPORT OF LABORATORY ANALYSIS

nelac

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Department of Health and Human Services
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Phone: (603) 271-3445
Fax: (603) 271-2997

ANALYTICAL RESULTS

Workorder: B602712 - SPECIAL
Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Lab ID: **B602712002**
Sample ID: **36464-02**
Description: HARRISON 11/12

Matrix: WATER
Sample Type: SAMPLE
Collector : AARON DEWEES

Parameters	Results	Units	RDL	DF	Prepared	Analyzed	Limit	Qual
Radiochemistry								
Analytical Method: SM 7500B								
Radon	1043+/-25	pCi/L	100	1		5/12/2016 17:41		

Date: 05/17/2016

REPORT OF LABORATORY ANALYSIS

nelac

9000595

B2 8 T-CK

Absolute Resource associates

SUBCONTRACT CHAIN OF CUSTODY DOCUMENTATION

Client:	Absolute Resource Associates	Contact:	Aaron DeWees	Phone: 603-436-2001 Fax:	Page 1 of 1
Report to:	Aaron DeWees/Jane Stratton	Address:	124 Heritage Ave, #16	Project Name/Number: 36464	
Invoice to:	cathyd@absoluteresourceassociates.com		Portsmouth, NH 03801	Project State: NH MA ME VT	
PO#:	Quote #:			Protocol: RCRA SDWA NPDES MCP NHDES Other	

Lab Number: (assigned by laboratory)	Field ID (must agree with container) 36464-01	Date Sampled	Time Sampled	Sampled By	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Soil W=Water	Analyses Requested: Special Instructions:
(1)	F2-11/12	5/9/16	13:00		40mlx2	G	None	W	Radon
(2)	Harrison 11/12	↓	↓		↓	↓	↓	W	↓
	36464-02								

B602712001
36464-01
9000595
05/09/16 13:00

B602712002
36464-02
9000595
05/09/16 13:00

Subcontract Laboratory: Nit State Lab

Relinquished by:		Date: 5/10/16	Time: 14:52	Received by:	Date: Time:
Relinquished by:		Date:	Time:	Received by:	Date: Time:
Relinquished by:		Date:	Time:	Received by:	Date: Time:

Reporting Instructions: PDF (Email Address: aarond@absoluteresourceassociates.com; janes@absoluteresourceassociates.com)

Excel File: Y / N

Received on ice? (Y) N

Temp:

TAT Requested: Priority (24hr) Expedited (48hr) 10 Business days Date needed:

Comments:

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36464
Date Received: 5/9/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 5/17/2016
Total number of pages: 4

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36464

Sample#: 36464-001
Sample ID: F2 (1-5, 8-11)
Matrix: Water
Sampled: 5/9/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Time	Reference
Arsenic	**0.007**	0.005	mg/L	1	AC	5/13/16	8779	5/13/16	17:31	E200.8
Calcium	**28**	1.0	mg/L	10	AC	5/13/16	8779	5/13/16	17:58	E200.8
Iron	**0.01**	0.01	mg/L	1	AC	5/13/16	8779	5/13/16	17:31	E200.8
Manganese	< 0.01	0.01	mg/L	1	AC	5/13/16	8779	5/13/16	17:31	E200.8

Sample#: 36464-002
Sample ID: Harrison (1-5, 8-11)
Matrix: Water
Sampled: 5/9/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Time	Reference
Arsenic	< 0.005	0.005	mg/L	1	AC	5/13/16	8779	5/13/16	17:36	E200.8
Calcium	**33**	1.0	mg/L	10	AC	5/13/16	8779	5/13/16	18:03	E200.8
Iron	**0.03**	0.01	mg/L	1	AC	5/13/16	8779	5/13/16	17:36	E200.8
Manganese	< 0.01	0.01	mg/L	1	AC	5/13/16	8779	5/13/16	17:36	E200.8

Absolute Resource associates

Project ID: Pease Pilot
Job ID: 36464

Sample#: 36464-001
Sample ID: F2 (1-5, 8-11)
Matrix: Water
Sampled: 5/9/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**110**	5	mg/L	1	APA		1601097	5/16/16		SM2320B
Chloride	**47**	0.5	mg/L	1	AJC		1601103	5/13/16	18:48	E300.0A
Sulfate	**6.5**	0.5	mg/L	1	AJC		1601103	5/13/16	18:48	E300.0A
Turbidity	< 1.0	1.0	NTU	1	AM		1601090	5/10/16	13:47	SM2130B

Sample#: 36464-002
Sample ID: Harrison (1-5, 8-11)
Matrix: Water
Sampled: 5/9/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**92**	5	mg/L	1	APA		1601097	5/16/16		SM2320B
Chloride	**32**	0.5	mg/L	1	AJC		1601103	5/13/16	19:05	E300.0A
Sulfate	**17**	0.5	mg/L	1	AJC		1601103	5/13/16	19:05	E300.0A
Turbidity	< 1.0	1.0	NTU	1	AM		1601090	5/10/16	13:48	SM2130B

Sample#: 36464-003
Sample ID: Raw-1
Matrix: Water
Sampled: 5/9/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**110**	5	mg/L	1	APA		1601097	5/16/16		SM2320B

Sample#: 36464-004
Sample ID: F1-1
Matrix: Water
Sampled: 5/9/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**99**	5	mg/L	1	APA		1601097	5/16/16		SM2320B

PAGE____ OF____

Absolute Resource associates

124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36464

Company Name: Weston + Sampson

Company Address: 100 International, Portsmouth

Report To: Andrew Walker

Phone #: 603-397-9280

Invoice to Email: walkera@wseinc.com

☐ Hard Copy Invoice Required

Project Name: Pease Pilot

Project #:

Project Location: (NH) MA ME VT NY ____ Other

Protocol: RCRA SDWA NPDES MCP NHDES OTHER

Reporting Limits: QAPP GW-1 S-1 EPA DW Other________

Quote #________ ☐ NH Reimbursement Pricing

PO #________

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP; ☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT; ☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane; ☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:; ☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint; ☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB; ☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB; ☐ O&G 1664 ☐ Mineral O&G SM5520F; ☐ pH ☐ BOD ☐ Conductivity ☒ Turbidity; ☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity; ☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness; ☐ Total Metals-list:; ☒ Dissolved Metals-list: Calcium, Arsenic, Iron, Manganese; ☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC; ☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN; ☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P; ☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride; ☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP; ☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide; Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde; Color; Anions - Chloride, Sulfate; Gross Alpha, Uranium, Ra 226/228; Grab/Composite; Radon

Lab Sample ID (Lab Use Only)	Field ID	# Containers	Matrix: Water	Matrix: Solid	Matrix: Other	HCl	HNO_3	H_2SO_4	NaOH	MeOH	Date	Time	Sampler	Analysis
36464-01	F2-1, Harrison-1	1	X								5/9/16	1300	AW	Color
-02	F2-5, Harrison-5	1	X								5/9/16	1300	AW	Anions - Chloride, Sulfate
	F2-3, Harrison-3	1	X								5/9/16	1300	AW	Turbidity
	F2-4, Harrison-4	1	X								5/9/16	1300	AW	Alkalinity
	F2-2, Harrison-2	1	X				X				5/9/16	1300	AW	Dissolved Metals
	F2-10, Harrison-8	1	X								5/9/16	1300	AW	
	F2-8, Harrison-9	1	X								5/9/16	1300	AW	Gross Alpha, Uranium, Ra 226/228
	F2-9, Harrison-10	1	X								5/9/16	1300	AW	X (Grab/Composite)
	F2-11/12, Harrison-11/12	1	X								5/9/16	1300	AW	Radon
-03 / -04	Raw-1, F1-1	1	X								5/9/16	1300	AW	Alkalinity

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ________

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS

REPORTING INSTRUCTIONS ☒ PDF (e-mail address) walkera@wseinc.com
☒ HARD COPY REQUIRED ☐ FAX (FAX#)________

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 7 °C

CUSTODY RECORD

QSD-01 Revision 1/27/16

Relinquished by	Date	Time	Received by	Date	Time
Relinquished by Sampler: Andrew Walker [signature]	5/9/16	1600	Received by:		
Relinquished by:			Received by:		
Relinquished by:			Received by Laboratory: [signature]	5/9/16	1600

Eastern Analytical, Inc.

professional laboratory & drilling services

Andrew Walker
Weston & Sampson Engineers, Inc.
100 International Dr. Suite 152
Portsmouth, NH 03801

ACCREDITED IN ACCORDANCE WITH nelac

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 155900
Client Identification: Pease Pilot
Date Received: 5/10/2016

Report revision/reissue: Revision, replaces report dated 5/18/2016

Revision information: Per customer requested TOC values have been revised.

Dear Mr. Walker :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.eailabs.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director	5.23.16	3
	Date	# of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **155900**

Client: **Weston & Sampson Engineers, Inc.**

Client Designation: **Pease Pilot**

Temperature upon receipt (°C): 1.3 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
155900.01	Harrison-1	5/10/16	5/10/16	aqueous		Adheres to Sample Acceptance Policy
155900.02	F2-1	5/10/16	5/10/16	aqueous		Adheres to Sample Acceptance Policy
155900.03	Harrison-6	5/10/16	5/9/16	aqueous		Adheres to Sample Acceptance Policy
155900.04	Harrison-7	5/10/16	5/9/16	aqueous		Adheres to Sample Acceptance Policy
155900.05	F2-6	5/10/16	5/9/16	aqueous		Adheres to Sample Acceptance Policy
155900.06	F2-7	5/10/16	5/9/16	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitibility, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.
Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.
All results contained in this report relate only to the above listed samples.
References include:
1) EPA 600/4-79-020, 1983
2) Standard Methods for Examination of Water and Wastewater,20th Edition, 1998 and 22nd Edition, 2012
3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
4) Hach Water Analysis Handbook, 2nd edition, 1992

LABORATORY REPORT

EAI ID#: **155900**

Client: **Weston & Sampson Engineers, Inc.**

Client Designation: **Pease Pilot**

Sample ID:	Harrison-1	F2-1						
Lab Sample ID:	155900.01	155900.02						
Matrix:	aqueous	aqueous						
Date Sampled:	5/10/16	5/10/16						
Date Received:	5/10/16	5/10/16			Analysis			
			Units	**Date**	**Time**	**Method**	**Analyst**	
CO2 (Free)	**5**	< 1	mg/L	05/12/16	10:40	4500CO2B	SCW	

Sample ID:	Harrison-6	Harrison-7	F2-6	F2-7					
Lab Sample ID:	155900.03	155900.04	155900.05	155900.06					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	5/9/16	5/9/16	5/9/16	5/9/16			Analysis		
Date Received:	5/10/16	5/10/16	5/10/16	5/10/16	**Units**	**Date**	**Time**	**Method**	**Analyst**
TOC	**0.41 J**	**0.38 J**	**0.19 J**	**0.22 J**	mg/L	05/16/16	12:06	5310C-00	LO

J: These are estimated values. The analytical result is above the theoretical MDL but below the lowest calibration standard of 0.5 mg/L. Quality control analyzed with this batch does not support a value below the lowest calibration standard.

Page _____ of _____

Chain-of-Custody Record

155900

Bold Fields Required. Please Circle Requested Analysis.

Sample I.D.	Sampling Date/Time *If Composite, Indicate Both Start & Finish Date/Time	Matrix (see below)	Grab/*Composite	VOC: 524.2 524.2 BTEX 524.2 MTBE only	VOC: 8260B 624 VTICs 1, 4 Dioxane	VOC: 8021B BTEX HALOS	VOC: 8015B GRO MAVPH	SVOC: 8270D 625 SVTICs EDB DBCP ABN A BN PAH	SVOC: TPH8100 LI L2	SVOC: 8015B DRO MAEPH	SVOC: PEST 608 PCB 608 PEST 8081A PCB 8082	SVOC: Oil & Grease 1664 TPH 1664	TCLP: TCLP 1311 ABN Metals VOC Pest Herb	Metals: Dissolved Metals (List Below)	Metals: Total Metals (List Below)	Inorganics: TS TSS TDS Spec. Con.	Inorganics: Br Cl F SO_4 NO_2 NO_3 NO_2NO_3	Inorganics: BOD CBOD T. Alk.	Inorganics: TKN NH_3 T. Phos. O. Phos.	Inorganics: pH T. Res. Chlorine	Inorganics: COD Phenols TOC DOC	Inorganics: Total Cyanide Total Sulfide	Inorganics: Reactive Cyanide Reactive Sulfide Flashpoint Ignitability	Micro: Total Coliform E. Coli Fecal Coliform	Micro: Enterococci Heterotrophic Plate Count	Other: CO_2	Other	Other	# of Containers	Notes MeOH Vial #
Harrison - 1	5/10/16 530	DW	G																								X				
F2 - 1	5/10/16 530	DW	G																								X				
Harrison - 6	5/9/16 1500																				X									Lowest possible detection Limit	
Harrison - 7	5/9/16 1500																				X										
F2 - 6	5/9/16 1500																				X										
F2 - 7	5/9/16 1500																				X										

Matrix: A-Air; S-Soil; GW-Ground Water; SW-Surface Water; DW-Drinking Water; WW-Waste water

Preservative: H-HCL; N-HNO_3; S-H_2SO_4; Na-NaOH; M-MEOH

Project Manager: Andrew Walker

Company: Weston & Sampson

Address: 100 Int'l Dr, Suite 152

City: Portsmouth **State:** NH **Zip:** 03801

Phone: 603-397-9280 **Ext.:**

Fax:

E-Mail: walkeraw@wseinc.com

Site Name: Pease Pilot

Project #:

State: (NH) MA ME VT **Other:**

Regulatory Program: NPDES: RGP POTW Stormwater or GWP, Oil Fund, Brownfield or Other:

Quote #: **PO #:**

Date Needed:

QA/QC Reporting Level A B C OR Presumptive Certainty

Reporting Options Prelims: Yes or No If Yes: Fax or PDF

Electronic Options No Fax E-Mail PDF Equis

Temp. 4.3 °C ICE? (Yes) No

Metals: 8 RCRA 13 PP Fe, Mn Pb, Cu

Other Metals:

Samples Field Filtered? ☐ Yes ☐ No

Notes: (ie: Special Detection Limits, Billing Info, If Different)

Sampler(s): AW Andrew Walker

Relinquished By:	Date:	Time:	Received By:
Andrew Walker	5/10/16	12:48	Sean Boynton
Sean Boynton	5/10/16	15:35	

Site History:

Suspected Contamination:

