2019 Annual Operations Report

Groundwater Treatment Plant
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant
Bethpage, New York

Contract No. N40085-16-D-2288
Contract Task Order No. 0005

March 2020

Prepared for:

Naval Facilities Engineering Command Mid-Atlantic
9324 Virginia Avenue
Norfolk, VA 23511

Prepared by:

KOMAN Government Solutions, LLC
180 Gordon Drive, Suite 110
Exton, Pennsylvania 19341
(610) 363-3000

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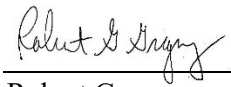
Patrick Schauble
Program Manager

Date



3/12/2020

Robert Gregory
Project Manager

Date

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Acronyms and Abbreviations

AOP	Advanced Oxidation Process
ARAR	Applicable or Relevant and Appropriate Requirement
AS	air stripper
ASE	air stripper effluent
BFE	bag filter effluent
bgs	below ground surface
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
DAR	Division of Air Resources
DCA	dichloroethane
DCE	dichloroethene
DMR	Discharge Monitoring Report
DO	dissolved oxygen
DoD	Department of Defense
DTW	depth to water
ECL	Environmental Conservation Law
EB	equipment rinsate blank
ELAP	Environmental Laboratory Accreditation Program
GOCO	Government Owned Contractor Operated
gpm	gallon per minute
GWTP	groundwater treatment plant
KGS	KOMAN Government Solutions, LLC
HMI	human-machine interface
IRP	Installation Restoration Program
L	liter
lb	pound
LGAC	liquid-phase granular activated carbon
LTM	Long Term Monitoring
MS/MSD	matrix spike/matrix spike duplicate
NAVFAC	Naval Facilities Engineering Command Mid-Atlantic
Navy	United States Department of the Navy
NELAC	National Environmental Accreditation Conference
NG	Northrop Grumman
NWIRP	Naval Weapons Industrial Reserve Plant

NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
ORP	oxidation reduction potential
OU	operable unit
PCE	tetrachloroethene
PLC	programmable logic controller
QA/QC	quality assurance / quality control
ROD	Record of Decision
RPD	relative percent difference
SC	specific conductance
SCADA	Supervisory Control and Data Acquisition
scfm	standard cubic feet per minute
SPDES	Storm Pollution Discharge Elimination System
TB	trip blank
TCE	trichloroethene
TE	treated effluent
TIC	tentatively identified compound
TSS	total suspended solids
TtEC	Tetra Tech EC, Inc.
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VGAC	vapor–phase granular activated carbon
VOC	volatile organic compound

1.0 INTRODUCTION

KOMAN Government Solutions, LLC (KGS) has prepared this Annual Operations Report for the GM-38 Area Groundwater Treatment Plant (GWTP) at the Naval Weapons Industrial Reserve Plant (NWIRP) in Bethpage, New York. This report has been prepared for the United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic, under Contract No. N40085-16-D-2288, Contract Task Order No. 0005. This 2019 Annual Operations Report summarizes activities that occurred during 2019, and also further details activities that occurred during the Fourth Quarter 2019 (October 2019 through December 2019). Data were collected and operational activities were performed by KGS in accordance with the following documents:

- *Final Operation, Maintenance & Monitoring Plan for Groundwater Treatment Plant GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by Tetra Tech EC, Inc. (TtEC) in 2010, hereafter referred to as the "O&M Manual."
- *Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), UFP-SAP for Operations, Maintenance, and Monitoring of the Groundwater Treatment Plant, GM-38 Area, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by TtEC in 2010.

The following quarterly reports, along with data collected during the Fourth Quarter (October through December), are used as a basis for this 2019 Annual Operations Report:

- *Quarterly Operations Report, First Quarter 2019, Groundwater Treatment Plant, GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in October 2019.
- *Quarterly Operations Report, Second Quarter 2019, Groundwater Treatment Plant, GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in October 2019.
- *Quarterly Operations Report, Third Quarter 2019, Groundwater Treatment Plant, GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in November 2019.

