City of Portsmouth

Department of Public Works

April 20, 2021

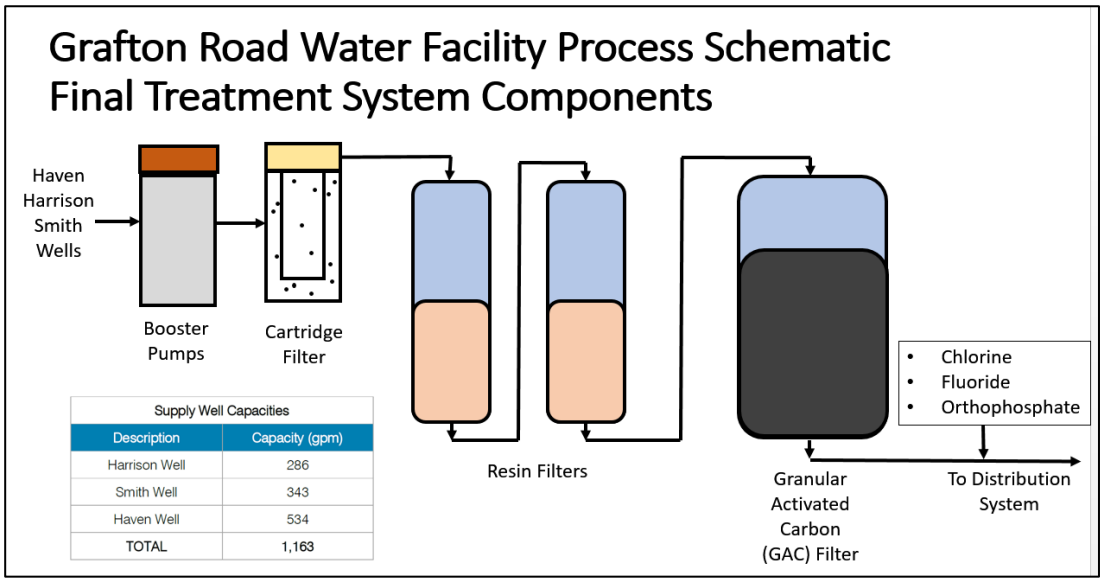
PEASE TRADEPORT WATER SUPPLY UPDATE

Construction of New Drinking Water Treatment Facility Upgrade – February 2021

Construction of the final treatment system, which includes both resin and activated carbon filtration systems, is nearly complete. The Harrison and Smith wells continue to be treated through granular activated carbon (GAC) and will soon also go through the newly installed IOX Resin Filter vessels. Work completing the new piping, pumps and controls is in the final stages and the system has been tested and approved by the New Hampshire Department of Environmental Services (NHDES) for operation. A copy of that approval letter is included in this update.

We anticipate full operation of the system to begin later in the week of April 19, 2021, treating Smith and Harrison Wells. Testing of the system with the Haven well water has been performed but that treated water was not sent into the drinking water system. Operation of the full system with Haven Well water will not occur until a five day pumping test has been performed, a full set of regulated drinking water contaminants has been performed and approval has been given by the NHDES.

The following graphic shows the components of the new water treatment system. Water from the wells flows through resin vessel 1, then into resin vessel 2, and finally through a GAC filter prior to going into the drinking water system:



The City's engineering consultant continues to sample the performance of the activated carbon filters based on the amount of water treated. The following table provides a summary of the most recent treatment system testing results from samples taken on March 15 and 16, 2021.

PFAS Sampling for March 15 and 16, 2021

Sample Point	PFHxS	PFNA	PFOS	PFOA
NH MCLs (ppt)	18	11	15	12
Grafton Road Treatment Treated Water	ND	ND	ND	ND

Notes:
"NH MCLs" are the New Hampshire Maximum Contaminant Levels (effective July 2020).
"ND" is considered Non Detect. Per NHDES, "estimated numbers below the reporting limit are considered Non Detects." The sampling of PFHxS on March 16, 2021 revealed an "estimated" result of 0.191 ppt, just above the sampling method capability of 0.18 ppt but below the reportable limit.

A copy of the comprehensive filter sampling results, which includes other regulated compounds sampled, is attached at the end of this update. The tables show all the contaminants analyzed by the laboratory.

ONGOING WATER QUALITY MONITORING AND UPDATES

The Air Force's consultant continues to perform routine sampling of the water supply wells in the Pease water system. In addition to these water supply wells, the Air Force's consultant samples other monitoring wells in the surrounding area to track the aquifer and monitor for any PFAS moving toward the supply wells. Currently, with the demonstration filters on line, the supply wells are sampled monthly and eleven monitoring wells are sampled quarterly. Sampling data is posted on the City's website once it has been validated by the Air Force's engineering consultant. Information is also posted on the City's website for the City of Portsmouth's PFAS sampling program. Data for the Pease Well sampling is uploaded to the City's website when it is validated by the Air Force's consultant and sent to the City.