Field Readings:

Eastern Analytical, Inc.
professional laboratory & drilling services
25 Chenell Drive | Concord, NH 03301 | Tel: 603.228.0525 | 1.800.287.0525 | Fax: 603.228.4591 | E-Mail: customerservice@eailabs.com | www.eailabs.com

(White: Original Green: Project Manager)

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36497
Date Received: 5/11/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 5/17/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36497

Sample#: 36497-001
Sample ID: F1-1
Matrix: Water
Sampled: 5/11/16 15:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**120**	5	mg/L	1	APA		1601097	5/16/16		SM2320B

Sample#: 36497-002
Sample ID: F2-1
Matrix: Water
Sampled: 5/11/16 15:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**120**	5	mg/L	1	APA		1601097	5/16/16		SM2320B

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36497

Company Name: Weston + Sampson

Company Address: 100 International Dr. Suite 152 Portsmouth NH

Report To: Andrew Walker

Phone #: 603-397-9280

Invoice to Email: walkera@wseinc.com

☒ Hard Copy Invoice Required

Project Name: Freese Pilot

Project #:

Project Location: (NH) MA ME VT NY Other ____

Protocol: RCRA SDWA NPDES MCP NHDES OTHER

Reporting Limits: QAPP GW-1 S-1 EPA DW Other ____

Quote # ____ ☐ NH Reimbursement Pricing

PO # ____

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☐ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☐ Total Metals-list:
☐ Dissolved Metals-list:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TDN ☐ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	TSS	Alkalinity	Grab (G) or Composite (C)
[redacted]																
[redacted]																
264970 01	[redacted] F1-1	1	X								5/11/16	1500	AW	X		G
02	F2-1	1	X								5/11/16	1500	AW	X		G

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS

REPORTING INSTRUCTIONS ☐ PDF (e-mail address) ____
☐ HARD COPY REQUIRED ☐ FAX (FAX#) ____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 3 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

	Relinquished by Sampler:	Date	Time	Received by:	Date	Time
	Andrew Walker	5/11/16	1515			
	Relinquished by:	Date	Time	Received by:	Date	Time
	Relinquished by:	Date	Time	Received by Laboratory:	Date	Time
					5/11/16	1515

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36528
Date Received: 5/13/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 5/18/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36528

Sample#: 36528-001
Sample ID: F1-1
Matrix: Water
Sampled: 5/13/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**130**	5	mg/L	1	APA		1601097	5/16/16		SM2320B

Sample#: 36528-002
Sample ID: F2-1
Matrix: Water
Sampled: 5/13/16 13:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**120**	5	mg/L	1	APA		1601097	5/16/16		SM2320B

Absolute Resource associates

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36528

Company Name: Weston + Sampson
Company Address: 100 International, Portsmouth
Report To: Andrew Walker
Phone #: 603-397-6280
Invoice to Email: walkwa@wseinc.com
☐ Hard Copy Invoice Required

Project Name: Pease Pilot
Project #:
Project Location: (NH) MA ME VT NY ____ Other
Protocol: RCRA SDWA NPDES MCP NHDES OTHER
Reporting Limits: QAPP GW-1 S-1 EPA DW Other____
Quote #____ ☐ NH Reimbursement Pricing
PO # ____

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VGC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☐ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☐ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☐ Total Metals-list:
☐ Dissolved Metals-list:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	TVS	Alkalinity	Grab (G) or Composite (C)
36528-01	F1-1	1	X								5/13/16	1300	AW	X		
-02	F2-1	1	X								5/13/16	1300	AW	X		

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS

REPORTING INSTRUCTIONS ☐ PDF (e-mail address)____
☐ HARD COPY REQUIRED ☐ FAX (FAX#)____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 5 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

		Date	Time		Date	Time
Relinquished by Sampler:	Andrew Walker	5/13/16	1437	Received by:		
Relinquished by:				Received by:		
Relinquished by:				Received by Laboratory:	5/13/16	14:37

3

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36536
Date Received: 5/16/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 5/19/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36536

Sample#: 36536-001
Sample ID: F1-1
Matrix: Water
Sampled: 5/16/16 14:30

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**110**	5	mg/L	1	APA		1601146	5/18/16		SM2320B

Sample#: 36536-002
Sample ID: F2-1
Matrix: Water
Sampled: 5/16/16 14:30

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**110**	5	mg/L	1	APA		1601146	5/18/16		SM2320B

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36536

Company Name: Weston + Sampson
Company Address: 100 International, Suite 152, Portsmouth
Report To: Andrew Walker
Phone #: 603-397-9290
Invoice to Email: walkera@westonandsampson.com
☐ Hard Copy Invoice Required

Project Name: Pease Pilot
Project #:
Project Location: (NH) MA ME VT NY Other ____
Protocol: RCRA MCP SDWA NHDES NPDES OTHER
Reporting Limits: QAPP EPA DW GW-1 Other ____ S-1
Quote # ____ ☐ NH Reimbursement Pricing
PO # ____

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☐ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☐ Total Metals-list:
☐ Dissolved Metals-list:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	TSS	Grab (G) or Composite (C)
365601	FL-1	1	X								5/16/16	1430	AW	X	
-02	FL-2	1	X								"	"	"	X	

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS

REPORTING INSTRUCTIONS ☐ PDF (e-mail address) ____
☐ HARD COPY REQUIRED ☐ FAX (FAX#) ____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 8 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

	Date	Time		Date	Time
Relinquished by Sampler: Andrew Walker	5/16/16	1508	Received by:		
Relinquished by:			Received by:		
Relinquished by:			Received by Laboratory:	5/16/16	1508

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-17461-1
Client Project/Site: 36552

For:
Absolute Resource Associates
124 Heritage Ave
Unit 16
Portsmouth, New Hampshire 03801

Attn: Aaron DeWees

Elizabeth M. Hoerchler

Authorized for release by:
6/17/2016 5:13:59 PM

Elizabeth Hoerchler, Project Mgmt. Assistant
(314)298-8566
elizabeth.hoerchler@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Job ID: 160-17461-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Absolute Resource Associates

Project: 36552

Report Number: 160-17461-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 05/19/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7° C.

METALS (ICP/MS)

Samples SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2) were analyzed for Metals (ICP/MS) in accordance with EPA Method 200.8. The samples were prepared on 06/03/2016 and analyzed on 06/16/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GROSS ALPHA AND GROSS BETA RADIOACTIVITY

Samples SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2) were analyzed for Gross Alpha and Gross Beta Radioactivity in accordance with USEPA Method 900.0. The samples were prepared on 06/01/2016 and analyzed on 06/06/2016.

The gross alpha detection goal (3.00 pCi/L) was not met for the following samples in batch 160-254147 due to a reduction of the sample

Job ID: 160-17461-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

size attributed to high residual mass: SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2). Analytical results are reported with the detection limit achieved.

The gross alpha and gross beta detection goals were not met for the following samples in batch 160-254147 due to a reduction of the sample size attributed to high residual mass: (280-83520-D-1-A) and (280-83520-C-1-A DU). Analytical results are reported with the detection limit achieved.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 (GFPC)

Samples SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2) were analyzed for Radium-226 (GFPC) in accordance with EPA Method 903.0. The samples were prepared on 05/20/2016 and analyzed on 06/13/2016.

Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples in batch 160-252224: SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-228 (GFPC)

Samples SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2) were analyzed for Radium-228 (GFPC) in accordance with EPA 904. The samples were prepared on 05/20/2016 and analyzed on 05/27/2016.

Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples in batch 160-252225: SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

COMBINED RADIUM-226 AND RADIUM-228

Samples SS-7/10 (160-17461-1) and F2-6/7 (160-17461-2) were analyzed for Combined Radium-226 and Radium-228 in accordance with EPA 903 Radium 226/EPA 904 Radium 228. The samples were analyzed on 06/16/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

360325-Boston

160-17461 Chain of Custody

Absolute Resource associates

SUBCONTRACT CHAIN OF CUSTODY DOCUMENTATION

Client:	Absolute Resource Associates	Contact:	Aaron DeWees	Phone: 603-436-2001 Fax:	Page 1 of 1
Report to:	Aaron DeWees/Jane Stratton	Address:	124 Heritage Ave, #16	Project Name/Number: 36552	
Invoice to:	cathyd@absoluteresourceassociates.com		Portsmouth, NH 03801	Project State: NH MA ME VT	
PO#:	Quote #:			Protocol: RCRA SDWA NPDES MCP NHDES Other	

Lab Number: (assigned by laboratory)	Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Soil W=Water	Analyses Requested: Special Instructions:
	SS-7/10	5/17/16	15:00		1Lx2	G	None	W	Gross alpha, rad. 226/228/ Uranium
	FZ-6/7	5/17/16	15:00		1Lx1	G	None	W	

Boston

360325

Subcontract Laboratory: _____

Relinquished by:	Date: 5/18/16 Time: 10:35	Received by:	Date: 5/18/16 Time: 1035
Relinquished by:	Date: 5/18/16 Time: 1600	Received by:	Date: 05/19/16 Time: 0930
Relinquished by:	Date: Time:	Received by:	Date: Time:

Reporting Instructions: PDF (Email Address: aarond@absoluteresourceassociates.com; janes@absoluteresourceassociates.com)

Excel File: Y / N

Received on ice? (Y) N

Temp:

TAT Requested: Priority (24hr) Expedited (48hr) 10 Business days Date needed:

Comments:

QSD-21 4/15/16 Rev0 ajd (pg 1/1)

Login Sample Receipt Checklist

Client: Absolute Resource Associates

Job Number: 160-17461-1

Login Number: 17461
List Number: 1
Creator: McKinney, Gerrod E

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Absolute Resource Associates
Project/Site: 36552

TestAmerica Job ID: 160-17461-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
G	The Sample MDC is greater than the requested RL.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Absolute Resource Associates
Project/Site: 36552

TestAmerica Job ID: 160-17461-1

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL SL
900.0	Gross Alpha and Gross Beta Radioactivity	EPA	TAL SL
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL

Protocol References:

EPA = US Environmental Protection Agency

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Absolute Resource Associates
Project/Site: 36552

TestAmerica Job ID: 160-17461-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-17461-1	SS-7/10	Water	05/17/16 15:00	05/19/16 09:30
160-17461-2	F2-6/7	Water	05/17/16 15:00	05/19/16 09:30

Client Sample ID: SS-7/10

Date Collected: 05/17/16 15:00
Date Received: 05/19/16 09:30

Lab Sample ID: 160-17461-1

Matrix: Water

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	**0.79**	**J**	1.0	0.23	ug/L		06/03/16 13:02	06/16/16 21:18	2

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.901	U G	2.62	2.62	3.00	4.67	pCi/L	06/01/16 15:39	06/06/16 08:18	1
Gross Beta	**2.83**		1.39	1.42	4.00	2.03	pCi/L	06/01/16 15:39	06/06/16 08:18	1

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.0693**		0.0429	0.0434	1.00	0.0584	pCi/L	05/20/16 12:43	06/13/16 07:25	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*96.9*		*40 - 110*	*05/20/16 12:43*	*06/13/16 07:25*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.207	U	0.212	0.213	1.00	0.345	pCi/L	05/20/16 12:53	05/27/16 11:59	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*96.9*		*40 - 110*	*05/20/16 12:53*	*05/27/16 11:59*	*1*
Y Carrier	*93.1*		*40 - 110*	*05/20/16 12:53*	*05/27/16 11:59*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.277	U	0.216	0.217	5.00	0.345	pCi/L		06/16/16 12:32	1

Client Sample ID: F2-6/7

Date Collected: 05/17/16 15:00
Date Received: 05/19/16 09:30

Lab Sample ID: 160-17461-2

Matrix: Water

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	ND		1.0	0.23	ug/L		06/03/16 13:02	06/16/16 22:05	2

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	1.03	U G	1.74	1.75	3.00	3.01	pCi/L	06/01/16 15:39	06/06/16 08:19	1
Gross Beta	1.16	U	0.947	0.954	4.00	1.49	pCi/L	06/01/16 15:39	06/06/16 08:19	1

Client Sample ID: F2-6/7
Date Collected: 05/17/16 15:00
Date Received: 05/19/16 09:30

Lab Sample ID: 160-17461-2
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.137		0.0543	0.0557	1.00	0.0619	pCi/L	05/20/16 12:43	06/13/16 07:25	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*96.3*		*40 - 110*	*05/20/16 12:43*	*06/13/16 07:25*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.135	U	0.192	0.193	1.00	0.322	pCi/L	05/20/16 12:53	05/27/16 12:00	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*96.3*		*40 - 110*	*05/20/16 12:53*	*05/27/16 12:00*	*1*
Y Carrier	*93.1*		*40 - 110*	*05/20/16 12:53*	*05/27/16 12:00*	*1*

Method: Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.273	U	0.200	0.201	5.00	0.322	pCi/L		06/16/16 12:32	1

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 160-254752/1-A
Matrix: Water
Analysis Batch: 256865

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 254752

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Uranium	ND		1.0	0.23	ug/L		06/03/16 13:02	06/16/16 21:04	2

Lab Sample ID: LCS 160-254752/2-A
Matrix: Water
Analysis Batch: 256865

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 254752

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	1000	1030		ug/L		103	85 - 115

Lab Sample ID: 160-17461-1 MS
Matrix: Water
Analysis Batch: 256865

Client Sample ID: SS-7/10
Prep Type: Total/NA
Prep Batch: 254752

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Uranium	0.79	J	1000	1060		ug/L		106	70 - 130

Lab Sample ID: 160-17461-1 MSD
Matrix: Water
Analysis Batch: 256865

Client Sample ID: SS-7/10
Prep Type: Total/NA
Prep Batch: 254752

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Uranium	0.79	J	1000	1000		ug/L		100	70 - 130	6	20

Method: 900.0 - Gross Alpha and Gross Beta Radioactivity

Lab Sample ID: MB 160-254147/1-A
Matrix: Water
Analysis Batch: 254900

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 254147

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Gross Alpha	0.1731	U	0.551	0.552	3.00	1.01	pCi/L	06/01/16 15:39	06/06/16 08:13	1
Gross Beta	0.5039	U	0.529	0.531	4.00	0.858	pCi/L	06/01/16 15:39	06/06/16 08:13	1

Lab Sample ID: LCS 160-254147/2-A
Matrix: Water
Analysis Batch: 254900

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 254147

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Alpha	50.0	41.66		6.16	3.00	1.33	pCi/L	83	73 - 133