1.1 Background

NWIRP Bethpage is located in east central Nassau County, Long Island, New York, approximately 30 miles east of New York City (**Figure 1**) and is currently listed by New York State Department of Environmental Conservation (NYSDEC) as an "inactive hazardous waste site" (#1-30-003B). In the late 1990s, the Navy's property totaled approximately 109.5 acres and was a Government Owned Contractor-Operated (GOCO) facility that was operated by Northrop Grumman (NG) until September 1998. NWIRP Bethpage was bordered on the north, west, and south by property owned, or formerly owned, by NG that covered approximately 550 acres, and on the east by a residential neighborhood.

The GM-38 Area refers to a cluster of monitoring wells installed in the 1990s by NG. The GM-38 Area

is approximately 8,500 feet south, southeast and hydraulically downgradient of NWIRP Bethpage. The GWTP is located within a utility easement with a street address of 100 Broadway, Bethpage, NY.

The "hot spot" cleanup remedy for the GM-38 Area groundwater was originally set forth in Record of Decision (ROD) documents for Operable Unit (OU) 2. Groundwater for the NG and NWIRP Sites (New York State Registry Site Numbers 1-30-003A & 1-30-003B, respectively) issued by NYSDEC Division of Environmental Remediation in March 2001 and for the NWIRP Bethpage Site by NAVFAC in April 2003 (Revision 1). The selected remedy was chosen in accordance with the New York State Environmental Conservation Law (ECL) and the Navy's Installation Restoration Program (IRP). It is also consistent with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended, 42 U.S.C. §§ 9601-9675.

1.2 GWTP Overview

Currently, groundwater is extracted from recovery wells RW-1 and RW-3 (pumping at RW-3 was suspended from July 2015 to June 2018 as described below) and treated in the GWTP. The treatment process consists of flow equalization, air stripping and vapor-phase carbon treatment, bag filtration, and liquid-phase carbon treatment. Though the GWTP was originally equipped with a pH adjustment system utilizing sodium hydroxide, it has since been determined that pH adjustment is not necessary, and the equipment has been taken off-line and sodium hydroxide sent off site for beneficial reuse. A process flow diagram is presented as **Figure 2**. The treated water is either re-injected into injection well IW-1 or discharged into the Nassau County Recharge Basin #495. Under CERCLA, the Navy is required to meet the effluent requirement in the NYSDEC's Storm Pollution Discharge Elimination System (SPDES) Permit Equivalent Application as an Applicable or Relevant and Appropriate Requirement (ARAR).

The GWTP was designed to operate at an average flow rate of 1,100 gallons per minute (gpm) (800 gpm from RW-1 and 300 gpm from RW-3), as measured by the average discharge flow rate. It was determined that this flow rate would be necessary to effectively contain the higher concentration of contamination in the GM-38 Area groundwater. Volatile Organic Compounds (VOCs) in the influent groundwater consist of trichloroethene (TCE), tetrachloroethene (PCE), vinyl chloride (VC), cis-1,2-dichloroethene (DCE), 1,2-dichloroethane (DCA), benzene, toluene, and total xylenes.

The air stripper (AS) is a structural aluminum tower that is packed with 3.5-inch diameter polypropylene Jaeger Tripack. Groundwater is pumped to the AS distribution port and sprayed over the column of Jaeger Tripack at a flow rate of approximately 1,100 gpm. Previously, 100 gpm of recirculated water was also rerouted through the AS, but as of October 2010, recirculation was no longer deemed necessary to the operation of the system. An induced draft countercurrent flow of air enters the AS below the base of the packing material at a rate of 8,000 standard cubic feet per minute (scfm). The large surface area of the packing material allows for a mass transfer of the VOCs from the groundwater into the air stream. The VOCs in the off-gas, except for VC, are removed via two 20,000-pound (lb) vapor phase granular activated carbon (VGAC) units (VGAC-1 and VGAC-2). VC is oxidized into potassium chloride and carbon dioxide via treatment in a 20,000-lb vessel (VGAC-3) containing zeolite impregnated with potassium permanganate. The potassium chloride remains in the pore structure of the zeolite substrate. The treated off-gas is discharged from the stack.