The Air Force is currently installing additional sentry monitoring wells between the former Air Base and the City's Portsmouth and Collins wells to further identify the extent that PFAS from Pease may be migrating to these two sources. The City staff continue to meet with the technical team of consultants and regulators to review the data, forensics and analysis of the PFAS contamination. Additional measures have been implemented and comprehensive sampling of water sources and sentry wells continues to assure that all water delivered to both the Pease and the Portsmouth systems is in compliance with current state and federal drinking water regulations.

PUBLIC OUTREACH AND OTHER INFORMATION

Advisory Groups and Health Studies

- **The Pease Restoration Advisory Board (RAB)** continues to meet virtually every quarter.

Minutes and meeting materials from RAB meetings can be accessed via the following link:

https://www.afcec.af.mil/Home/BRAC/Pease-Archives/

- **Pease Community Assistance Panel (CAP)** – The Agency for Toxic Substances and Disease Registry (ATSDR), a federal public health agency, is evaluating the public health impact of drinking water contaminated with per- and polyfluoroalkyl substances (PFAS) at the Pease International Tradeport site and nearby wells. ATSDR has created a Community Assistance Panel (CAP) for Pease as a way for the community to participate directly in ATSDR's health activities. CAP members are voluntary, unpaid individuals from the Pease community. CAP members will work with ATSDR to gather and review community health

concerns, provide information on how people might have been exposed to hazardous substances, and inform ATSDR how to involve the community.
    - https://www.atsdr.cdc.gov/pfas/activities/pease/cap.html

- **Evaluation of Exposure to Per- and Polyfluoroalkyl Substances (PFAS) in the Pease Tradeport Public Water Supply (PWS) April 1, 2019 - ATSDR releases their Public Health Consultation on PFAS in the Pease Tradeport Public Water System -** The Agency for Toxic Substances and Disease Registry (ATSDR) is a public health agency that evaluates environmental exposures for public health risks. ATSDR has released a health consultation on drinking water contamination at the Pease Tradeport PWS. The health consultation evaluated whether water containing PFAS posed a health threat to people who drank it any time since 1993. Those people included workers at the Pease International Tradeport. They also included children at the two childcare centers at the Pease International Tradeport. This fact sheet summarizes ATSDR's findings, released in April 1, 2019. The full report is titled "Perand Polyfluoroalkyl Substances (PFAS) in the Pease Tradeport Public Water System (PWS)." You can find the report at https://www.atsdr.cdc.gov/HAC/PHA/HCPHA.asp?State=NH.
    - Summary of Key Findings
        - Water from the Pease Tradeport PWS between January 1993 through May 2014 could have increased the risk for harmful health effects to Pease International Tradeport workers and children attending the childcare centers. Other possible sources of exposure to users of the Pease Tradeport PWS include food and consumer products. Those could increase the risk for harmful effects beyond the risk from the drinking water exposures alone.
        - Exposure to perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorohexane sulfonic acid (PFHxS) can depress the immune response, increase cholesterol, slow growth and development, and cause liver damage.
        - Community members, particularly mothers exposed to PFAS from the Pease Tradeport PWS, have concerns about the possible health effects of PFAS exposures to infants who breastfeed. Based on available scientific information,
        - ATSDR concludes that the health and nutritional benefits of breastfeeding outweigh the risks associated with PFAS in breast milk.
        - Consuming water from the Pease Tradeport PWS after May 2014 is not expected to cause people harm.

- **The Pease Study: PFAS Health Effects** - The Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) are studying the health effects from drinking PFAS (per and polyfluoroalkyl substances)-contaminated water in the Portsmouth, New Hampshire area.
    - Trained health professionals will be:
        - Testing blood and urine samples;
        - Taking body measurements;

        - Asking about medical history; and
        - Studying behaviors in child participants.
    - After the study ends and the results are analyzed, CDC and ATSDR will share results as soon as possible and will write and share a report with the public.
    - https://www.atsdr.cdc.gov/pfas/activities/pease.html?CDC_AA_refVal=https%3A%2F%2Fwww.atsdr.cdc.gov%2Fpfas%2FPease-Study.html

- **PFAS-REACH (Research, Education, and Action for Community Health)** – Silent Spring Institute - A five-year project funded by a grant from the National Institute of Environmental Health Sciences (NIEHS), with is part of the National Institutes of Health. One of the major goals of PFAS-REACH is to evaluation immune system effects in children (ages 4 to 6) in communities with prior PFAS water contamination. PFAS-REACH is being led by Silent Spring Institute in collaboration with Northeaster University and Michigan State University. The main community partner organizations are Testing for Pease, Massachusetts Breast Cancer Coalition, and Toxics Action Center.
    - Goals of the Study:
        - To evaluation potential effects of PFAS exposures on the immune systems of young children in two communities that have had PFAS water contamination
        - To develop an innovative online resource center, called the PFAS Exchange, with data interpretation tools, tap water testing, and educational materials for affected communities and other audiences.
        - To conduct a social science analysis affected communities to assess individual, family, and community-level experiences of residents in areas impacted by PFAS-contaminated drinking water.
    - www.PFAS-Exchange.org/childrenstudy