Lab Sample ID: LCSB 160-254147/3-A
Matrix: Water
Analysis Batch: 254900

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 254147

Analyte	Spike Added	LCSB Result	LCSB Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Gross Beta	92.7	91.88		9.73	4.00	1.11	pCi/L	99	75 - 125

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-252224/1-A
Matrix: Water
Analysis Batch: 256128

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 252224

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.06005	U	0.0427	0.0430	1.00	0.0614	pCi/L	05/20/16 12:43	06/13/16 07:25	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*92.3*		*40 - 110*	*05/20/16 12:43*	*06/13/16 07:25*	*1*

Lab Sample ID: LCS 160-252224/2-A
Matrix: Water
Analysis Batch: 256128

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 252224

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.2	13.81		1.32	1.00	0.0574	pCi/L	124	68 - 137		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*94.9*		*40 - 110*

Lab Sample ID: LCSD 160-252224/3-A
Matrix: Water
Analysis Batch: 256128

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 252224

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226			11.2	14.25		1.36	1.00	0.0621	pCi/L	128	68 - 137	0.16	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*94.3*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-252225/1-A
Matrix: Water
Analysis Batch: 253649

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 252225

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.07651	U	0.202	0.202	1.00	0.374	pCi/L	05/20/16 12:53	05/27/16 11:58	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*92.3*		*40 - 110*	*05/20/16 12:53*	*05/27/16 11:58*	*1*
Y Carrier	*91.6*		*40 - 110*	*05/20/16 12:53*	*05/27/16 11:58*	*1*

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-252225/2-A
Matrix: Water
Analysis Batch: 253649

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 252225

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			15.1	18.40		1.90	1.00	0.354	pCi/L	122	56 - 140		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*94.9*		*40 - 110*
Y Carrier	*92.3*		*40 - 110*

Lab Sample ID: LCSD 160-252225/3-A
Matrix: Water
Analysis Batch: 253649

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 252225

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228			15.1	18.97		1.95	1.00	0.380	pCi/L	126	56 - 140	0.15	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*94.3*		*40 - 110*
Y Carrier	*93.5*		*40 - 110*

QC Association Summary

Client: Absolute Resource Associates
Project/Site: 36552

TestAmerica Job ID: 160-17461-1

Metals

Prep Batch: 254752

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17461-1	SS-7/10	Total/NA	Water	200.7/200.8	
160-17461-1 MS	SS-7/10	Total/NA	Water	200.7/200.8	
160-17461-1 MSD	SS-7/10	Total/NA	Water	200.7/200.8	
160-17461-2	F2-6/7	Total/NA	Water	200.7/200.8	
LCS 160-254752/2-A	Lab Control Sample	Total/NA	Water	200.7/200.8	
MB 160-254752/1-A	Method Blank	Total/NA	Water	200.7/200.8	

Analysis Batch: 256865

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17461-1	SS-7/10	Total/NA	Water	200.8	254752
160-17461-1 MS	SS-7/10	Total/NA	Water	200.8	254752
160-17461-1 MSD	SS-7/10	Total/NA	Water	200.8	254752
160-17461-2	F2-6/7	Total/NA	Water	200.8	254752
LCS 160-254752/2-A	Lab Control Sample	Total/NA	Water	200.8	254752
MB 160-254752/1-A	Method Blank	Total/NA	Water	200.8	254752

Rad

Prep Batch: 252224

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17461-1	SS-7/10	Total/NA	Water	PrecSep-21	
160-17461-2	F2-6/7	Total/NA	Water	PrecSep-21	
LCS 160-252224/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-252224/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	
MB 160-252224/1-A	Method Blank	Total/NA	Water	PrecSep-21	

Prep Batch: 252225

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17461-1	SS-7/10	Total/NA	Water	PrecSep_0	
160-17461-2	F2-6/7	Total/NA	Water	PrecSep_0	
LCS 160-252225/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-252225/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	
MB 160-252225/1-A	Method Blank	Total/NA	Water	PrecSep_0	

Prep Batch: 254147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-17461-1	SS-7/10	Total/NA	Water	Evaporation	
160-17461-2	F2-6/7	Total/NA	Water	Evaporation	
LCS 160-254147/2-A	Lab Control Sample	Total/NA	Water	Evaporation	
LCSB 160-254147/3-A	Lab Control Sample	Total/NA	Water	Evaporation	
MB 160-254147/1-A	Method Blank	Total/NA	Water	Evaporation	

Tracer/Carrier Summary

Client: Absolute Resource Associates
Project/Site: 36552

TestAmerica Job ID: 160-17461-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(40-110)
160-17461-1	SS-7/10	96.9
160-17461-2	F2-6/7	96.3
LCS 160-252224/2-A	Lab Control Sample	94.9
LCSD 160-252224/3-A	Lab Control Sample Dup	94.3
MB 160-252224/1-A	Method Blank	92.3

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(40-110)	(40-110)
160-17461-1	SS-7/10	96.9	93.1
160-17461-2	F2-6/7	96.3	93.1
LCS 160-252225/2-A	Lab Control Sample	94.9	92.3
LCSD 160-252225/3-A	Lab Control Sample Dup	94.3	93.5
MB 160-252225/1-A	Method Blank	92.3	91.6

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

NH DIVISION OF
Public Health Services
Improving health, preventing disease, reducing costs for all

Wednesday, June 01, 2016

JANE STRATTON
ABSOLUTE RESOURCE
124 HERITAGE AVENUE #16
PORTSMOUTH NH 03801

RE: Workorder: B603070 - SPECIAL
Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Dear JANE STRATTON:

Enclosed are the analytical results for the sample(s) received by the laboratory on Thursday, May 19, 2016. Unless indicated as exceptions, the sample(s) met EPA requirements for hold times, preservation techniques, container types and other receipt conditions. Please contact us if you need measurement uncertainty values associated with radiological parameters. Results reported conform to the most current NELAC standard, where applicable, unless otherwise narrated in the body of the report. Any results reported for samples subcontracted to another laboratory are indicated on the report. Please refer to http://www2.des.nh.gov/CertifiedLabs/Certified-Method.aspx for a copy of our current NELAP certificate and accredited parameters.

We appreciate the opportunity to provide this analytical service for you. If you have any questions regarding this report or your results, please feel free to contact us.

The following signature indicates technical review and acceptance of the data.

Sincerely,

Lucio S. Barinelli, Ph.D.
Authorized Signature

Enclosures

NH DIVISION OF
Public Health Services
improving health preventing disease reducing costs for all

New Hampshire Public Health Laboratories
Department of Health and Human Services
29 Hazen Dr., Concord NH 03301
Phone: (603) 271-3445
Fax: (603) 271-2997

DATA QUALIFIER DESCRIPTIONS

Workorder: B603070 - SPECIAL

Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

The following are a list of some column headers and abbreviations with their meanings as used throughout the analysis report. Referring to them will assist you in interpreting your report.

RDL= The lowest value the laboratory calibrates its instrumentation for this parameter. Any instrumental estimate of results below the Report Limit is reported as Not Detected (ND).

DF= For some heavily contaminated samples, the laboratory must dilute samples to keep the final number within its calibration scale. This is referred to as the Dilution Factor. Final results and reporting limits are adjusted relative to the DF used.

QUAL= Indicates that the result has been qualified. Refer to the Analytical Report Comments and Qualifiers page for details.

LIMIT= Reflects the Maximum Contamination Level (MCL), if one exists, a secondary or recommended level or another State or Federal action level.

Surrogates = For some analyses, the laboratory adds a number of compounds to monitor analytical performance. These results are provided for your information.

> = Greater than	< = Less than
mg/L = milligrams per Liter	ug/L = micrograms per Liter
mg/kg = milligrams per kilogram	ug/kg = micrograms per kilogram
P-A = Present/Absent	CTS/100 mL = Counts per 100 milliliters
CFU = Colony forming unit	MPN = Most Probable Number
pCi/L = picoCuries per Liter	

J = Estimated value; analyte detected at less than the Reporting Limit but greater than the laboratory's Method Detection Limit.

B = Analyte detected in the method blank for the batch of samples. Its presence in the sample may be suspect.

E = Estimated value; result exceeded the upper calibration level for the parameter.

Radiological results are expressed as a number + an uncertainty factor. Uncertainty is a calculated measure of the precision around the reported value.

All results for pH and residual chlorine samples analyzed more than 15 minutes after time of collection shall be considered QUALIFIED.

For assistance in interpreting your lab results and obtaining information regarding water treatment; go to www.des.nh.gov and search "Be Well Informed." Or go to http://xml2.des.state.nh.us/DWITool/.

NH DIVISION OF
Public Health Services

New Hampshire Public Health Laboratories
Department of Health and Human Services
29 Hazen Dr., Concord NH 03301
Phone: (603) 271-3445
Fax: (603) 271-2997

SAMPLE SUMMARY

Workorder: B603070 - SPECIAL

Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Lab ID	Sample ID	Ref ID	Matrix	Date Collected	Date Received	Misc Info
B603070001	36552-1	S-9	WATER	5/17/2016 15:00	5/19/2016	
B603070002	36552-2	F2-5	WATER	5/17/2016 15:00	5/19/2016	

NH DIVISION OF
Public Health Services
Improving health, preventing disease, reducing costs for all

New Hampshire Public Health Laboratories
Department of Health and Human Services
29 Hazen Dr., Concord NH 03301
Phone: (603) 271-3445
Fax: (603) 271-2997

ANALYTICAL RESULTS

Workorder: B603070 - SPECIAL

Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Lab ID:	**B603070001**	Matrix:	WATER
Sample ID:	**36552-1**	Sample Type:	SAMPLE
Description:	S-9	Collector :	AARON DEWEES

Parameters	Results	Units	RDL	DF	Prepared	Analyzed	Limit	Qual
Radiochemistry								
Analytical Method: SM 7500B								
Radon	769+/-25	pCi/L	100	1		5/21/2016 12:16		

REPORT OF LABORATORY ANALYSIS

nelac

NH DIVISION OF
Public Health Services
Improving health, preventing disease, reducing costs for all

New Hampshire Public Health Laboratories
Department of Health and Human Services
29 Hazen Dr., Concord NH 03301
Phone: (603) 271-3445
Fax: (603) 271-2997

ANALYTICAL RESULTS

Workorder: B603070 - SPECIAL
Project ID: 9000595 - ABSOLUTE RESOURCE ASSOCIATES - PORTSMOUTH

Lab ID: **B603070002**
Sample ID: **36552-2**
Description: F2-5

Matrix: WATER
Sample Type: SAMPLE
Collector : AARON DEWEES

Parameters	Results	Units	RDL	DF	Prepared	Analyzed	Limit	Qual
Radiochemistry								
Analytical Method: SM 7500B								
Radon	189+/-19	pCi/L	100	1		5/21/2016 13:10		

Date: 06/01/2016

REPORT OF LABORATORY ANALYSIS

nelac

Absolute Resource associates

SUBCONTRACT CHAIN OF CUSTODY DOCUMENTATION

Client:	Absolute Resource Associates	Contact: Aaron DeWees	Phone: 603-436-2001	Fax:	Page 1 of 1
Report to:	Aaron DeWees/Jane Stratton	Address: 124 Heritage Ave, #16		Project Name/Number: 36552	
Invoice to:	cathyd@absoluteresourceassociates.com	Portsmouth, NH 03801		Project State: NH MA ME VT	
PO#:	Quote #: 9000595			Protocol: RCRA SDWA NPDES MCP NHDES Other	

Lab Number: (assigned by laboratory)	Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Soil W=Water	Analyses Requested: Special Instructions:
001	S-9	5/17/16	15:00		40mL x2	G	None	W	Radon
002	FZ-5	5/17/16	15:00		1	1	1	1	1

B603070001 05/17/16 15:00
36552-1
9000595

B603070002 05/17/16 15:00
36552-2
9000595

Subcontract Laboratory: NH State Lab

Relinquished by:		Date: 5/18/16	Time: 13:21	Received by: UPS	Date: 5/18/16	Time: 13:21
Relinquished by: UPS		Date:	Time:	Received by: W Roche	Date: 5/19/16	Time: 12:30
Relinquished by:		Date:	Time:	Received by:	Date:	Time:

Reporting Instructions: PDF (Email Address: aarond@absoluteresourceassociates.com; janes@absoluteresourceassociates.com)

Excel File: Y / N

Received on ice? (Y) N

Temp:

TAT Requested: Priority (24hr) Expedited (48hr) 10 Business days Date needed:

Comments:

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36552
Date Received: 5/17/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 6/10/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36552

Sample#: 36552-001
Sample ID: S-(1-4, 6-10)
Matrix: Water
Sampled: 5/17/16 15:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Arsenic	< 0.005	0.005	mg/L	1	AC	5/20/16	8799	5/20/16	18:01	E200.8
Calcium	**53**	1.0	mg/L	10	AC	5/20/16	8799	5/20/16	19:36	E200.8
Iron	< 0.01	0.01	mg/L	1	AC	5/20/16	8799	5/20/16	18:01	E200.8
Manganese	< 0.01	0.01	mg/L	1	AC	5/20/16	8799	5/20/16	18:01	E200.8

Sample#: 36552-002
Sample ID: F2-(1-9)
Matrix: Water
Sampled: 5/17/16 15:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Arsenic	< 0.005	0.005	mg/L	1	AC	5/20/16	8799	5/20/16	18:08	E200.8
Calcium	**46**	1.0	mg/L	10	AC	5/20/16	8799	5/20/16	19:44	E200.8
Iron	**0.02**	0.01	mg/L	1	AC	5/20/16	8799	5/20/16	18:08	E200.8
Manganese	< 0.01	0.01	mg/L	1	AC	5/20/16	8799	5/20/16	18:08	E200.8

Sample#: 36552-001
Sample ID: S-(1-4, 6-10)
Matrix: Water
Sampled: 5/17/16 15:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**130**	5	mg/L	1	APA		1601146	5/18/16		SM2320B
Chloride	**76**	0.5	mg/L	1	JZL		1601340	6/6/16	16:52	E300.0A
Sulfate	**15**	0.5	mg/L	1	JZL		1601340	6/6/16	16:52	E300.0A
Turbidity	< 1.0	1.0	NTU	1	JZL		1601161	5/18/16	16:03	SM2130B