Water treated by the AS is subsequently processed through three 8,000-lb liquid-phase granular activated carbon (LGAC) units in parallel prior to discharge in the recovery basin (or injection well, if necessary).

The GWTP is controlled by a programmable logic controller (PLC)-based digital and analog control system, with instrumentation that monitors pH, pressure, tank level, flow and differential pressure transmitters, water level in recovery wells, and motor operational status. The information in the PLC is made available to an operator via a human-machine interface (HMI) program. By using this program, the status of the GWTP can be displayed in real time and adjusted, if necessary, by the operator.

A 2014 evaluation of the GM-38 Area, conducted in order to better determine the capture zone of the recovery wells, recommended that use of recovery well RW-3 be discontinued ("*Capture Zone Evaluation and Path Forward, GM-38 Area Groundwater Treatment Plant*" [Tetra Tech, 2014]). The report was sent to NYSDEC in March 2014 and recommended ceasing operation of recovery well RW-3 and increasing the pumping rate of recovery well RW-1. These system modifications would maintain the existing GWTP pumping rate of 1,000 to 1,100 gpm while maintaining the desired capture zone of the GWTP (Tetra Tech, 2014). NYSDEC concurred with the implementation of this path forward and associated system modifications on 20 April 2015. On 1 July 2015, in accordance with the approved path forward, recovery well RW-3 was taken off-line. The flowrate of recovery well RW-1 was increased from approximately 800 gpm to approximately 1,000 gpm. Pumping at RW-3 was once again resumed in June 2018 to address persistent VOC concentrations at this well. Pumping rates were adjusted so that approximately 80% of the total groundwater extracted is from RW-1 with the remaining 20% extracted from RW-3.

2.0 GWTP OPERATIONS AND MAINTENANCE

While designed to run autonomously, the GWTP requires regular visits by an operator to record and adjust operational parameters and to perform scheduled maintenance. The GWTP is equipped with telemetry that will alert an on-call operator in the event of a plant shutdown.

2.1 Routine Maintenance Activities

Routine maintenance activities at the GWTP were performed during the operator's visits. These activities include general site inspections, collection of operational data (water and vapor flowrates, differential pressures across the AS, carbon units, bag filter units and blower discharge pressures, tank levels and totalizer readings), measurement of water levels in the recovery wells, adjustment of pump signal settings, collection of vapor and process water samples, changing out of bag filters, switching of lead/lag pump assignments, and preventive maintenance of system equipment.

In addition, the following maintenance tasks were also performed during 2019:

- On 5 February, the annual backflow preventer inspection was performed. Results were submitted to the Bethpage Water District and the New York State Department of Health (NYSDOH), as required.
- On 11 February, 8 May, 11, 30, and 31 October, the Operator backwashed the LGAC vessels.
- On 6 August, the semi-annual fire alarm inspection was performed.

2.2 Non-routine Maintenance / Site Activities

The following non-routine activities occurred at the GWTP during 2019:

- On 8 January, KGS staff attended an onsite training of the updated Supervisory Control and Data Acquisition (SCADA) system and remote access.
- On 18 January, the Advanced Oxidation Process (AOP) experimental treatment unit for 1,4-dioxane was delivered on site and installation was subsequently completed by others.
- On 31 March, the GWTP was down for 8.5 hours from a high sump alarm caused by a leaking pressure gauge inside the plant on influent pump 3A. The pressure gauge was replaced, and the plant was placed back online on 1 April.
- On 17 April, the system was down for approximately 6 hours because of a power outage.
- On 21 May, F&M Mechanical was onsite to troubleshoot the inoperative plant sump pump. The check valve was disassembled, and the impeller was cleared of debris. The pump was operating properly after cleaning.
- On 3 July, a Hayes Pump representative was on site to assess the AS transfer pumps.
- On 8 July, Veolia picked up spent carbon from the 1,000 lbs VGAC vessels as well as four drums of investigation derived waste (IDW).