- **PFAS Blood Testing Program – New Hampshire DHHS** - In 2015, the New Hampshire Department of Health and Human Services began a blood testing program for people who had lived on, worked on, or attended child care on the Pease Tradeport. A total of 1,578 individuals had their blood tested for PFAS between April to October 2015.
    - 1,181 Adults tested
    - 366 Children tested
    - Three public meetings announcing blood test results
    - Report can be accessed at:
        - https://www.atsdr.cdc.gov/pfas/Pease-Study.html

Treatment and Drinking Water System Studies

- **Haven well resin performance piloting study** – A treatment pilot system has been set up at the Air Force's AIMS treatment facility to study the performance of the resin media that will be installed at the new Grafton Road water treatment facility. This will help identify the filter run times for establishing time periods when the filter media should be changed out to assure adequate treatment of PFAS compounds.

- **Testing for Pease Tap Water Sampling Study** - The goal of the Testing For Pease Portsmouth Community Tap Sampling Program is to gather accurate data about the presence and concentration of PFAS coming out of city taps, enabling us to understand the precise nature of the PFAS load the public is being exposed to via the public water supply. Three rounds of testing have been performed to date with the City of Portsmouth's water staff. So far, results are what were expected based on the PFAS detections from the various water supply sources and the blending of waters in the City's 200 miles of water distribution system piping network. Results are posted on the Testing for Pease website: testingforpease.com

- **PFAS Costs Research Group** – Northeastern University, Dr. Phil Brown (formed August 2020) - This pilot project would be part of a larger project aimed at tallying the enormous costs to the United States due to PFAS exposures. These costs have not yet been calculated, but they are expected to be significant. The project will have two parts: One part, which is national in scope, will review newly available information showing linkages between PFAS exposure and specific health endpoints, to show how exposure to PFAS causes diseases. It will then calculate the economic burden of those diseases across the country, in terms of costs of medical care, lost workdays, and other aspects.

- **Non Target Analysis for PFAS Compounds** – October 2018 to July 2019 - In 2018, Testing for Pease was awarded grant money from the Seacoast Womens Giving Circle to fund additional water testing, which was performed by Dr. Chris Higgins, PhD, from the Colorado School of Mines. Dr. Higgin's laboratory has technology used to conduct Non Target Analysis tests for many PFAS compounds not routinely tested for in commercial labs. Sampling occurred from October 2018 to July 2019 and results were presented to the Pease RAB at their December 5, 2020 meeting. Dr. Higgins stated that "All of the compounds that we see at Grafton can be removed by treatment. They clearly are being captured by the GAC. To the extent that GAC and resin are used in conjunction that would probably do a very good job for both of them."
    - More information can be found at: www.testingforpease.com

Additional information can be accessed at:

www.cityofportsmouth.com/publicworks/water/pease-tradeport-water-system

or by calling Al Pratt, Water Resources Manager, at: 603-520-0622 or Brian Goetz, Deputy Director of Public Works at: 603-766-1420

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

April 9, 2021

Ms. Margaret McCarthy, PE
Weston & Sampson
5 Centennial Drive
Peabody, MA 01960
Via email to: McCarthyM@wseinc.com

Subject: **PWS 1951020 – Pease Trade Port**
Pease Water Treatment Plant (WTP) / Harrison and Smith Wells

Dear Ms. McCarthy:

We are in receipt of your request on behalf of the City of Portsmouth (City) to begin operations of the Pease WTP for the Harrison and Smith wells. The laboratory results provided as part of this request demonstrates the water quality is in compliance with current standards, including non-detect levels of PFAS. We therefore **approve the new Pease WTP** to begin providing drinking water to the system when treating the Harrison and Smith wells. We understand that the request for approval of the Pease WTP treating the Haven well will be submitted under a forthcoming separate cover after completion of testing on that well. We also understand that several items required as part of the design approval are also forthcoming as outlined in your request. These items should be submitted prior to the season of high demand expected this summer.

Required sampling in accordance with the approved sampling plan for startup and continuous monitoring, required during the first year of operation is currently separate from the required sampling on your Master Sampling Schedule. This sampling is under consideration for reporting to OneStop and will be reviewed and discussed with the water system separately.

Prior to going online with this approval, please provide notice so we have an official start for our records.

Please contact me at (603) 271-1746 or Randal.A.Suozzo@des.nh.gov for any questions regarding this letter.