Sample#: 36552-002
Sample ID: F2-(1-9)
Matrix: Water
Sampled: 5/17/16 15:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**120**	5	mg/L	1	APA		1601146	5/18/16		SM2320B
Chloride	**51**	0.5	mg/L	1	JZL		1601340	6/6/16	17:08	E300.0A
Sulfate	**16**	0.5	mg/L	1	JZL		1601340	6/6/16	17:08	E300.0A
pH	**7.8** H		pH	1	JZL		1601149	5/17/16	17:14	SM4500H+B
H = Sample was received beyond method holding time.										
Turbidity	< 1.0	1.0	NTU	1	JZL		1601161	5/18/16	16:06	SM2130B

PAGE ____ OF ____

Absolute Resource associates

124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Ca as CaCO3

36552

Company Name: Weston & Sampson

Company Address: 100 International Rd, Suite 152, Portsmouth

Report To: Andrew Walker

Phone #: 603-397-9280

Invoice to Email: walkera@wseinc.com

☐ Hard Copy Invoice Required

Project Name: Pease Pilot

Project #:

Project Location: (NH) MA ME VT NY ____ Other

Protocol: RCRA SDWA NPDES MCP NHDES OTHER

Reporting Limits: QAPP GW-1 S-1 EPA DW Other____

Quote #____ ☐ NH Reimbursement Pricing

PO # ____

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP; ☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT; ☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane; ☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:; ☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint; ☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB; ☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB; ☐ O&G 1664 ☐ Mineral O&G SM5520F; ☒ pH ☐ BOD ☐ Conductivity ☒ Turbidity; ☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity; ☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness; ☐ (Total) Metals-list: Arsenic, Iron, Manganese; ☐ Dissolved Metals-list:; ☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC; ☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN; ☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P; ☐ Nitrate ☐ Nitrite ☒ Chloride ☒ Sulfate ☐ Bromide ☐ Fluoride; ☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP; ☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide; Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde; Calc; 226/228 Radium; Radon; Gross Alpha; (Grab (G)) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# Containers	Matrix	Date	Time	Analysis marked
3655201 -02	S-1, F2-1	1	Water	5/17/16	15:00	Total Metals (Arsenic, Iron, Manganese)
	S-2, F2-9	1	Water	5/17/16	15:00	Calc
	S-3, F2-2	1	Water	5/17/16	15:00	pH / Turbidity
	S-4, F2-3	1	Water	5/17/16	15:00	Chloride / Sulfate
	S-6, F2-8	1	Water	5/17/16	15:00	Alkalinity
	S-7, F2-7	1	Water	5/17/16	15:00	226/228 Radium
	S-8, S-9, F2-4, F2-5	1	Water	5/17/16	15:00	Radon
	S-10, F2-6	1	Water	5/17/16	15:00	Gross Alpha

Preservation Method: HCl, HNO_3, H_2SO_4, NaOH, MeOH (none marked)

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS: pH from any sample starting w/ "F2"

REPORTING INSTRUCTIONS ☒ PDF (e-mail address) walkera@wseinc.com
☐ HARD COPY REQUIRED ☐ FAX (FAX#)____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 5 °C

CUSTODY RECORD

Relinquished by	Date	Time	Received by	Date	Time
Relinquished by Sampler: Andrew Walker [signature]	5/17/16	1611	Received by:		
Relinquished by:			Received by:		
Relinquished by:			Received by Laboratory: [signature]	5/17/16	16:11

QSD-01 Revision 1/27/16

Eastern Analytical, Inc.

professional laboratory & drilling services

Andrew Walker
Weston & Sampson Engineers, Inc.
100 International Dr. Suite 152
Portsmouth , NH 03801

ACCREDITED IN ACCORDANCE WITH nelac

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 156210
Client Identification: Pease Pilot
Date Received: 5/18/2016

Dear Mr. Walker :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.eailabs.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director | 5.20.16 Date | 3 # of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **156210**

Client: **Weston & Sampson Engineers, Inc.**

Client Designation: **Pease Pilot**

Temperature upon receipt (°C): 3.1 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
156210.01	F2-1	5/18/16	5/18/16	aqueous		Adheres to Sample Acceptance Policy
156210.02	S-1	5/18/16	5/18/16	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitibility, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.
Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.

All results contained in this report relate only to the above listed samples.

References include:

1) EPA 600/4-79-020, 1983
2) Standard Methods for Examination of Water and Wastewater,20th Edition, 1998 and 22nd Edition, 2012
3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
4) Hach Water Analysis Handbook, 2nd edition, 1992

LABORATORY REPORT

EAI ID#: **156210**

Client: **Weston & Sampson Engineers, Inc.**

Client Designation: **Pease Pilot**

Sample ID:	F2-1	S-1
Lab Sample ID:	156210.01	156210.02
Matrix:	aqueous	aqueous
Date Sampled:	5/18/16	5/18/16
Date Received:	5/18/16	5/18/16

			Analysis			
	Units	**Date**	**Time**	**Method**	**Analyst**	
CO2 (Free)	**3**	**4**	mg/L	5/19/16	9:42	4500CO2B	SCW

Page 1 of 1

Chain-of-Custody Record

156210

Bold Fields Required. Please Circle Requested Analysis.

Sample I.D.	Sampling Date/Time *If Composite, Indicate Both Start & Finish Date/Time	Matrix (see below)	Grab/*Composite	VOC: 524.2 / 524.2 BTEX / 524.2 MTBE only	VOC: 8260B / 624 / VTICs / 1,4 Dioxane	VOC: 8021B / BTEX / HALOS	VOC: 8015B GRO / MAVPH	SVOC: 8270D / 625 / SVTICs / EDB / DBCP / ABN / A / BN / PAH	SVOC: TPH8100 / L1 / L2	SVOC: 8015B DRO / MAEPH	SVOC: PEST 608 / PCB 608 / PEST 8081A / PCB 8082	SVOC: Oil & Grease 1664 / TPH 1664	TCLP: TCLP 1311 / ABN / Metals / VOC / Pest / Herb	Metals: Dissolved Metals (List Below)	Metals: Total Metals (List Below)	Inorganics: TS / TSS / TDS / Spec. Con.	Inorganics: Br / Cl / F / SO_4 / NO_2 / NO_3 / NO_3NO_2	Inorganics: BOD / CBOD / T. Alk.	Inorganics: TKN / NH_3 / T. Phos. / O. Phos.	Inorganics: pH / T. Res. Chlorine	Inorganics: COD / Phenols / TOC / DOC	Inorganics: Total Cyanide / Total Sulfide	Inorganics: Reactive Cyanide / Reactive Sulfide / Flashpoint / Ignitability	Micro: Total Coliform / E. Coli / Fecal Coliform	Micro: Enterococci / Heterotrophic Plate Count	Other: CO_2	Other	Other	# of Containers	Notes MeOH Vial #
F2-1	5/18/16 1030	DW	G																							X			1	
S-1	5/18/16 1030	DW	G																							X			1	

Matrix: A-Air; S-Soil; GW-Ground Water; SW-Surface Water; DW-Drinking Water; WW-Waste water

Preservative: H-HCL; N-HNO_3; S-H_2SO_4; Na-NaOH; M-MEOH

Project Manager: Andrew Walker

Company: Weston & Sampson

Address: 100 International Dr, Suite 152

City: Portsmouth State: NH Zip: 03801

Phone: 603-397-9280 Ext.:

Fax:

E-Mail: walkera@wseinc.com

Site Name: Pease Pilot

Project #: —

State: (NH circled) MA ME VT Other:

Regulatory Program: NPDES: RGP POTW Stormwater or GWP, Oil Fund, Brownfield or Other:

Quote #: PO #:

Date Needed:

QA/QC Reporting Level: A B C or Presumptive Certainty

Reporting Options: Prelims: (Yes circled) or No. If Yes: Fax or (PDF circled)

Electronic Options: No Fax E-Mail PDF Equis

Temp. 3.1 °C

Ice? (Yes circled) No

Sampler(s): Andrew Walker

Relinquished By	Date	Time	Received By
[signature]	5/18/16		[signature] 5/18/16 13:08
[signature] 5/18/16		14:12	[signature]

Metals: 8 RCRA 13 PP Fe, Mn Pb, Cu

Other Metals:

Samples Field Filtered? ☐ Yes ☐ No

Notes: (ie: Special Detection Limits, Billing Info, If Different)

Site History:

Suspected Contamination:

Field Readings:

Eastern Analytical, Inc. professional laboratory & drilling services

25 Chenell Drive | Concord, NH 03301 | Tel: 603.228.0525 | 1.800.287.0525 | Fax: 603.228.4591 | E-Mail: customerservice@eailabs.com | www.eailabs.com

(White: Original Green: Project Manager)

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36563
Date Received: 5/18/16

Project: None

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 5/27/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: None
Job ID: 36563

Sample#: 36563-001
Sample ID: F2-(1-2)
Matrix: Water
Sampled: 5/18/16 10:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	110	5	0.47	mg/L	1	APA			1601215	5/25/16		SM2320B

Sample#: 36563-001
Sample ID: F2-(1-2)
Matrix: Water
Sampled: 5/18/16 10:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.5 J	1.0	0.074	mg/L	1	CL			1601155	5/18/16	13:55	SM5310C

Sample#: 36563-002
Sample ID: S-1
Matrix: Water
Sampled: 5/18/16 10:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.6 J	1.0	0.074	mg/L	1	CL			1601155	5/18/16	14:13	SM5310C

J = The analytical result was below the instrument calibration range, but above the detection limit.

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36563

Company Name: Weston & Sampson
Company Address: 100 International, Suite 152 Portsmouth
Report To: Andrew Walker
Phone #: 603-397-9280
Invoice to Email: walkera@wse-inc.com
☐ Hard Copy Invoice Required

Project Name:
Project #:
Project Location: NH MA ME VT NY Other
Protocol: RCRA MCP SDWA NHDES NPDES OTHER
Reporting Limits: QAPP EPA DW GW-1 Other S-1
Quote # ☐ NH Reimbursement Pricing
PO #

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☐ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☐ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☐ Total Metals-list:
☐ Dissolved Metals-list:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	Analysis: TOC	TSS	Grab (G) or Composite (C)
3656301	F2-1	1	X			Phosphoric Acid					5/18/16	1030	MW	X		G
-02	S-1	1	X								5/18/16	1030	MW	X		
	F2-2	1	X								5/18/16	1030	MW		X	

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS
Please report lowest possible detection limit on TOC analyses

REPORTING INSTRUCTIONS ☒ PDF (e-mail address) walkera@wse-inc.com
☐ HARD COPY REQUIRED ☐ FAX (FAX#) ____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 0 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

		Date	Time		Date	Time
Relinquished by Sampler:	Andrew Walker	5/18/16	1052	Received by:		
Relinquished by:				Received by:		
Relinquished by:				Received by Laboratory:	5/18/16	10:52

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36586
Date Received: 5/19/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 6/1/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36586

Sample#: 36586-001
Sample ID: F1-1
Matrix: Water
Sampled: 5/19/16 14:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**110**	5	mg/L	1	APA		1601215	5/25/16		SM2320B

Sample#: 36586-002
Sample ID: F2-1
Matrix: Water
Sampled: 5/19/16 14:00

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	**120**	5	mg/L	1	APA		1601215	5/25/16		SM2320B

Absolute Resource associates

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36586

Company Name: Weston & Sampson

Company Address: 100 Fatternational, Suite 152 Portsmouth

Report To: Andrew Walker

Phone #: 603-387-8280

Invoice to Email: walkera@wseinc.com

☐ Hard Copy Invoice Required

Project Name: Pease Pilot

Project #: ——

Project Location: (NH) MA ME VT NY Other ____

Protocol: RCRA MCP SDWA NHDES NPDES OTHER

Reporting Limits: QAPP EPA DW GW-1 Other S-1

Quote #____ ☐ NH Reimbursement Pricing

PO # ____

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☐ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☐ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☐ Total Metals-list:
☐ Dissolved Metals-list:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	TSS	TDS	TS	TVS	Alkalinity
365869 01	F1-1	1	X								5/19/16	1400	AW				X	X
02	F2-1	1	X								"	"	"	X				

TAT REQUESTED

Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS

REPORTING INSTRUCTIONS ☒ PDF (e-mail address) walkera@wseinc.com
☐ HARD COPY REQUIRED ☐ FAX (FAX#)____

RECEIVED ON ICE ☐ YES ☐ NO
TEMPERATURE 2 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

		Date	Time		Date	Time
Relinquished by Sampler:	Andrew Walker	5/19/16	1500	Received by:		
Relinquished by:		Date	Time	Received by:	Date	Time
Relinquished by:		5/19/16	1600	Received by Laboratory:	5/19/16	16:00

GRANITE STATE ANALYTICAL SERVICES, LLC

22 Manchester Road, Unit 2, Derry, NH 03038

Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837

http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 05/25/2016

CLIENT NAME: Absolute Resource Associates

CLIENT ADDRESS: 124 Heritage Avenue, Suite 10
Portsmouth, NH 03801

Legend

Passes ✓
Fails EPA Primary ⊗
Fails EPA Secondary ▽
Fails EPA Proposed Limit ✕

SAMPLE ID#: 1605-02774-001

SAMPLED BY: Client-Customer

SAMPLE ADDRESS: 36612-01
R-1

LOCATION:

DATE AND TIME COLLECTED: 05/23/2016 2:30 PM

DATE AND TIME RECEIVED: 05/24/2016 2:42 PM

ANALYSIS PACKAGE: Color

RECEIPT TEMPERATURE: ON ICE 4.9 CELSIUS

CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	EPA Limit	Method	Analyst	Date-Time Analyzed
Color	<5	CPU	✓		5	15 CPU	SM 2120B	ST-NH	05/24/16 4:35 PM

The results presented in this report relate to the samples listed above in the condition in which they were received.
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

*** NELAC Accredited Analysis**

ACCREDITED IN ACCORDANCE WITH nelac

Donald J. D'Anjou, Ph. D.
Laboratory Director

This analysis meets NELAC requirements except as noted.
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |

GRANITE STATE ANALYTICAL SERVICES, LLC

22 Manchester Road, Unit 2, Derry, NH 03038

Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837

http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 05/25/2016

CLIENT NAME: Absolute Resource Associates

CLIENT ADDRESS: 124 Heritage Avenue, Suite 10
Portsmouth, NH 03801

Legend

Passes ✓
Fails EPA Primary ⊗
Fails EPA Secondary ▽
Fails EPA Proposed Limit ✕

SAMPLE ID#: 1605-02774-002

SAMPLED BY: Client-Customer

SAMPLE ADDRESS: 36612-02
F2-1

LOCATION:

DATE AND TIME COLLECTED: 05/23/2016 2:30 PM

DATE AND TIME RECEIVED: 05/24/2016 2:42 PM

ANALYSIS PACKAGE: Color

RECEIPT TEMPERATURE: ON ICE 4.9 CELSIUS

CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	EPA Limit	Method	Analyst	Date-Time Analyzed
Color	<5	CPU	✓		5	15 CPU	SM 2120B	ST-NH	05/24/16 4:36 PM

The results presented in this report relate to the samples listed above in the condition in which they were received.
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

*** NELAC Accredited Analysis**

ACCREDITED IN ACCORDANCE WITH nelac

Donald J. D'Anjou, Ph. D.
Laboratory Director

This analysis meets NELAC requirements except as noted.
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36612
Date Received: 5/23/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 6/9/2016
Total number of pages: 5

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36612

Sample#: 36612-001
Sample ID: R(1-6)
Matrix: Water
Sampled: 5/23/16 14:30

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Arsenic	< 0.005	0.005	mg/L	1	AM	5/25/16	8812	6/6/16	16:04	E200.8
Calcium	**44**	1.0	mg/L	10	AC	5/25/16	8812	6/8/16	12:34	E200.8
Iron	**0.02**	0.01	mg/L	1	AM	5/25/16	8812	6/6/16	16:04	E200.8
Manganese	< 0.01	0.01	mg/L	1	AM	5/25/16	8812	6/6/16	16:04	E200.8

Sample#: 36612-002
Sample ID: F2(1-6)
Matrix: Water
Sampled: 5/23/16 14:30

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Analysis Time	Reference
Arsenic	< 0.005	0.005	mg/L	1	AM	5/25/16	8812	6/6/16	16:11	E200.8
Calcium	**46**	1.0	mg/L	10	AC	5/25/16	8812	6/8/16	12:41	E200.8
Iron	**0.03**	0.01	mg/L	1	AM	5/25/16	8812	6/6/16	16:11	E200.8
Manganese	< 0.01	0.01	mg/L	1	AM	5/25/16	8812	6/6/16	16:11	E200.8

Project ID: Pease Pilot
Job ID: 36612

Sample#: 36612-001
Sample ID: R(1-6)
Matrix: Water
Sampled: 5/23/16 14:30

Parameter	Result		Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	120		5	0.47	mg/L	1	APA			1601215	5/25/16		SM2320B
Chloride	53	M	0.5	0.012	mg/L	1	JEN			1601254	5/27/16	1:50	E300.0A
M = The recovery for the matrix spike was 48%. The acceptance criteria is 90-110%. All other associated QC samples were acceptable.													
Sulfate	16	M	0.5	0.016	mg/L	1	JEN			1601254	5/27/16	1:50	E300.0A
M = The recovery for the matrix spike was 83%. The acceptance criteria is 90-110%. All other associated QC samples were acceptable.													
Turbidity	U		1.0	1.0	NTU	1	AM			1601232	5/24/16	10:50	SM2130B

Sample#: 36612-002
Sample ID: F2(1-6)
Matrix: Water
Sampled: 5/23/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	120	5	0.47	mg/L	1	APA			1601215	5/25/16		SM2320B
Chloride	53	0.5	0.012	mg/L	1	JEN			1601254	5/27/16	2:39	E300.0A
Sulfate	16	0.5	0.016	mg/L	1	JEN			1601254	5/27/16	2:39	E300.0A
Turbidity	U	1.0	1.0	NTU	1	AM			1601232	5/24/16	10:52	SM2130B

Sample#: 36612-003
Sample ID: F1-1
Matrix: Water
Sampled: 5/23/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	120	5	0.47	mg/L	1	APA			1601215	5/25/16		SM2320B

Project ID: Pease Pilot
Job ID: 36612

Sample#: 36612-001
Sample ID: R(1-6)
Matrix: Water
Sampled: 5/23/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.5 J	1.0	0.074	mg/L	1	CL			1601248	5/26/16	16:54	SM5310C

Sample#: 36612-002
Sample ID: F2(1-6)
Matrix: Water
Sampled: 5/23/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.3 J	1.0	0.074	mg/L	1	CL			1601248	5/26/16	17:12	SM5310C

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36612

Company Name: Weston & Sampson
Company Address: 100 International Dr, Suite 152 Portsmouth
Report To: Andrew Walker
Phone #: 603-397-9280
Invoice to Email: walkera@wseinc.com
☐ Hard Copy Invoice Required

Project Name: Pease Pilot
Project #: —
Project Location: (NH) MA ME VT NY Other
Protocol: RCRA MCP SDWA NHDES NPDES OTHER
Reporting Limits: QAPP EPA DW GW-1 Other S-1
Quote # ____ ☐ NH Reimbursement Pricing
PO # ____

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☒ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
~~☐ Target Analytes~~ List: Iron, Manganese, Chloride
☐ Dissolved Metals-List:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☒ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Color, Chloride, Ca, Sulfate
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	Analysis marks
	36612-01 R1, F2-1	1	X								5/23/16	1430	AW	Color, Chloride, Ca, Sulfate; Grab
	R2, F2-2	1												pH
	R3, F2-3	1												Color
	R4, F2-4	1												
→	R5, F2-5	2												Iron, Manganese
	R6, F2-6	1												TSS, Alkalinity
	-03 F1-1	1												TSS, Alkalinity

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS
TOC - please provide lowest value to detection limit in addition to formal reporting limit

REPORTING INSTRUCTIONS ☐ PDF (e-mail address) ____
☐ HARD COPY REQUIRED ☐ FAX (FAX#) ____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 7.0 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

		Date	Time		Date	Time
Relinquished by Sampler:	Andrew Walker	5/23/16	1521	Received by:		
Relinquished by:				Received by:		
Relinquished by:				Received by Laboratory:	5/23/16	1521

Maxxam
A Bureau Veritas Group Company

Your Project #: PEASE PILOT
Site Location: F1
Your C.O.C. #: 63849

Attention:Andrew Walker

Weston & Sampson
100 International Dr
Suite 152
Portsmouth, NH
USA 038101

Report Date: 2016/06/06
Report #: R4017358
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6B0943
Received: 2016/06/01, 10:20

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water	1	2016/06/02	2016/06/03	CAM SOP-00894	EPA 537 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

U = Undetected at the limit of quantitation.
J = Estimated concentration between the EDL & RDL.
B = Blank Contamination.
Q = One or more quality control criteria failed.
E = Analyte concentration exceeds the maximum concentration level.
K = Estimated maximum possible concentration due to ion abundance ratio failure.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Melissa DiGrazia, Project Manager - ATUT
Email: MDiGrazia@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B6B0943
Report Date: 2016/06/06

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: F1

RESULTS OF ANALYSES OF WATER

Maxxam ID		CLM514			
Sampling Date		2016/05/31 08:00			
COC Number		63849			
	UNITS	F1-1	RDL	MDL	QC Batch
Miscellaneous Parameters					
6:2 Fluorotelomer sulfonate	ug/L	0.0065 U	0.020	0.0065	4522833
8:2 Fluorotelomer sulfonate	ug/L	0.0055 U	0.020	0.0055	4522833
N-ethylperfluorooctane sulfonamide	ug/L	0.0053 U	0.020	0.0053	4522833
N-ethylperfluorooctane sulfonamidoe	ug/L	0.0049 U	0.020	0.0049	4522833
N-methylperfluorooctane sulfonamide	ug/L	0.0040 U	0.020	0.0040	4522833
N-methylperfluorooctanesulfonamidol	ug/L	0.0061 U	0.020	0.0061	4522833
Perfluorobutane Sulfonate (PFBS)	ug/L	0.0019 U	0.020	0.0019	4522833
Perfluorobutanoic acid	ug/L	0.0066 U	0.020	0.0066	4522833
Perfluorodecane Sulfonate	ug/L	0.0043 U	0.020	0.0043	4522833
Perfluorodecanoic Acid (PFDA)	ug/L	0.0066 U	0.020	0.0066	4522833
Perfluorododecanoic Acid (PFDoA)	ug/L	0.0057 U	0.020	0.0057	4522833
Perfluoroheptane sulfonate	ug/L	0.0036 U	0.020	0.0036	4522833
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.0047 U	0.020	0.0047	4522833
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.0040 U	0.020	0.0040	4522833
Perfluorohexanoic Acid (PFHxA)	ug/L	0.0046 U	0.020	0.0046	4522833
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.0053 U	0.020	0.0053	4522833
Perfluorononanoic Acid (PFNA)	ug/L	0.0046 U	0.020	0.0046	4522833
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.0058 U	0.020	0.0058	4522833
Perfluorooctane Sulfonate (PFOS)	ug/L	0.0033 U	0.020	0.0033	4522833
Perfluoropentanoic Acid (PFPeA)	ug/L	0.0036 U	0.020	0.0036	4522833
Perfluorotetradecanoic Acid	ug/L	0.0052 U	0.020	0.0052	4522833
Perfluorotridecanoic Acid	ug/L	0.0032 U	0.020	0.0032	4522833
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.0037 U	0.020	0.0037	4522833
Surrogate Recovery (%)					
13C4-Perfluorooctanesulfonate	%	86	N/A	N/A	4522833
13C4-Perfluorooctanoic acid	%	95	N/A	N/A	4522833
13C8-Perfluorooctanesulfonamide	%	82	N/A	N/A	4522833

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B0943
Report Date: 2016/06/06

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: F1

TEST SUMMARY

Maxxam ID: CLM514
Sample ID: F1-1
Matrix: Water

Collected: 2016/05/31
Shipped:
Received: 2016/06/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water	LCMS	4522833	2016/06/02	2016/06/03	Colm McNamara

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B0943
Report Date: 2016/06/06

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: F1

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B0943
Report Date: 2016/06/06

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: F1

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4522833	CM5	Matrix Spike	13C4-Perfluorooctanesulfonate	2016/06/03		83	%	70 - 130
			13C4-Perfluorooctanoic acid	2016/06/03		89	%	70 - 130
			13C8-Perfluorooctanesulfonamide	2016/06/03		78	%	60 - 120
			6:2 Fluorotelomer sulfonate	2016/06/03		98	%	70 - 130
			8:2 Fluorotelomer sulfonate	2016/06/03		105	%	70 - 130
			N-ethylperfluorooctane sulfonamide	2016/06/03		100	%	70 - 130
			N-ethylperfluorooctane sulfonamidoe	2016/06/03		121	%	70 - 130
			N-methylperfluorooctane sulfonamide	2016/06/03		93	%	70 - 130
			N-methylperfluorooctanesulfonamidol	2016/06/03		108	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2016/06/03		104	%	70 - 130
			Perfluorobutanoic acid	2016/06/03		110	%	70 - 130
			Perfluorodecane Sulfonate	2016/06/03		114	%	70 - 130
			Perfluoroheptane sulfonate	2016/06/03		96	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2016/06/03		108	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2016/06/03		109	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2016/06/03		113	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2016/06/03		109	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/03		109	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2016/06/03		108	%	70 - 130
			Perfluorotetradecanoic Acid	2016/06/03		116	%	70 - 130
			Perfluorotridecanoic Acid	2016/06/03		123	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2016/06/03		111	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2016/06/03		118	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2016/06/03		109	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/03		103	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2016/06/03		97	%	70 - 130
4522833	CM5	Spiked Blank	13C4-Perfluorooctanesulfonate	2016/06/03		86	%	70 - 130
			13C4-Perfluorooctanoic acid	2016/06/03		89	%	70 - 130
			13C8-Perfluorooctanesulfonamide	2016/06/03		76	%	60 - 120
			6:2 Fluorotelomer sulfonate	2016/06/03		101	%	70 - 130
			8:2 Fluorotelomer sulfonate	2016/06/03		113	%	70 - 130
			N-ethylperfluorooctane sulfonamide	2016/06/03		98	%	70 - 130
			N-ethylperfluorooctane sulfonamidoe	2016/06/03		116	%	70 - 130
			N-methylperfluorooctane sulfonamide	2016/06/03		94	%	70 - 130
			N-methylperfluorooctanesulfonamidol	2016/06/03		128	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2016/06/03		97	%	70 - 130
			Perfluorobutanoic acid	2016/06/03		110	%	70 - 130
			Perfluorodecane Sulfonate	2016/06/03		106	%	70 - 130
			Perfluoroheptane sulfonate	2016/06/03		101	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2016/06/03		106	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2016/06/03		111	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2016/06/03		121	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2016/06/03		107	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/03		115	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2016/06/03		108	%	70 - 130
			Perfluorotetradecanoic Acid	2016/06/03		106	%	70 - 130
			Perfluorotridecanoic Acid	2016/06/03		130	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2016/06/03		113	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2016/06/03		108	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2016/06/03		120	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/03		101	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2016/06/03		97	%	70 - 130
4522833	CM5	Method Blank	13C4-Perfluorooctanesulfonate	2016/06/03		92	%	70 - 130

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C4-Perfluorooctanoic acid	2016/06/03		96	%	70 - 130
			13C8-Perfluorooctanesulfonamide	2016/06/03		82	%	60 - 120
			6:2 Fluorotelomer sulfonate	2016/06/03	0.0065 U, MDL=0.0065		ug/L	
			8:2 Fluorotelomer sulfonate	2016/06/03	0.0055 U, MDL=0.0055		ug/L	
			N-ethylperfluorooctane sulfonamide	2016/06/03	0.0053 U, MDL=0.0053		ug/L	
			N-ethylperfluorooctane sulfonamidoe	2016/06/03	0.0049 U, MDL=0.0049		ug/L	
			N-methylperfluorooctane sulfonamide	2016/06/03	0.0040 U, MDL=0.0040		ug/L	
			N-methylperfluorooctanesulfonamidol	2016/06/03	0.0061 U, MDL=0.0061		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2016/06/03	0.0019 U, MDL=0.0019		ug/L	
			Perfluorobutanoic acid	2016/06/03	0.0066 U, MDL=0.0066		ug/L	
			Perfluorodecane Sulfonate	2016/06/03	0.0043 U, MDL=0.0043		ug/L	
			Perfluoroheptane sulfonate	2016/06/03	0.0036 U, MDL=0.0036		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2016/06/03	0.0047 U, MDL=0.0047		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2016/06/03	0.0040 U, MDL=0.0040		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2016/06/03	0.0046 U, MDL=0.0046		ug/L	
			Perfluorononanoic Acid (PFNA)	2016/06/03	0.0046 U, MDL=0.0046		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/03	0.0058 U, MDL=0.0058		ug/L	
			Perfluoropentanoic Acid (PFPeA)	2016/06/03	0.0036 U, MDL=0.0036		ug/L	
			Perfluorotetradecanoic Acid	2016/06/03	0.0052 U, MDL=0.0052		ug/L	
			Perfluorotridecanoic Acid	2016/06/03	0.0032 U, MDL=0.0032		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2016/06/03	0.0037 U, MDL=0.0037		ug/L	
			Perfluorodecanoic Acid (PFDA)	2016/06/03	0.0066 U, MDL=0.0066		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2016/06/03	0.0057 U, MDL=0.0057		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/03	0.0053 U, MDL=0.0053		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2016/06/03	0.0033 U, MDL=0.0033		ug/L	
4522833	CM5	RPD - Sample/Sample Dup	6:2 Fluorotelomer sulfonate	2016/06/03	NC		%	30
			8:2 Fluorotelomer sulfonate	2016/06/03	NC		%	30