- On 22 July, the system was offline because of a local power outage.
- On 27 August, effluent pump 4B was removed and transported off-site to the Hayes Pump facility to be evaluated.
- On 8 October, the system was offline for 8.7 hours because of a power outage.
- On 9 October, the system was offline for 1.4 hours because of a power outage.
- On 28 October, the plant sump pump stopped working; the operator manually pumped water from the floor sump.
- On 6 December, effluent pump 4B was reinstalled by Hayes Pump.

3.0 GWTP MONITORING

The intent of the GWTP is to remove contaminant mass and reduce elevated VOC levels to levels similar to those in the surrounding aquifer. It is anticipated that GWTP operation will minimize contaminant impacts on water supply wells and currently unaffected portions of the groundwater aquifer. The GWTP is not intended to remediate groundwater contamination in the local aquifer to non-detectable levels (TtEC, 2010. Various process samples (water and vapor are collected on a monthly basis to monitor GWTP efficiency and to ensure compliance with Federal and State effluent discharge and air emission requirements. In addition, groundwater samples are collected semi-annually to monitor water quality and determine the effectiveness of the remediation activities and monitor the hydraulic containment and capture of impacted groundwater by the recovery wells.

3.1 Process Water Quality Monitoring

Processed groundwater is analyzed to comply with calculations submitted by the Navy and documented in the NYSDEC Water Division SPDES Equivalent Application for the effluent limitations and monitoring requirements. These results are also submitted to NYSDEC on a monthly basis in the form of a Discharge Monitoring Report (DMR. A copy of the current NYSDEC effluent limitations, monitoring constituents, and the reporting forms are included in **Appendix A**.

Monthly aqueous samples are collected from the active recovery wells (RW-1 and RW-3), and the treated effluent (TE) discharge line. In addition, various intermediary process system samples are collected monthly, consisting of air stripper effluent (ASE), bag filter effluent (BFE), and effluent of each of the three LGAC units (LC1, LC2, and LC3).

3.1.1 Fourth Quarter 2019 Summary

The analytical results of monthly process water samples collected during the Fourth Quarter are presented in **Table 1**. The data demonstrate that all permitted constituents were in compliance with regulatory requirements. **Table 1** also summarizes the average monthly flowrates along with the total volume of water processed during each month of the Fourth Quarter. Monthly DMRs for the Fourth Quarter
(October – December 2019) are included in **Appendix A**. DMRs for January – September 2019 are included in previously submitted quarterly operations reports, as outlined in Section 1.0.

Based on NYSDEC's interest with several non-VOC parameters in groundwater near Bethpage Water District Plant 4, the Navy has agreed to sample and analyze groundwater for 1,4-dioxane, using United States Environmental Protection Agency (USEPA) Method 8270D, on a monthly basis from the system's treated effluent. Analytical results for 1,4-dioxane are also provided in **Table 1**.

3.1.2 2019 Annual Summary

Flow Totals
Annual flow volumes and system operation for 2019 are summarized in **Table 2**. The total volume of groundwater treated in 2019 based on effluent flow totals was 451,736,001 gallons. During 2019, GM-38 operated with and average uptime of 99% at an average effluent flowrate of 869 gpm.

Mass Removal

Mass removal was calculated based on monthly influent concentrations combined with monthly influent flow totals. During 2019, approximately 369.5 lbs of VOCs were removed by the GWTP, for an average monthly mass removal rate of approximately 30.8 lbs per month. Mass removal calculations are presented in **Table 3**.

3.2 Air Quality Monitoring

Treated off-gas discharged at the stack of the GWTP is subject to emissions limitations. Original discharge goals were derived from calculations submitted by the Navy and approved by the NYSDEC Division of Air Resources (DAR) in July 2009. In November 2011, the Navy submitted an evaluation proposing revised discharge goals, which NYSDEC approved in October 2013. A copy of this documentation is included as **Appendix B**.