Sincerely,

Randal A. Suozzo, PE
Drinking Water & Groundwater Bureau

ec. Brian Goetz, Al Pratt, Tim Green, City of Portsmouth
Kyle Hay, Weston and Sampson

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

November 16, 2018 *Via email to: McCarthyM@wseinc.com*

Ms. Margaret McCarthy, PE
Weston & Sampson
5 Centennial Drive
Peabody, MA 01960

Subject: **PWS 1951020 – Pease Trade Port**
DR 5210 – Grafton Road Drinking Water Treatment Plant (WTP)

Dear Ms. McCarthy:

This confirms our approval, with conditions, of the referenced treatment per your submittal received August 3, 2018, along with the proposed follow-up sampling schedule received September 28, 2018 and the revised Startup and Testing specification section received October 24, 2018. The proposed treatment for all wells using ion exchange and carbon filtration for the removal of per- and polyfluoroalkyl substances (PFAS) contamination is summarized as follows:

Water Source(s)

- 001 GPW Smith /2200' S of TP
- 009 GPW /Harrison Replacement Well
- 002 GPW Haven /5200' NW of TP (currently inactive)

Raw water quality (as presented in Contract Documents):
Fe 0.2 ppm, Mn 0.3 ppm, pH 7.4, PFAS levels:

PFAS Compound	**Harrison Well (ppb)**	**Smith Well (ppb)**	**Haven Well (ppb)**
PFBS	ND	ND	0.041
PFBA	0.010	ND	0.073
PFPeA	0.018	0.010	0.260
PFHpS	ND	ND	0.050
PFHpA	0.009	ND	0.125
PFHxS	0.045	0.037	0.820
PFHxA	0.018	0.012	0.295
PFNA	ND	ND	0.018
PFOS	0.026	0.017	1.200
PFOA	0.016	0.009	0.300
6:2 FTS	ND	ND	0.220
8:2 FTS	ND	ND	0.034

<table>
<tr><td>Design Flow</td><td>
<table>
<tr><th>Source</th><th>Flow (gpm)</th></tr>
<tr><td>Harrison Well</td><td>286</td></tr>
<tr><td>Smith Well</td><td>343</td></tr>
<tr><td>Haven Well</td><td>534</td></tr>
<tr><td>Water Treatment Plant (WTP)</td><td>1200</td></tr>
</table>
</td></tr>
<tr><td>Chemical Treatment Description</td><td>
<table>
<tr><th>Chemical Name</th><th>Bulk Storage (gal)</th><th>Day Storage (gal)</th><th>Pump (gph)</th></tr>
<tr><td>Hydrofluorosilicic Acid*</td><td>70</td><td>10</td><td>0.3</td></tr>
<tr><td>Sodium Hypochlorite</td><td>325</td><td>30</td><td>2</td></tr>
<tr><td>Ortho/Polyphosphate</td><td>70</td><td>10</td><td>0.3</td></tr>
</table>
* - Hydrofluorosilicic Acid will be replaced with sodium fluoride prior to construction.
</td></tr>
<tr><td>Filtration Description (In order of treatment)</td><td>
1. Cartridge Filters (Fe, Mn, and particulate reduction) – 4 x 20” diameter x 63.5” tall rated for 235 psi and 300 gpm each, 3 cartridges in each vessel, 10 micron openings, all supplied by Harmsco Filtration Products.
2. Resin Filters (PFAS reduction) – 12 x 6’ diameter x 10’ tall vessels rated for 165 psi working pressure and 170-200 gpm each, lead lag piping manifold, 152 cu ft ECT2 Sorbix LC1 ion exchange resin each, 5 minute EBCT, all supplied by ECT2.
Sample taps: inlet, 50% filter point, outlet (each vessel)
3. GAC Filters (PFAS reduction) – 3 x 10’ diameter x 10’ tall vessels rated for 165 psi working pressure and 400 gpm each, lead lag piping manifold, 20,000 pounds Filtrasorb 400 media each, 10 minutes EBCT, all supplied by Calgon Carbon.
Sample taps: inlet, 50% filter point, outlet (each vessel)
</td></tr>
<tr><td>Process Pumping Equipment</td><td>
002 GPW Haven Well Vertical Turbine:
HVN_100: 534 gpm @ 257 ft and 65% efficiency
Centrifugal Pumps:
Recycle, PES_RCP-711/721: 177 gpm @ 350 ft
Residuals, PES_RES-712/722: 50gpm @ 76 ft
Booster, PES_PBP_602: 600 gpm @ 125 ft
Skid mounted – Raw water booster pumps, P-1/2/3: 400 @ 460 ft
</td></tr>
<tr><td>Onsite Storage</td><td>
No finished water storage onsite.
Two (2) Interconnected Backwash Basins / Recycle Tanks:
24,000 gallons each (approximate)
</td></tr>
<tr><td>Waste Disposal / Discharge Registration</td><td>
Connection to sewer, or alternatively to a hauling truck.
Startup water will be discharged according to an approved plan submitted by the Contractor.
</td></tr>
</table>

Sampling Requirements	See attached sampling plan. Upon activation of the Haven Well: Reset lead and copper sampling plan. Six (6) consecutive months of RAW water Investigative Monitoring (IM) samples for *E.coli* from the Haven Well source (enclosed IM form to be returned to this office).
Safety Equipment	Personal chemical safety equipment (gloves, goggles, etc.). Emergency showers and eyewash stations.
Emergency Power	A standby generator connected to a buried natural gas feed line.