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6B0943
Report Date: 2016/06/06

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: F1

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			N-ethylperfluorooctane sulfonamide	2016/06/03	NC		%	30
			N-ethylperfluorooctane sulfonamidoe	2016/06/03	NC		%	30
			N-methylperfluorooctane sulfonamide	2016/06/03	NC		%	30
			N-methylperfluorooctanesulfonamidol	2016/06/03	NC		%	30
			Perfluorobutane Sulfonate (PFBS)	2016/06/03	NC		%	30
			Perfluorobutanoic acid	2016/06/03	NC		%	30
			Perfluorodecane Sulfonate	2016/06/03	NC		%	30
			Perfluoroheptane sulfonate	2016/06/03	NC		%	30
			Perfluoroheptanoic Acid (PFHpA)	2016/06/03	NC		%	30
			Perfluorohexane Sulfonate (PFHxS)	2016/06/03	NC		%	30
			Perfluorohexanoic Acid (PFHxA)	2016/06/03	NC		%	30
			Perfluorononanoic Acid (PFNA)	2016/06/03	NC		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/03	NC		%	30
			Perfluoropentanoic Acid (PFPeA)	2016/06/03	NC		%	30
			Perfluorotetradecanoic Acid	2016/06/03	NC		%	30
			Perfluorotridecanoic Acid	2016/06/03	NC		%	30
			Perfluoroundecanoic Acid (PFUnA)	2016/06/03	NC		%	30
			Perfluorodecanoic Acid (PFDA)	2016/06/03	NC		%	30
			Perfluorododecanoic Acid (PFDoA)	2016/06/03	NC		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/03	NC		%	30
			Perfluorooctane Sulfonate (PFOS)	2016/06/03	NC		%	30

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B6B0943
Report Date: 2016/06/06

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: F1

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Adam Robinson, Supervisor, LC/MS/MS

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36685
Date Received: 5/31/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 6/8/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36685

Sample#: 36685-001
Sample ID: R-1
Matrix: Water
Sampled: 5/31/16 8:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	110	5	0.47	mg/L	1	APA			1601272	6/2/16		SM2320B

Sample#: 36685-003
Sample ID: F2-1
Matrix: Water
Sampled: 5/31/16 8:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	120	5	0.47	mg/L	1	APA			1601272	6/2/16		SM2320B

Sample#: 36685-002
Sample ID: R-2
Matrix: Water
Sampled: 5/31/16 8:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.6 J	1.0	0.074	mg/L	1	CL			1601328	6/2/16	15:27	SM5310C

Sample#: 36685-004
Sample ID: F2-2
Matrix: Water
Sampled: 5/31/16 8:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.3 J	1.0	0.074	mg/L	1	CL			1601328	6/2/16	15:45	SM5310C

Absolute Resource associates

124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36685

Company Name: Weston + Sampson

Company Address: 100 International Dr, Suite 152 Portsmouth NH

Report To: Andrew Walker

Phone #: 603-397-9280

Invoice to Email: walkera@wseinc.com

☐ Hard Copy Invoice Required

Project Name: Pease Pilot

Project #: —

Project Location: (NH) MA ME VT NY ____ Other

Protocol: RCRA SDWA NPDES MCP NHDES OTHER

Reporting Limits: QAPP GW-1 S-1 EPA DW Other____

Quote # ____ ☐ NH Reimbursement Pricing

PO # ____

ANALYSIS REQUEST

- ☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
- ☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
- ☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
- ☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
- ☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
- ☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
- ☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
- ☐ O&G 1664 ☐ Mineral O&G SM5520F
- ☐ pH ☐ BOD ☐ Conductivity ☐ Turbidity
- ☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity
- ☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
- ☐ Total Metals-list:
- ☐ Dissolved Metals-list:
- ☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☒ TOC
- ☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
- ☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
- ☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
- ☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
- ☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
- Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
- Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	TSS/TDS/TS/TVS/Alkalinity	Ammonia/COD/TKN/TN/TON/TOC	Grab (G) or Composite (C)
3668501	R-1	1	X								5/31/16	800	AW	X		G
-02	R-2	1	X					X			5/31/16	800	AW		X	G
-03	F2-1	1	X								5/31/16	800	AW	X		G
-04	F2-2	1	X					X			5/31/16	800	AW		X	G

TAT REQUESTED

- Priority (24 hr)* ☐
- Expedited (48 hr)* ☐
- Standard (10 Business Days) ☐
- *Date Needed ____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS: Lowest possible value for TOC, Flags are okay

REPORTING INSTRUCTIONS ☒ PDF (e-mail address) walkera@wseinc.com

☐ HARD COPY REQUIRED ☐ FAX (FAX#)____

RECEIVED ON ICE ☒ YES ☐ NO

TEMPERATURE 4 °C

CUSTODY RECORD

Relinquished by	Date	Time	Received by	Date	Time
Relinquished by Sampler: [signature] Andrew Walker	5/31/16	841	Received by:		
Relinquished by:			Received by:		
Relinquished by:			Received by Laboratory: [signature]	5/31/16	841

QSD-01 Revision 1/27/16

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36714
Date Received: 6/1/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 6/14/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36714

Sample#: 36714-002
Sample ID: F2-(1-6)
Matrix: Water
Sampled: 6/1/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Arsenic	0.001 J	0.005	0.00016	mg/L	1	AM	6/6/16	10:45	8838	6/6/16	23:42	E200.8
Calcium	43	1.0	0.038	mg/L	10	AC	6/6/16	10:45	8838	6/8/16	13:02	E200.8
Iron	0.03	0.01	0.00086	mg/L	1	AM	6/6/16	10:45	8838	6/6/16	23:42	E200.8
Manganese	0.002 J	0.01	0.00004	mg/L	1	AM	6/6/16	10:45	8838	6/6/16	23:42	E200.8

Sample#: 36714-001
Sample ID: F1-1
Matrix: Water
Sampled: 6/1/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	110	5	0.47	mg/L	1	APA			1601272	6/2/16		SM2320B

Sample#: 36714-002
Sample ID: F2-(1-6)
Matrix: Water
Sampled: 6/1/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	110	5	0.47	mg/L	1	APA			1601272	6/2/16		SM2320B
Chloride	51	0.5	0.012	mg/L	1	JZL			1601364	6/8/16	19:18	E300.0A
Sulfate	15	0.5	0.016	mg/L	1	JZL			1601398	6/9/16	17:11	E300.0A
Turbidity	U	1.0	1.0	NTU	1	JZL			1601307	6/3/16	11:03	SM2130B

Sample#: 36714-002
Sample ID: F2-(1-6)
Matrix: Water
Sampled: 6/1/16 14:30

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.3 J	1.0	0.074	mg/L	1	CL			1601328	6/2/16	13:34	SM5310C

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36714

Company Name: Weston & Sampson
Company Address: 100 International, Suite 152 Portsmouth NH
Report To: Andrew Walker
Phone #: 603-397-9280
Invoice to Email: walkera@wseinc.com
☐ Hard Copy Invoice Required

Project Name: Pease Pilot
Project #: ___
Project Location: (NH) MA ME VT NY ___ Other
Protocol: RCRA SDWA NPDES MCP NHDES OTHER
Reporting Limits: QAPP GW-1 S-1 EPA DW Other ___
Quote # ___ ☐ NH Reimbursement Pricing
PO # ___

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☒ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☐ Total Metals-list:
☐ Dissolved Metals-list:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Color
Iron, Manganese, Arsenic
Sulphate, Cl, Chloride
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER
36714-01	F1-1	1	X								6/1/16	1430	AW
-02	F2-1												
	F2-2												
	F2-3												
	F2-4												
	F2-5												
	F2-6												

TOC

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed ___

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS
TOC as low as possible, flags ok Kay

REPORTING INSTRUCTIONS ☒ PDF (e-mail address) walkera@wseinc.com
☐ HARD COPY REQUIRED ☐ FAX (FAX#) ___

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 3 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

		Date	Time		Date	Time
Relinquished by Sampler:	Andrew Walker	6/1/16	14:57	Received by:		
Relinquished by:				Received by:		
Relinquished by:				Received by Laboratory:	6/1/16	1457

GRANITE STATE ANALYTICAL SERVICES, LLC

22 Manchester Road, Unit 2, Derry, NH 03038

Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837

http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 06/03/2016

CLIENT NAME: Absolute Resource Associates

CLIENT ADDRESS: 124 Heritage Avenue, Suite 10
Portsmouth, NH 03801

Legend
- Passes ✓
- Fails EPA Primary ⊗
- Fails EPA Secondary ▽
- Fails EPA Proposed Limit ✕

SAMPLE ID#: 1606-00288-001

SAMPLED BY: Client-Customer

SAMPLE ADDRESS: 36714
F2-2

LOCATION:

DATE AND TIME COLLECTED: 06/01/2016 2:30 PM

DATE AND TIME RECEIVED: 06/02/2016 11:50 AM

ANALYSIS PACKAGE: Color

RECEIPT TEMPERATURE: ON ICE 5.1 CELSIUS

CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	EPA Limit	Method	Analyst	Date-Time Analyzed
Color	<5	CPU	✓		5	15 CPU	SM 2120B	ST-NH	06/02/16 4:21 PM

The results presented in this report relate to the samples listed above in the condition in which they were received.
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

*** NELAC Accredited Analysis**

ACCREDITED IN ACCORDANCE WITH nelac

Donald J. D'Anjou, Ph. D.
Laboratory Director

This analysis meets NELAC requirements except as noted.
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Andrew Walker
Weston & Sampson
100 International Drive, Suite 152
Portsmouth, NH 03801

PO Number: None
Job ID: 36812
Date Received: 6/9/16

Project: Pease Pilot

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

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Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 6/23/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Pilot
Job ID: 36812

Sample#: 36812-001
Sample ID: F2- (1-6)
Matrix: Water
Sampled: 6/9/16 14:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Arsenic	0.001 J	0.005	0.00016	mg/L	1	AM	6/10/16	11:00	8847	6/10/16	18:49	E200.8
Calcium	43	1.0	0.038	mg/L	10	AM	6/10/16	11:00	8847	6/20/16	15:30	E200.8
Iron	0.008 J	0.01	0.00086	mg/L	1	AM	6/10/16	11:00	8847	6/10/16	18:49	E200.8
Manganese	0.0005 J	0.01	0.00004	mg/L	1	AM	6/10/16	11:00	8847	6/10/16	18:49	E200.8

Sample#: 36812-001
Sample ID: F2- (1-6)
Matrix: Water
Sampled: 6/9/16 14:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	110	5	0.47	mg/L	1	APA			1601391	6/13/16		SM2320B
Chloride	51	0.5	0.012	mg/L	1	JZL			1601428	6/14/16	16:58	E300.0A
Sulfate	16	0.5	0.016	mg/L	1	JZL			1601428	6/14/16	16:58	E300.0A
Turbidity	U	1.0	0.40	NTU	1	AM			1601431	6/9/16	16:25	SM2130B

Sample#: 36812-002
Sample ID: F1-1
Matrix: Water
Sampled: 6/9/16 14:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Alkalinity, total (as CaCO3)	110	5	0.47	mg/L	1	APA			1601391	6/13/16		SM2320B

Sample#: 36812-001
Sample ID: F2- (1-6)
Matrix: Water
Sampled: 6/9/16 14:00

Parameter	Result	Reporting Limit	DL	Units	Instr Dil'n Factor	Analyst	Prep Date	Prep Time	Batch	Analysis Date	Analysis Time	Reference
Total Organic Carbon (TOC)	0.3 J	1.0	0.074	mg/L	1	CL			1601434	6/15/16	17:32	SM5310C

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36812

Company Name: Weston + Sampson
Company Address: 100 International Drive Portsmouth
Report To: Andrew Walker
Phone #: 603-397-9280
Invoice to Email: walkera@wseinc.com
☐ Hard Copy Invoice Required

Project Name: Pease Pilot
Project #: —
Project Location: (NH) MA ME VT NY Other
Protocol: RCRA MCP SDWA NHDES NPDES OTHER
Reporting Limits: QAPP EPA DW GW-1 Other S-1
Quote # ☐ NH Reimbursement Pricing
PO #

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☐ pH ☐ BOD ☐ Conductivity ☒ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☒ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☐ Total Metals-list:
☐ Dissolved Metals-list: Arsenic, Iron, Manganese
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TOC ☐ TON
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☐ Ortho P
☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde
Color
Chloride, Ca (CaCO3), Sulphate
TOC Cl⁻s as possible
Grab (G) or Composite (C)

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER
36812 01	D2 F1-1 / F2-1	1	X								6/9/16	1400	AW
	F2-2	1	X										
	F2-3	1	X										
	F2-4	1	X										
	F2-5	1	X										
	F2-6 (1)	1	X										
	[illegible]												
	F2-6 (2)	1	X										

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☐
*Date Needed _____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS
Toc analysis as low as possible, flags ok ; F2-6(2) backup only

REPORTING INSTRUCTIONS ☒ PDF (e-mail address) walkera@wseinc.com
☐ HARD COPY REQUIRED ☐ FAX (FAX#) _____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 6.0 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

		Date	Time		Date	Time
Relinquished by Sampler:	Andrew Walker	6/9/16	14:20	Received by:		
Relinquished by:				Received by:		
Relinquished by:				Received by Laboratory:	6/9/16	1420

GRANITE STATE ANALYTICAL SERVICES, LLC

22 Manchester Road, Unit 2, Derry, NH 03038

Phone (800) 699-9920 (603) 432-3044 Fax (603) 434-4837

http://www.granitestateanalytical.com/

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 06/10/2016

CLIENT NAME: Absolute Resource Associates

CLIENT ADDRESS: 124 Heritage Avenue, Suite 10
Portsmouth, NH 03801

Legend

- Passes ✓
- Fails EPA Primary ⊗
- Fails EPA Secondary ▼
- Fails EPA Proposed Limit ✕