3.2.1 Fourth Quarter 2019 Summary

While only sampling of the stack emissions is required for NYSDEC compliance, process vapor samples are also collected using 6-L summa canisters at various locations to monitor for breakthrough of the VGAC units. The analytical results of monthly influent and effluent vapor samples as well as midfluent samples (VC12 and VC13) collected during the Fourth Quarter are presented in **Table 4**. Air emissions calculations using the stack vapor concentrations along with discharge flowrates are presented in **Table 5**. The calculations demonstrate that all constituents were within the regulatory requirements during the Fourth Quarter based on the calculated emission rates.

3.2.2 2019 Annual Summary

Table 6 summarizes annual air emissions based on monthly emissions during the 12-month period. During 2019, total air emissions of permitted constituents consisted of 0.54 lbs of TCE, 0.07 lbs of VC, 20.12 lbs of 1,2-DCE, and 0.06 lbs of PCE, well below the discharge goals approved by NYSDEC in October 2013.

3.3 Groundwater Quality Monitoring

The groundwater monitoring well system at the GM-38 Groundwater Remediation Area consists of 14 monitoring wells, three recovery wells (RW-1, RW-2, RW-3) and one injection well (IW-1). Groundwater level measurements were collected and are summarized in **Table 7**. Although RW-2 was installed in 2005, a pump was never installed in this well and the well is not operated as a recovery well because of concerns expressed by the Bethpage Water District. As mentioned above, pumping at RW-3 was suspended between July 2015 and June 2018. RW-3 was reactivated on 1 June 2018 to address persistent VOC concentrations at this location. Well locations are depicted on **Figure 3**.

Depth to water (DTW) measurements are collected from 12 of the monitoring wells on a quarterly basis. Prior to 2014, water quality samples were collected from eight of the monitoring wells on a quarterly basis; beginning in 2014, the sample collection frequency was reduced to semi-annually, with sample collection generally in the March and September time-frame. The monitoring network includes well

clusters located near the recovery and injection wells as described below and as shown on **Figure 3**. In addition, two wells, GM-38D and GM-38D2, located at the corner of Arthur Avenue and Broadway, are monitored by others.

Semi-annual groundwater samples are collected from eight monitoring wells (RW1-MW1, RW1-MW3, RW2-MW1, RW3-MW1, RW3-MW2, RW3-MW3, RW3-MW4, and TP-01) and from two recovery wells (RW-1 and RW-3). Samples are collected from monitoring wells using bladder pumps in accordance with USEPA low-flow sampling methodologies. Samples are collected from recovery wells RW-1 and RW-3 using the dedicated extraction pump as it is normally done during routine O&M sampling. Results of the groundwater sampling for the Fourth Quarter are presented in Section 3.3.1 below, and descriptions of monitoring well locations are as follows:

Recovery Well 1 (RW-1) Monitoring Wells
The RW-1 cluster consists of three monitoring wells screened between 395 and 435 feet below ground surface (bgs). RW1-MW1 is located approximately 140 feet northwest of RW-1 and RW1-MW2 is located approximately 50 feet north of RW-1. RW1-MW3 is located approximately 400 feet northeast of RW-1, on the eastern side of Seaford Oyster Bay Expressway. All three wells are hydraulically monitored while only RW1-MW1 and RW1-MW3 are also monitored for water quality.

Recovery Well 2 (RW-2) Monitoring Wells
The RW-2 cluster consists of three monitoring wells screened between 470 and 510 feet bgs. RW2-MW1 is located approximately 60 feet northwest of RW-2, RW2-MW2 is located approximately 20 feet west of RW-2, and RW2-MW3 is located approximately 100 feet west of RW-2. All three wells are hydraulically monitored while only RW2-MW1 is monitored for water quality.