This approval is subject to:

1. Submittal of electronic copies of **As-Bid Plans and Specifications** to this department prior to the bid opening, at the latest.
2. Approval of any changes to the submitted 90% design, including any addenda issued during the bid process.
3. Compliance with all construction requirements per Env-Dw 404 *Design Standards for Large Public Water Systems*.
4. **DES site inspection** prior to water treatment plant startup.
5. Submittal of an updated **Water System Emergency Plan** per Env-Dw 503.21 *Emergency Plans for Community Water Systems.*
6. Contract of a **Primary Operator** with a minimum **Grade 2 certification** for treatment and distribution operations.
7. The certified, or delegated operator must, at a minimum, perform daily inspections at the WTP.
8. Submittal of electronic copies of final **Record Drawings** to this department, and maintenance of copies on file by the water system owner.
9. Preparation of a final **O&M Manual** and maintenance of copy on file by the water system owner. Water system copies of the O&M manual and Record Drawings shall be available for review during DES site inspections, when requested.
10. Submittal of a plan for final disposal of **spent resin and carbon media**.
11. Submit for approval all water quality results included in the specifications.
12. Sampling is required in accordance with the attached sampling plan for startup and continuous monitoring. DES reserves the right to either remove or add additional PFAS analytes to this list upon the receipt and consideration of any new information or regulation. DES is currently in the process of reviewing PFAS contamination and is preparing to set new maximum contaminant levels (MCLs) in the near future. It is anticipated that MCLs will be set for PFOA, PFAS, PFHxS and PFNA prior to the WTP going online. The WTP shall be designed and operated to reduce all four regulated PFAS analytes to non-detect levels, as expected from the proposed Best Technology Available. Non-detect levels are required based on review of the pilot data and the very quick spike in filtered water levels once breakthrough occurs. This was evident in all four of the future regulatory contaminants, and especially PFOS and PFNA.
    As stated in the attached sampling plan, continuous monitoring will be required during the first year of operation and at that time, sampling requirements will be reevaluated.

General Comments/Recommendations:

1. According to specification, the membrane waterproofing is not being applied to basin walls on the building's interior. Since this a recycle tank, any interior repair or leak prevention product must be approved for use in drinking water.
2. The plumbing systems have color coding that are the same as some of the chemical piping colors. This should be coordinated and avoided.
3. Hydrant drains should be plugged if located within the high ground water table. Information on ground water levels shall be provided to this office levels if drain plugs are not to be installed.
4. It was unclear during this review what pipe material is to be used inside the WTP. Ductile Iron, PVC, and HDPE are all acceptable materials, and can be selected by the owner of the system/
5. Communications failure at this WTP should be an alarm called out from the main PLC at the Madbury WTP since there is no backup PLC specified.
6. Standard operating procedures (SOPs) should be established for many operations including, but not limited to, chemical deliveries, storage and startup of filters that are in not in operation, recycling of wash water, pumping to sewer, bag filter replacement, resin exchange, carbon exchange, pumping to waste, and pumping wells to waste.
7. It appears that the Filter to Waste is only piped to one Backwash Recycle Basins. If so, a SOPs should be established for shutting down one tank for maintenance.
8. The raw water booster pumps are designed for 460 feet of total dynamic head (200 psi) but the resin and GAC filter vessels are only rated for 165 psi. At a minimum, the VFD programming should be programmed to avoid over pressurization of the vessels.
9. The specification should consider adding PFHxS and PFNA to the operational requirements listed for the resin media, as these are expected to be included in the state's regulations prior to the WTP going online.
10. VOC testing shall be per Env-Dw 705.01, not 22.07B(1), 22.07C(5) as specified.
11. The installation of motion detectors in the lab was discussed at a previous meeting since there are no intrusion devices on the exterior windows in this room. There are also no intrusion alarms noted on the drawings for the Harrison and Smith Wells, although these may be existing. Security of the drinking water sources should be reviewed.
12. Per subsequent discussions with the engineer after receiving the review documents, a change from Hydrofluorosilicic acid to sodium fluoride is being incorporated into the design. DES will confirm compliance with regulations when the requested as-bid documents are received. As a general note, we recommend that the dry chemical for this treatment application be researched to confirm NSF 60 approval and free from any impurities. Products made in the USA are recommended.

Please contact me at (603) 271-1746 or Randal.Suozzo@des.nh.gov for any questions regarding this letter.

Sincerely,

Randal A. Suozzo, PE
Drinking Water & Groundwater Bureau

ec. Brian Goetz, Terry Desmarais, Al Pratt, City of Portsmouth
Kyle Hay, Blake Martin, Weston and Sampson
Rick Skarinka, NHDES

Enclosures: Sampling Plan, GWR-IM form

WATER QUALITY TEST RESULTS
PEASE WATER TREATMENT PLANT
IONIC EXCHANGE & GRANULAR ACTIVATED CARBON TREATMENT
SMITH WELL & HARRISON WELL WATER
SAMPLED: 3/15/2021