SAMPLE ID#: 1606-01295-001

SAMPLED BY: Client-Customer

SAMPLE ADDRESS: 36812-01
F2-3

LOCATION:

DATE AND TIME COLLECTED: 06/09/2016 2:00 PM

DATE AND TIME RECEIVED: 06/10/2016 12:38 PM

ANALYSIS PACKAGE: Color

RECEIPT TEMPERATURE: ON ICE 0.5 CELSIUS

CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	EPA Limit	Method	Analyst	Date-Time Analyzed
Color	<5	CPU	✓		5	15 CPU	SM 2120B	ST-NH	06/10/16 3:17 PM

The results presented in this report relate to the samples listed above in the condition in which they were received.
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

*** NELAC Accredited Analysis**

ACCREDITED IN ACCORDANCE WITH nelac

Donald J. D'Anjou, Ph. D.
Laboratory Director

This analysis meets NELAC requirements except as noted.
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |

Maxxam
A Bureau Veritas Group Company

Your Project #: PEASE PILOT
Site Location: FILTER 1
Your C.O.C. #: 63850

Attention:Andrew Walker

Weston & Sampson
100 International Dr
Suite 152
Portsmouth, NH
USA 038101

Report Date: 2016/06/22
Report #: R4037468
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6C2729
Received: 2016/06/15, 11:10

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
PFOS and PFOA in water	1	2016/06/16	2016/06/18	CAM SOP-00894	EPA 537 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

U = Undetected at the limit of quantitation.
J = Estimated concentration between the EDL & RDL.
B = Blank Contamination.
Q = One or more quality control criteria failed.
E = Analyte concentration exceeds the maximum concentration level.
K = Estimated maximum possible concentration due to ion abundance ratio failure.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Melissa DiGrazia, Project Manager - ATUT
Email: MDiGrazia@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B6C2729
Report Date: 2016/06/22

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: FILTER 1

RESULTS OF ANALYSES OF WATER

Maxxam ID		CNR311			
Sampling Date		2016/06/14 12:43			
COC Number		63850			
	UNITS	F1-1	RDL	MDL	QC Batch
Miscellaneous Parameters					
6:2 Fluorotelomer sulfonate	ug/L	0.0065 U	0.020	0.0065	4542286
8:2 Fluorotelomer sulfonate	ug/L	0.0055 U	0.020	0.0055	4542286
N-ethylperfluorooctane sulfonamide	ug/L	0.0053 U	0.020	0.0053	4542286
N-ethylperfluorooctane sulfonamidoe	ug/L	0.0049 U	0.020	0.0049	4542286
N-methylperfluorooctane sulfonamide	ug/L	0.0040 U	0.020	0.0040	4542286
N-methylperfluorooctanesulfonamidol	ug/L	0.0061 U	0.020	0.0061	4542286
Perfluorobutane Sulfonate (PFBS)	ug/L	0.0019 U	0.020	0.0019	4542286
Perfluorobutanoic acid	ug/L	0.0066 U	0.020	0.0066	4542286
Perfluorodecane Sulfonate	ug/L	0.0043 U	0.020	0.0043	4542286
Perfluorodecanoic Acid (PFDA)	ug/L	0.0066 U	0.020	0.0066	4542286
Perfluorododecanoic Acid (PFDoA)	ug/L	0.0057 U	0.020	0.0057	4542286
Perfluoroheptane sulfonate	ug/L	0.0036 U	0.020	0.0036	4542286
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.0047 U	0.020	0.0047	4542286
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.0040 U	0.020	0.0040	4542286
Perfluorohexanoic Acid (PFHxA)	ug/L	0.0046 U	0.020	0.0046	4542286
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.0053 U	0.020	0.0053	4542286
Perfluorononanoic Acid (PFNA)	ug/L	0.0046 U	0.020	0.0046	4542286
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.0058 U	0.020	0.0058	4542286
Perfluorooctane Sulfonate (PFOS)	ug/L	0.0033 U	0.020	0.0033	4542286
Perfluoropentanoic Acid (PFPeA)	ug/L	0.0036 U	0.020	0.0036	4542286
Perfluorotetradecanoic Acid	ug/L	0.0052 U	0.020	0.0052	4542286
Perfluorotridecanoic Acid	ug/L	0.0032 U	0.020	0.0032	4542286
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.0037 U	0.020	0.0037	4542286
Surrogate Recovery (%)					
13C4-Perfluorooctanesulfonate	%	97	N/A	N/A	4542286
13C4-Perfluorooctanoic acid	%	94	N/A	N/A	4542286
13C8-Perfluorooctanesulfonamide	%	88	N/A	N/A	4542286

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C2729
Report Date: 2016/06/22

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: FILTER 1

TEST SUMMARY

Maxxam ID: CNR311
Sample ID: F1-1
Matrix: Water

Collected: 2016/06/14
Shipped:
Received: 2016/06/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFOS and PFOA in water	LCMS	4542286	2016/06/16	2016/06/18	Colm McNamara

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C2729
Report Date: 2016/06/22

Weston & Sampson
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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B6C2729
Report Date: 2016/06/22

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: FILTER 1

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4542286	CM5	Matrix Spike	13C4-Perfluorooctanesulfonate	2016/06/18		85	%	70 - 130
			13C4-Perfluorooctanoic acid	2016/06/18		78	%	70 - 130
			13C8-Perfluorooctanesulfonamide	2016/06/18		67	%	60 - 120
			6:2 Fluorotelomer sulfonate	2016/06/18		NC	%	70 - 130
			8:2 Fluorotelomer sulfonate	2016/06/18		NC	%	70 - 130
			N-ethylperfluorooctane sulfonamide	2016/06/18		107	%	70 - 130
			N-ethylperfluorooctane sulfonamidoe	2016/06/18		108	%	70 - 130
			N-methylperfluorooctane sulfonamide	2016/06/18		110	%	70 - 130
			N-methylperfluorooctanesulfonamidol	2016/06/18		120	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2016/06/18		115	%	70 - 130
			Perfluorobutanoic acid	2016/06/18		NC	%	70 - 130
			Perfluorodecane Sulfonate	2016/06/18		98	%	70 - 130
			Perfluoroheptane sulfonate	2016/06/18		113	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2016/06/18		NC	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2016/06/18		126	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2016/06/18		NC	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2016/06/18		113	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/18		119	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2016/06/18		NC	%	70 - 130
			Perfluorotetradecanoic Acid	2016/06/18		112	%	70 - 130
			Perfluorotridecanoic Acid	2016/06/18		120	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2016/06/18		127	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2016/06/18		117	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2016/06/18		116	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/18		NC	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2016/06/18		NC	%	70 - 130
4542286	CM5	Spiked Blank	13C4-Perfluorooctanesulfonate	2016/06/18		79	%	70 - 130
			13C4-Perfluorooctanoic acid	2016/06/18		77	%	70 - 130
			13C8-Perfluorooctanesulfonamide	2016/06/18		77	%	60 - 120
			6:2 Fluorotelomer sulfonate	2016/06/18		100	%	70 - 130
			8:2 Fluorotelomer sulfonate	2016/06/18		117	%	70 - 130
			N-ethylperfluorooctane sulfonamide	2016/06/18		102	%	70 - 130
			N-ethylperfluorooctane sulfonamidoe	2016/06/18		114	%	70 - 130
			N-methylperfluorooctane sulfonamide	2016/06/18		102	%	70 - 130
			N-methylperfluorooctanesulfonamidol	2016/06/18		111	%	70 - 130
			Perfluorobutane Sulfonate (PFBS)	2016/06/18		105	%	70 - 130
			Perfluorobutanoic acid	2016/06/18		110	%	70 - 130
			Perfluorodecane Sulfonate	2016/06/18		132 (1)	%	70 - 130
			Perfluoroheptane sulfonate	2016/06/18		115	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2016/06/18		121	%	70 - 130
			Perfluorohexane Sulfonate (PFHxS)	2016/06/18		115	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2016/06/18		120	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2016/06/18		122	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/18		117	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2016/06/18		110	%	70 - 130
			Perfluorotetradecanoic Acid	2016/06/18		111	%	70 - 130
			Perfluorotridecanoic Acid	2016/06/18		105	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2016/06/18		118	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2016/06/18		133 (1)	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2016/06/18		122	%	70 - 130
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/18		120	%	70 - 130
			Perfluorooctane Sulfonate (PFOS)	2016/06/18		108	%	70 - 130
4542286	CM5	Method Blank	13C4-Perfluorooctanesulfonate	2016/06/18		96	%	70 - 130

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Maxxam Job #: B6C2729
Report Date: 2016/06/22

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: FILTER 1

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C4-Perfluorooctanoic acid	2016/06/18		92	%	70 - 130
			13C8-Perfluorooctanesulfonamide	2016/06/18		91	%	60 - 120
			6:2 Fluorotelomer sulfonate	2016/06/18	0.0065 U, MDL=0.0065		ug/L	
			8:2 Fluorotelomer sulfonate	2016/06/18	0.0055 U, MDL=0.0055		ug/L	
			N-ethylperfluorooctane sulfonamide	2016/06/18	0.0053 U, MDL=0.0053		ug/L	
			N-ethylperfluorooctane sulfonamidoe	2016/06/18	0.0049 U, MDL=0.0049		ug/L	
			N-methylperfluorooctane sulfonamide	2016/06/18	0.0040 U, MDL=0.0040		ug/L	
			N-methylperfluorooctanesulfonamidol	2016/06/18	0.0061 U, MDL=0.0061		ug/L	
			Perfluorobutane Sulfonate (PFBS)	2016/06/18	0.0019 U, MDL=0.0019		ug/L	
			Perfluorobutanoic acid	2016/06/18	0.0066 U, MDL=0.0066		ug/L	
			Perfluorodecane Sulfonate	2016/06/18	0.0043 U, MDL=0.0043		ug/L	
			Perfluoroheptane sulfonate	2016/06/18	0.0036 U, MDL=0.0036		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2016/06/18	0.0047 U, MDL=0.0047		ug/L	
			Perfluorohexane Sulfonate (PFHxS)	2016/06/18	0.0040 U, MDL=0.0040		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2016/06/18	0.0046 U, MDL=0.0046		ug/L	
			Perfluorononanoic Acid (PFNA)	2016/06/18	0.0046 U, MDL=0.0046		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/18	0.0058 U, MDL=0.0058		ug/L	
			Perfluoropentanoic Acid (PFPeA)	2016/06/18	0.0036 U, MDL=0.0036		ug/L	
			Perfluorotetradecanoic Acid	2016/06/18	0.0052 U, MDL=0.0052		ug/L	
			Perfluorotridecanoic Acid	2016/06/18	0.0032 U, MDL=0.0032		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2016/06/18	0.0037 U, MDL=0.0037		ug/L	
			Perfluorodecanoic Acid (PFDA)	2016/06/18	0.0066 U, MDL=0.0066		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2016/06/18	0.0057 U, MDL=0.0057		ug/L	
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/18	0.0053 U, MDL=0.0053		ug/L	
			Perfluorooctane Sulfonate (PFOS)	2016/06/18	0.0033 U, MDL=0.0033		ug/L	
4542286	CM5	RPD - Sample/Sample Dup	8:2 Fluorotelomer sulfonate	2016/06/18	20		%	30
			N-ethylperfluorooctane sulfonamide	2016/06/18	NC		%	30

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Maxxam Job #: B6C2729
Report Date: 2016/06/22

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: FILTER 1

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			N-ethylperfluorooctane sulfonamidoe	2016/06/18	NC		%	30
			N-methylperfluorooctane sulfonamide	2016/06/18	NC		%	30
			N-methylperfluorooctanesulfonamidol	2016/06/18	NC		%	30
			Perfluorobutane Sulfonate (PFBS)	2016/06/18	NC		%	30
			Perfluorobutanoic acid	2016/06/18	10		%	30
			Perfluorodecane Sulfonate	2016/06/18	NC		%	30
			Perfluoroheptane sulfonate	2016/06/18	NC		%	30
			Perfluoroheptanoic Acid (PFHpA)	2016/06/18	5.1		%	30
			Perfluorohexane Sulfonate (PFHxS)	2016/06/18	6.2		%	30
			Perfluorononanoic Acid (PFNA)	2016/06/18	3.4		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2016/06/18	NC		%	30
			Perfluorotetradecanoic Acid	2016/06/18	NC		%	30
			Perfluorotridecanoic Acid	2016/06/18	NC		%	30
			Perfluoroundecanoic Acid (PFUnA)	2016/06/18	NC		%	30
			Perfluorodecanoic Acid (PFDA)	2016/06/18	NC		%	30
			Perfluorododecanoic Acid (PFDoA)	2016/06/18	NC		%	30
			Perfluoro-n-Octanoic Acid (PFOA)	2016/06/18	3.5		%	30
			Perfluorooctane Sulfonate (PFOS)	2016/06/18	10		%	30

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B6C2729
Report Date: 2016/06/22

Weston & Sampson
Client Project #: PEASE PILOT
Site Location: FILTER 1

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Sin Chii Chia, Scientific Services

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

APPENDIX E

RTW Model Output

The RTW Model Ver. 3.0 ID: **Combined Raw Well WQ and Portsmouth System from 6/3/16 sample**

Blending Application Package

STEP 1: Enter characteristics for waters to be blended.

Water A

TDS	270	mg/L
Temperature	9	deg C
pH	7.5	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	110	mg/L
Cl	53	mg/L
SO4	16	mg/L

Water B

TDS	640	mg/L
Temperature	9	deg C
pH	7.3	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	172.5	mg/L
Cl	210	mg/L
SO4	25	mg/L

STEP 2: Enter portion of blend that is Water A

% Water A in blend	50	%

Press PAGE DOWN for blended water characteristics and chemical treatment calculations.

Press PAGE UP to review characteristics of waters A & B prior to blending

Initial blended water characteristics.

TDS	455	mg/L
Temperature	9	deg C
pH	7.40	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	141.25	mg/L
Cl	131.5	mg/L
SO4	20.5	mg/L
Acidity	146	mg/L
Ca sat, as CaCO3	346	mg/L
DIC, as CaCO3	266	mg/L

STEP 3: Enter amount of each chemical to be added to blended water (expressed as 100% chemical).