Recovery Well 3 (RW-3) Monitoring Wells
The RW-3 cluster consists of four monitoring wells. RW3-MW2 and RW3-MW4 are screened between 475 and 495 feet bgs. RW3-MW1 and RW3-MW3 are screened between 330 and 350 feet bgs and 320 and 340 feet bgs, respectively. RW3-MW1 and RW3-MW2 are located approximately 500 feet west of the GM-38 cluster, at the intersection of Arthur Avenue and Leroy Avenue. RW3-MW3 and RW3-MW4 are located approximately 400 feet north of the intersection of Arthur Avenue and Broadway. All four wells are both hydraulically monitored and monitored for water quality.

TP-01
TP-01 is screened between 450 and 470 feet bgs and is located approximately 25 feet north of the GWTP building, inside the fenced area. It is hydraulically monitored to observe the change in water levels associated with the influence from the pumping rates at the neighboring public water supply well field adjacent to the hot spot area and is also monitored for water quality.

Injection Well 1 (IW-1) Monitoring Well
There is one monitoring well associated with injection well IW-1. IW1-MW1 is screened between 20 and 150 feet bgs, is located approximately 20 feet south of IW-1, and is only hydraulically monitored on a quarterly basis.

3.3.1 Groundwater Quality Results

Groundwater samples were collected monthly from monitoring wells RW-1 and RW-3 during the Fourth Quarter 2019. Analytical results are summarized in **Table 1**.

Quarterly groundwater level monitoring of the 12 monitoring wells was performed on 24 December 2019. Results are summarized in **Table 7**. A copy of the field log is included in **Appendix C**.

3.3.2 Groundwater Concentration Trends

Historical groundwater analytical results through the Fourth Quarter are presented in **Table 8**. As previously mentioned, no monitoring wells were sampled in the Fourth Quarter, as sampling occurs on a semi-annual basis. Groundwater analytical results of select VOCs (cis-1,2-DCE, PCE, TCE, and VC) for 2019 monitoring events are presented graphically as **Figure 4**. Additionally, concentration trends of select VOCs (cis-1,2-DCE, TCE, and PCE, as well as VC) over time for each recovery well and the eight monitoring wells sampled during the 2019 semi-annual monitoring events are presented in **Figures 5 through 14** and discussed below.

Figure 5 presents concentrations measured at recovery well RW-1. Concentrations of TCE have decreased from initial concentrations in early 2010 (747 µg/L detected in April 2010), remaining below 300 µg/L since the latter half of 2012, decreasing to a low of 58.6 µg/L in November 2019, and increasing to 73.2 µg/L in December 2019. Concentrations of cis-1,2-DCE have followed a similar trend, decreasing from a high of 160 µg/L in February 2010 to a low of 3.92 µg/L in November 2019 before increasing to 4.86 µg/L in December 2019. PCE concentrations have also exhibited decreasing trends over time, with concentrations decreasing from 180 µg/L in February 2010 to a low of 15.2 µg/L in November 2019 before increasing to 18.5 µg/L in December 2019. Concentrations of VC have decreased below initial concentrations in 2010. After reaching a maximum concentration of 61 µg/L in February 2010, VC concentrations have remained below 5.0 µg/L since the final quarter of 2011 and below 1.0 µg/L since June 2013. VC was not detected during the Fourth Quarter 2019.

Figure 6a and Figure 6b presents concentrations measured at recovery well RW-3, with the most recent data collected in the Fourth Quarter 2019. Concentrations of TCE have decreased from initial concentrations in February 2010 (660 µg/L), remaining below 300 µg/L from the latter half of 2012 through the Third Quarter 2015. RW-3 was temporarily taken off-line between July 2015 and June 2018, which may have contributed to the increase to 371 µg/L in March 2016. However, since March 2016, TCE concentrations have decreased from 371 µg/L to a low of 120 µg/L detected in March 2018. The TCE concentrations for the Fourth Quarter 2019 (139 µg/L, 134 µg/L, and 159 µg/L in October, November, and December, respectively) were similar on average to those detected in the Third Quarter 2019. Concentrations of cis-1,2-DCE have remained consistently below 4.0 µg/L, and below 2.0 µg/L since September 2013, although the concentration increased slightly to 2.5 µg/L in June 2016, then decreased again below 2.0 µg/L during September 2016 and March 2017. Cis-1,2-DCE remained below 1.3 µg/L during the Fourth Quarter 2019. PCE has only been detected infrequently at this location, with the most recent detection of 0.260 J µg/L in December 2019. VC has not been detected during any sampling event.