SYNTHETIC ORGANIC CONTAMINANTS	ANALYTICAL RESULT	METHOD REPORTING LIMIT	DRINKING WATER LIMIT
1,2-Dibromo-3-chloropropane (DBCP)	<0.02 ug/L	0.02	0.2 ug/L
Ethylene Dibromide (EDB)	<0.02 ug/L	0.02	0.05 ug/L
Aroclor 1016 Screen	<0.2 ug/L	0.2	No Limit
Aroclor 1221 Screen	<0.2 ug/L	0.2	No Limit
Aroclor 1232 Screen	<0.2 ug/L	0.2	No Limit
Aroclor 1242 Screen	<0.2 ug/L	0.2	No Limit
Aroclor 1248 Screen	<0.2 ug/L	0.2	No Limit
Aroclor 1254 Screen	<0.2 ug/L	0.2	No Limit
Aroclor 1260 Screen	<0.2 ug/L	0.2	No Limit
Chlordane	<0.4 ug/L	0.4	2 ug/L
Toxaphene	<2 ug/L	2	3 ug/L
2,4,5-TP (Silvex)	<0.25 ug/L	0.25	50 ug/L
2,4-D	<1 ug/L	1	70 ug/L
Dalapon	<1 ug/L	1	200 ug/L
Dicamba	<0.5 ug/L	0.5	No Limit
Dinoseb	<1 ug/L	1	7 ug/L
Pentachlorophenol	<0.1 ug/L	0.1	1 ug/L
Picloram	<2 ug/L	2	500 ug/L
Alachlor	<0.1 ug/L	0.1	2 ug/L
Aldrin	<0.1 ug/L	0.1	No Limit
Atrazine	<0.1 ug/L	0.1	3 ug/L
Benzo(a)pyrene	<0.1 ug/L	0.1	0.2 ug/L
Butachlor	<0.1 ug/L	0.1	No Limit
Di(2-ethylhexyl)adipate	<1 ug/L	1	400 ug/L
Di(2-ethylhexyl)phthalate	<1 ug/L	1	6 ug/L
Dieldrin	<0.1 ug/L	0.1	No Limit
Endrin	<0.1 ug/L	0.1	2 ug/L
Heptachlor Epoxide	<0.1 ug/L	0.1	0.2 ug/L
Heptachlor	<0.1 ug/L	0.1	0.4 ug/L
Hexachlorobenzene	<0.1 ug/L	0.1	1 ug/L
Hexachlorocyclopentadiene	<0.1 ug/L	0.1	50 ug/L
Lindane	<0.1 ug/L	0.1	0.2 ug/L
Methoxychlor	<0.1 ug/L	0.1	40 ug/L
Metolachlor	<0.1 ug/L	0.1	No Limit
Metribuzin	<0.1 ug/L	0.1	70 ug/L
Propachlor	<0.1 ug/L	0.1	No Limit
Simazine	<0.1 ug/L	0.1	4 ug/L
3-Hydroxycarbofuran	<1 ug/L	1	No Limit

WATER QUALITY TEST RESULTS
PEASE WATER TREATMENT PLANT
IONIC EXCHANGE & GRANULAR ACTIVATED CARBON TREATMENT
SMITH WELL & HARRISON WELL WATER

SAMPLED: 3/15/2021

SYNTHETIC ORGANIC CONTAMINANTS (continued)	ANALYTICAL RESULT	METHOD REPORTING LIMIT	DRINKING WATER LIMIT
Aldicarb Sulfone	<1 ug/L	1	No Limit
Aldicarb Sulfoxide	<1 ug/L	1	No Limit
Aldicarb	<1 ug/L	1	No Limit
Carbaryl	<1 ug/L	1	No Limit
Carbofuran	<1 ug/L	1	40 ug/L
Methiocarb	<1 ug/L	1	No Limit
Methomyl	<1 ug/L	1	No Limit
Oxamyl (Vydate)	<1 ug/L	1	200 ug/L
Propoxur (Baygon)	<1 ug/L	1	No Limit
Glyphosate	<10 ug/L	10	700 ug/L
Diquat	<1 ug/L	1	20 ug/L

WATER QUALITY TEST RESULTS
PEASE WATER TREATMENT PLANT
IONIC EXCHANGE & GRANULAR ACTIVATED CARBON TREATMENT
SMITH WELL & HARRISON WELL WATER