Press Ctrl+C to select chemicals for this list.

Hydrochloric acid	0	mg/L
Hydrofluosilicic acid	0.115	mg/L
Phosphoric acid	1	mg/L
Soda ash	0	mg/L
Sodium bicarbonate	0	mg/L
Sodium hypochlorite	0.5	mg/L
Sulfuric Acid	0	mg/L
Zinc Sulfate	0	mg/L
Ctrl+C to add to list	0	mg/L
Ctrl+C to add to list	0	mg/L

STEP 4: Adjust at Step 3 until interim blended water characteristics meet your criteria.

Theoretical interim characteristics			Desired	Theoretical interim characteristics			Desired
Interim alkalinity	119	mg/L	> 40 mg/L	Interim pH	7.35		6.8-9.3
Interim Ca, as CaCO3	141	mg/L	> 40 mg/L	Precipitation potential	-14.88	mg/L	4-10 mg/L
Alk/(Cl+SO4)	0.8		> 5.0	Langelier index	-0.44		>0

Press PAGE DOWN for additional interim and final blended water characteristics if desired.

Press PAGE UP to review initial blended water characteristics, chemical addition quantities and additional interim blended water characteristics.

Theoretical interim blended water characteristics

Interim acidity	147	mg/L
Interim Ca sat, as CaCO3	393	mg/L
Ryznar index	8.24	
Interim DIC, as CaCO3	266	mg/L
Aggressiveness Index	11.57	

Theoretical final blended water characteristics after CaCO3 precipitation

Final alkalinity	N/A	mg/L
Final Ca	N/A	mg/L
Final acidity	N/A	mg/L
Final pH	N/A	
Final DIC, as CaCO3	N/A	mg/L

The RTW Model Ver. 3.0 ID: **Filtered WQ from Pilot, no aeration, and Portsmouth 6/3/16 sample**

Blending Application Package

STEP 1: Enter characteristics for waters to be blended.

Water A

TDS	270	mg/L
Temperature	9	deg C
pH	7.5	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	110	mg/L
Cl	53	mg/L
SO4	16	mg/L

Water B

TDS	640	mg/L
Temperature	9	deg C
pH	7.3	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	172.5	mg/L
Cl	210	mg/L
SO4	25	mg/L

STEP 2: Enter portion of blend that is Water A

% Water A in blend	50	%

Press PAGE DOWN for blended water characteristics and chemical treatment calculations.

Press PAGE UP to review characteristics of waters A & B prior to blending

Initial blended water characteristics.

TDS	455	mg/L
Temperature	9	deg C
pH	7.40	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	141.25	mg/L
Cl	131.5	mg/L
SO4	20.5	mg/L
Acidity	146	mg/L
Ca sat, as CaCO3	346	mg/L
DIC, as CaCO3	266	mg/L

STEP 3: Enter amount of each chemical to be added to blended water (expressed as 100% chemical).

Press Ctrl+C to select chemicals for this list.

Hydrochloric acid	0	mg/L
Hydrofluosilicic acid	0.115	mg/L
Phosphoric acid	1	mg/L
Soda ash	0	mg/L
Sodium bicarbonate	0	mg/L
Sodium hypochlorite	0.5	mg/L
Sulfuric Acid	0	mg/L
Zinc Sulfate	0	mg/L
Ctrl+C to add to list	0	mg/L
Ctrl+C to add to list	0	mg/L

STEP 4: Adjust at Step 3 until interim blended water characteristics meet your criteria.

Theoretical interim characteristics			Desired	Theoretical interim characteristics			Desired
Interim alkalinity	119	mg/L	> 40 mg/L	Interim pH	7.35		6.8-9.3
Interim Ca, as CaCO3	141	mg/L	> 40 mg/L	Precipitation potential	-14.88	mg/L	4-10 mg/L
Alk/(Cl+SO4)	0.8		> 5.0	Langelier index	-0.44		>0

Press PAGE DOWN for additional interim and final blended water characteristics if desired.

Press PAGE UP to review initial blended water characteristics, chemical addition quantities and additional interim blended water characteristics.

Theoretical interim blended water characteristics

Interim acidity	147	mg/L
Interim Ca sat, as CaCO3	393	mg/L
Ryznar index	8.24	
Interim DIC, as CaCO3	266	mg/L
Aggressiveness Index	11.57	

Theoretical final blended water characteristics after CaCO3 precipitation

Final alkalinity	N/A	mg/L
Final Ca	N/A	mg/L
Final acidity	N/A	mg/L
Final pH	N/A	
Final DIC, as CaCO3	N/A	mg/L

The RTW Model Ver. 3.0

ID: **Filtered WQ from Pilot post-aeration and Portsmouth 6/3/16 sample**

Blending Application Package

STEP 1: Enter characteristics for waters to be blended.

Water A

TDS	270	mg/L
Temperature	9	deg C
pH	7.9	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	110	mg/L
Cl	53	mg/L
SO4	16	mg/L

Water B

TDS	640	mg/L
Temperature	9	deg C
pH	7.3	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	172.5	mg/L
Cl	210	mg/L
SO4	25	mg/L

STEP 2: Enter portion of blend that is Water A

% Water A in blend	50	%

Press PAGE DOWN for blended water characteristics and chemical treatment calculations.

Press PAGE UP to review characteristics of waters A & B prior to blending

Initial blended water characteristics.

TDS	455	mg/L
Temperature	9	deg C
pH	7.52	
Alkalinity, as CaCO3	120	mg/L
Ca, as CaCO3	141.25	mg/L
Cl	131.5	mg/L
SO4	20.5	mg/L
Acidity	139	mg/L
Ca sat, as CaCO3	263	mg/L
DIC, as CaCO3	259	mg/L

STEP 3: Enter amount of each chemical to be added to blended water (expressed as 100% chemical).

Press Ctrl+C to select chemicals for this list.

Hydrochloric acid	0	mg/L
Hydrofluosilicic acid	0.115	mg/L
Phosphoric acid	1	mg/L
Soda ash	0	mg/L
Sodium bicarbonate	0	mg/L
Sodium hypochlorite	0.5	mg/L
Sulfuric Acid	0	mg/L
Zinc Sulfate	0	mg/L
Ctrl+C to add to list	0	mg/L
Ctrl+C to add to list	0	mg/L

STEP 4: Adjust at Step 3 until interim blended water characteristics meet your criteria.

Theoretical interim characteristics			Desired	Theoretical interim characteristics			Desired
Interim alkalinity	119	mg/L	> 40 mg/L	Interim pH	7.46		6.8-9.3
Interim Ca, as CaCO3	141	mg/L	> 40 mg/L	Precipitation potential	-10.02	mg/L	4-10 mg/L
Alk/(Cl+SO4)	0.8		> 5.0	Langelier index	-0.33		>0

Press PAGE DOWN for additional interim and final blended water characteristics if desired.

Press PAGE UP to review initial blended water characteristics, chemical addition quantities and additional interim blended water characteristics.

Theoretical interim blended water characteristics

Interim acidity	141	mg/L
Interim Ca sat, as CaCO3	305	mg/L
Ryznar index	8.13	
Interim DIC, as CaCO3	259	mg/L
Aggressiveness Index	11.68	

Theoretical final blended water characteristics after CaCO3 precipitation

Final alkalinity	N/A	mg/L
Final Ca	N/A	mg/L
Final acidity	N/A	mg/L
Final pH	N/A	
Final DIC, as CaCO3	N/A	mg/L

Laboratory Report

Absolute Resource associates
124 Heritage Avenue Portsmouth NH 03801

Al Pratt
Portsmouth Water and Sewer
680 Peverly Hill Road
Portsmouth, NH 03801

PO Number: POR3, 060316
Job ID: 36734
Date Received: 6/3/16

Project: Pease Booster Pilot Weston & Sampson

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of Absolute Resource Associates' Quality Assurance Plan. The Standard Operating Procedures are based upon USEPA SW-846, USEPA Methods for Chemical Analysis of Water and Wastewater, Standard Methods for the Examination of Water and Wastewater and other recognized methodologies. The results contained in this report pertain only to the samples as indicated on the chain of custody.

Absolute Resource Associates maintains certification with the agencies listed below.

We appreciate the opportunity to provide laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be glad to assist you.

Sincerely,
Absolute Resource Associates

(for)

Sue Sylvester
Principal, General Manager

Date of Approval: 6/21/2016
Total number of pages: 3

Absolute Resource Associates Certifications

New Hampshire	1732	Massachusetts	M-NH902
Maine	NH903		

Project ID: Pease Booster Pilot Weston & Sampson
Job ID: 36734

Sample#: 36734-001
Sample ID: Pease Booster
Matrix: Water
Sampled: 6/3/16 10:27

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Time	Reference
Calcium	**69**	1.0	mg/L	10	AM	6/6/16	8838	6/20/16	15:24	E200.8
Iron	**0.01**	0.01	mg/L	1	AM	6/6/16	8838	6/7/16	1:15	E200.8
Manganese	< 0.01	0.01	mg/L	1	AM	6/6/16	8838	6/7/16	1:15	E200.8

Sample#: 36734-001
Sample ID: Pease Booster
Matrix: Water
Sampled: 6/3/16 10:27

Parameter	Result	Reporting Limit	Units	Instr Dil'n Factor	Analyst	Prep Date	Batch	Analysis Date	Time	Reference
Alkalinity, total (as CaCO3)	**120**	5	mg/L	1	APA		1601391	6/13/16		SM2320B
Chloride	**210**	2.5	mg/L	5	JZL		1601428	6/14/16	15:36	E300.0A
Fluoride	**0.3**	0.1	mg/L	1	JLO		1601326	6/3/16	16:16	E300.0A
Nitrate-N	**2.1** M	0.1	mg/L	1	JLO		1601326	6/3/16	16:16	E300.0A
M = The recovery for the matrix spike was 89%. The acceptance criteria is 90-110%. All other associated QC samples were acceptable.										
ortho-phosphate as P	**0.7** M	0.1	mg/L	1	JLO		1601326	6/3/16	16:16	E300.0A
M = The recovery for the matrix spike was 55%. Note: Documentation of field filtration was not received. Prior to analysis, the sample was filtered through a 0.45um filter at the laboratory.										
Sulfate	**25** M	0.5	mg/L	1	JLO		1601326	6/3/16	16:16	E300.0A
M = The recovery for the matrix spike was 78%. The acceptance criteria is 90-110%. All other associated QC samples were acceptable.										
Conductivity	**1000**	5	umhos/cm	1	APA		1601423	6/15/16		SM2510B
pH	**7.6** H		pH	1	AAG		1601358	6/3/16	14:21	SM4500H+B
H = Sample was received beyond method holding time										

Absolute Resource associates
124 Heritage Avenue #16
Portsmouth, NH 03801
603-436-2001
absoluteresourceassociates.com

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

36734

Company Name: PORTSMOUTH WATER
Company Address: ON FILE
Report To: AL PRATT
Phone #: 617-1736 (PA)
Invoice to Email: plhenderson@...
☐ Hard Copy Invoice Required

Project Name: Pease Booster Pilot
Project #: Weston & Sampson
Project Location: NH MA ME VT NY Other
Protocol: RCRA SDWA NPDES MCP NHDES OTHER
Reporting Limits: QAPP GW-1 S-1 EPA DW Other
Quote # ☐ NH Reimbursement Pricing
PO # POR3,060314

ANALYSIS REQUEST

☐ VOC 8260 ☐ VOC 8260 NHDES ☐ VOC 8260 MADEP
☐ VOC 624 ☐ VOC BTEX ☐ MtBE, only ☐ VOC 8021VT
☐ VPH MADEP ☐ GRO 8015 ☐ 1,4-Dioxane
☐ VOC 524.2 ☐ VOC 524.2 NH List ☐ Gases-List:
☐ TPH ☐ DRO 8015 ☐ EPH MADEP ☐ TPH Fingerprint
☐ 8270PAH ☐ 8270ABN ☐ 625 ☐ EDB
☐ 8082 PCB ☐ 8081 Pesticides ☐ 608 Pest/PCB
☐ O&G 1664 ☐ Mineral O&G SM5520F
☑ pH ☐ BOD ☑ Conductivity ☐ Turbidity
☐ TSS ☐ TDS ☐ TS ☐ TVS ☑ Alkalinity
☐ RCRA Metals ☐ Priority Pollutant Metals ☐ TAL Metals ☐ Hardness
☑ Total Metals-list: Fe, Mn, Ca
☐ Dissolved Metals-list:
☐ Ammonia ☐ COD ☐ TKN ☐ TN ☐ TON ☐ TOC
☐ T-Phosphorus ☐ Phenols ☐ Bacteria P/A ☐ Bacteria MPN
☐ Cyanide ☐ Sulfide ☐ Nitrate + Nitrite ☑ Ortho P
☒ Nitrate ☐ Nitrite ☒ Chloride ☒ Sulfate ☐ Bromide ☒ Fluoride
☐ Corrosivity ☐ Reactive CN ☐ Reactive S- ☐ Ignitibility/FP
☐ TCLP Metals ☐ TCLP VOC ☐ TCLP SVOC ☐ TCLP Pesticide
Subcontract: ☐ Grain Size ☐ Herbicides ☐ Formaldehyde

Lab Sample ID (Lab Use Only)	Field ID	# CONTAINERS	Matrix: WATER	SOLID	OTHER	Preservation Method: HCl	HNO_3	H_2SO_4	NaOH	MeOH	Sampling: DATE	TIME	SAMPLER	Grab (G) or Composite (C)
36734-01	Pease	3	✓			none					6/3/16	10:27		G
	Booster	1	✓				✓							G

TAT REQUESTED
Priority (24 hr)* ☐
Expedited (48 hr)* ☐
Standard (10 Business Days) ☒
*Date Needed _____

See absoluteresourceassociates.com for sample acceptance policy and current accreditation lists.

SPECIAL INSTRUCTIONS parmstrong@...
anpratt@...

REPORTING INSTRUCTIONS ☒ RDF (e-mail address) ...@cityofportsmouth.com
☐ HARD COPY REQUIRED ☐ FAX (FAX#) _____

RECEIVED ON ICE ☒ YES ☐ NO
TEMPERATURE 19 °C

CUSTODY RECORD
QSD-01 Revision 1/27/16

	Date	Time		Date	Time
Relinquished by Sampler:	6/3/16	11:25	Received by:		
Relinquished by:			Received by:		
Relinquished by:			Received by Laboratory:	6/3/16	1125