SAMPLED: 3/15/2021

VOLATILE ORGANIC CONTAMINANTS	ANALYTICAL RESULT	METHOD REPORTING LIMIT	DRINKING WATER LIMIT
1,1,1,2-Tetrachloroethane	<0.5 ug/L	0.5	No Limit
1,1,1-Trichloroethane	<0.5 ug/L	0.5	200 ug/L
1,1,2,2-Tetrachloroethane	<0.5 ug/L	0.5	No Limit
1,1,2-Trichloroethane	<0.5 ug/L	0.5	5 ug/L
1,1-Dichloroethane	<0.5 ug/L	0.5	No Limit
1,1-Dichloroethylene	<0.5 ug/L	0.5	7 ug/L
1,1-Dichloropropylene	<0.5 ug/L	0.5	No Limit
1,2,3-Trichlorobenzene	<0.5 ug/L	0.5	No Limit
1,2,3-Trichloropropane	<0.5 ug/L	0.5	No Limit
1,2,4-Trichlorobenzene	<0.5 ug/L	0.5	70 ug/L
1,2,4-Trimethylbenzene	<0.5 ug/L	0.5	No Limit
1,2-Dibromo-3-chloropropane	<0.5 ug/L	0.5	0.2 ug/L
1,2-Dibromoethane	<0.5 ug/L	0.5	0.05 ug/L
1,2-Dichlorobenzene	<0.5 ug/L	0.5	600 ug/L
1,2-Dichloroethane	<0.5 ug/L	0.5	5 ug/L
1,2-Dichloropropane	<0.5 ug/L	0.5	5 ug/L
1,3,5-Trimethylbenzene	<0.5 ug/L	0.5	No Limit
1,3-Dichlorobenzene	<0.5 ug/L	0.5	No Limit
1,3-Dichloropropane	<0.5 ug/L	0.5	No Limit
1,4-Dichlorobenzene	<0.5 ug/L	0.5	75 ug/L
2-Chlorotoluene	<0.5 ug/L	0.5	No Limit
4-Chlorotoluene	<0.5 ug/L	0.5	No Limit
4-Isopropyltoluene	<0.5 ug/L	0.5	No Limit
Benzene	<0.5 ug/L	0.5	5 ug/L
Bromobenzene	<0.5 ug/L	0.5	No Limit
Bromochloromethane	<0.5 ug/L	0.5	No Limit
Bromodichloromethane	<0.5 ug/L	0.5	No Limit
Bromoform	<0.5 ug/L	0.5	No Limit
Bromomethane	<0.5 ug/L	0.5	No Limit
Carbon disulfide	<0.5 ug/L	0.5	No Limit
Carbon tetrachloride	<0.5 ug/L	0.5	5 ug/L
Chlorobenzene	<0.5 ug/L	0.5	100 ug/L
Chloroform	<0.5 ug/L	0.5	No Limit
Chloromethane	<0.5 ug/L	0.5	No Limit
cis-1,2-Dichloroethylene*	<0.5 ug/L	0.5	70 ug/L
cis-1,3-Dichloropropylene	<0.5 ug/L	0.5	No Limit
Dibromochloromethane	<0.5 ug/L	0.5	No Limit
Dibromomethane	<0.5 ug/L	0.5	No Limit
Dichlorodifluoromethane	<0.5 ug/L	0.5	No Limit

WATER QUALITY TEST RESULTS
PEASE WATER TREATMENT PLANT
IONIC EXCHANGE & GRANULAR ACTIVATED CARBON TREATMENT
SMITH WELL & HARRISON WELL WATER

SAMPLED: 3/15/2021

VOLATILE ORGANIC CONTAMINANTS (continued)	ANALYTICAL RESULT	METHOD REPORTING LIMIT	DRINKING WATER LIMIT
Diethyl ether	<0.5 ug/L	0.5	No Limit
Diisopropyl ether (DIPE)	<0.5 ug/L	0.5	No Limit
Ethyl tert-butyl ether (ETBE)	<0.5 ug/L	0.5	No Limit
Ethylbenzene	<0.5 ug/L	0.5	700 ug/L
Hexachlorobutadiene	<0.5 ug/L	0.5	No Limit
Hexachloroethane	<0.5 ug/L	0.5	No Limit
Isopropylbenzene	<0.5 ug/L	0.5	No Limit
m&p-Xylenes	<1 ug/L	1	No Limit
Methyl tert-butyl ether (MTBE)	<0.5 ug/L	0.5	13 ug/L
Methylene chloride	<0.5 ug/L	0.5	5 ug/L
Naphthalene	<0.5 ug/L	0.5	100 ug/L
n-Butylbenzene	<0.5 ug/L	0.5	No Limit
n-Propylbenzene	<0.5 ug/L	0.5	No Limit
o-Xylene	<0.5 ug/L	0.5	No Limit
sec-Butylbenzene	<0.5 ug/L	0.5	No Limit
Styrene	<0.5 ug/L	0.5	100 ug/L
tert-Amyl methyl ether (TAME)	<0.5 ug/L	0.5	No Limit
tert-Butyl alcohol (TBA)	<10 ug/L	10	No Limit
tert-Butylbenzene	<0.5 ug/L	0.5	No Limit
Tetrachloroethylene	<0.5 ug/L	0.5	5 ug/L
Tetrahydrofuran (THF)	<10 ug/L	10	No Limit
Toluene	<0.5 ug/L	0.5	1000 ug/L
Total THMs	<0.5 ug/L	0.5	80 ug/L
Total Xylenes	<0.5 ug/L	0.5	10000 ug/L
trans-1,2-Dichloroethylene	<0.5 ug/L	0.5	100 ug/L
trans-1,3-Dichloropropylene	<0.5 ug/L	0.5	No Limit
Trichloroethylene	<0.5 ug/L	0.5	5 ug/L
Trichlorofluoromethane	<0.5 ug/L	0.5	No Limit
Vinyl chloride	<0.5 ug/L	0.5	2 ug/L

WATER QUALITY TEST RESULTS
PEASE WATER TREATMENT PLANT
IONIC EXCHANGE & GRANULAR ACTIVATED CARBON TREATMENT
SMITH WELL & HARRISON WELL WATER

SAMPLED: 3/15/2021

INORGANIC COMPOUNDS & SECONDARY WATER QUALITY PARAMETERS	ANALYTICAL RESULT		METHOD REPORTING LIMIT	DRINKING WATER LIMIT
Turbidity	<0.5	NTU	0.5	5 NTU
Calcium	**41.9**	mg/L	1	No Limit
Hardness (calc.)	**128**	mg-CaCO3/L	2	No Limit
Iron	<0.01	mg/L	0.01	0.3 mg/L
Magnesium	**5.7**	mg/L	1	No Limit
Potassium	**2.5**	mg/L	1	No Limit
Sodium	**36.7**	mg/L	1	No Limit
Aluminum	**0.0531**	mg/L	0.001	0.2 mg/L
Antimony	<0.001	mg/L	0.001	0.006 mg/L
Arsenic	**0.0013**	mg/L	0.001	0.01 mg/L
Barium	**0.0251**	mg/L	0.001	2 mg/L
Beryllium	<0.001	mg/L	0.001	0.004 mg/L
Cadmium	<0.001	mg/L	0.001	0.005 mg/L
Copper	<0.001	mg/L	0.001	1.3 mg/L
Manganese	<0.001	mg/L	0.001	0.05 mg/L
Mercury	<0.0001	mg/L	0.0001	0.002 mg/L
Nickel	**0.0013**	mg/L	0.001	No Limit
Selenium	<0.001	mg/L	0.001	0.05 mg/L
Silver	<0.001	mg/L	0.001	0.1 mg/L
Thallium	<0.001	mg/L	0.001	0.002 mg/L
Zinc	<0.001	mg/L	0.001	5 mg/L
Chloride	**124**	mg/L	2	250 mg/L
Fluoride	<0.2	mg/L	0.2	4 mg/L
Nitrate as N	**1.02**	mg/L	0.2	10 mg/L
Nitrite as N	<0.2	mg/L	0.2	1 mg/L
Sulfate	**5**	mg/L	2	250 mg/L
Perchlorate	<0.050	ug/L	0.05	2 ug/L
Color, Apparent	<5	CPU	5	15 CPU
Odor	ND	T.O.N.	1	3 T.O.N.
Total Alkalinity	**34**	mg-CaCO3/L	20	No Limit
Total Dissolved Solids	**249**	mg/L	10	500 mg/L
Cyanide, Total	<0.02	mg/L	0.02	0.2 mg/L
pH	**8.14**	SU	N/A	6.5-8.5 SU

MICROBIOLOGICAL CONTAMINANTS	ANALYTICAL RESULT		METHOD REPORTING LIMIT	DRINKING WATER LIMIT
Coliform Bacteria	Absent	P-A/100mL	Absent	No Limit
E. coli Bacteria	Absent	P-A/100mL	Absent	Absent

WATER QUALITY TEST RESULTS

PEASE WATER TREATMENT PLANT

IONIC EXCHANGE & GRANULAR ACTIVATED CARBON TREATMENT

SMITH WELL & HARRISON WELL WATER

PERFLUORINATED ALKYL ACIDS **by EPA 533 Method** **Units: nanograms per liter (ng/L)**	**RESULT 3/15/2021**	**RESULT 3/16/2021**	**REPORTING LIMIT**	**METHOD DETECTION LIMIT**
Perfluorobutanoic Acid (PFBA)	0.273 J	0.229 J	2.00	0.18
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND	ND	2.00	0.10
Perfluoropentanoic Acid (PFPeA)	0.234 J	0.191 J	2.00	0.16
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	2.00	0.23
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND	ND	2.00	0.23
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND	ND	2.00	0.22
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND	ND	2.00	0.25
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	2.00	0.33
Perfluorohexanoic Acid (PFHxA)	ND	ND	2.00	0.23
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	2.00	0.36
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	2.00	0.18
Perfluoroheptanoic Acid (PFHpA)	ND	ND	2.00	0.30
Perfluorohexanesulfonic Acid (PFHxS)	ND	0.191 J	2.00	0.18
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	2.00	0.29
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	2.00	0.50
Perfluorooctanoic Acid (PFOA)	ND	ND	2.00	0.26
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	2.00	0.24
Perfluorononanoic Acid (PFNA)	ND	ND	2.00	0.34
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	2.00	0.96
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	2.00	0.22
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	2.00	0.33
Perfluorodecanoic Acid (PFDA)	ND	ND	2.00	0.39
Perfluoroundecanoic Acid (PFUnA)	ND	ND	2.00	0.19
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	2.00	0.20
Perfluorododecanoic Acid (PFDoA)	ND	ND	2.00	0.32

Note: ND = none detected above method detection limit

J = estimated value between reporting limit and method detection limit