Figure 7 presents concentrations measured at RW1-MW1, with the most recent data collected in the Third Quarter 2019. Concentrations of TCE at this location have varied widely since the initial sampling in May 2005 (53.6 µg/L). The concentration of TCE in September 2019 (95 µg/L) was higher than the initial concentration reported in May 2005, but less than the highest concentration observed to date (175 µg/L in September 2013). The concentration of cis-1,2-DCE in September 2019 (4.7 J µg/L) increased from concentrations observed in March 2019 but remains well below the initial concentration observed in May 2005 (78.6 µg/L). Concentrations of PCE have remained consistently below 1.0 µg/L.

Figure 8 presents concentrations measured at RW1-MW3, with the most recent data collected in the Third Quarter 2019. Concentrations of cis-1,2-DCE and PCE have consistently remained below 1.0 µg/L. Concentrations of TCE have also remained consistently low with a reported concentration of 3.34 J µg/L in September 2019.

Figure 9 presents concentrations measured at RW2-MW1, with the most recent data collected in the Third Quarter 2019. The concentration of TCE in the Third Quarter 2019 (15.7 µg/L) was below the March 2016 concentration (43.9 µg/L), which was the highest TCE concentration observed to date. The concentration of cis-1,2-DCE observed in the Third Quarter 2019 (7.18 µg/L) was above initial concentrations observed in May 2005 (non-detect) but below the maximum concentration observed in the March 2016 (15.3 µg/L). PCE has not been detected during any sampling events.

Figure 10 presents concentrations measured at RW3-MW1, with the most recent data collected in the Third Quarter 2019. The concentration of TCE in September 2019 (21.1 µg/L) was below the initial concentration observed in January 2010 (35.0 µg/L) and approached the lowest concentration detected to date (19.0 µg/L in March 2018). Cis-1,2-DCE has not been detected since September 2014. Concentrations of PCE have remained consistently near or below 2.0 µg/L, with a concentration of 1.69 J µg/L in September 2019.

Figure 11 presents concentrations measured at RW3-MW2, with the most recent data collected in the Third Quarter 2019. The TCE concentration observed in September 2019 (131 µg/L) was below the initial concentration observed in January 2010 (160 µg/L), and below the maximum concentration observed in April 2010 (211 µg/L). Concentrations of cis-1,2-DCE at this location have consistently remained below 2.0 µg/L. PCE has only been detected infrequently at this location, with concentrations ranging from 0.28 J µg/L in August 2012 to 0.66 J µg/L in March 2016.

Figure 12 presents concentrations measured at RW3-MW3, with the most recent data collected in the Third Quarter 2019. The TCE concentration observed in September 2019 (176 µg/L) was less than initial concentrations observed in January 2010 (350 µg/L) and the highest concentration measured in June 2013 (410 µg/L) and approached the lowest concentration detected to date (100 µg/L in September 2017). Concentrations of cis-1,2-DCE have remained near or below 2.0 µg/L since March 2012. PCE has remained below 1.0 µg/L for all events.

Figure 13 presents concentrations measured at RW3-MW4, with the most recent data collected in the Third Quarter 2019. TCE concentrations have decreased since the initial sampling event in January 2010 (21 µg/L), with the lowest concentration of 1.3 J µg/L observed in the Third Quarter 2019. PCE was

detected for the first time in the Third Quarter 2015 at a concentration of 0.31 J µg/L but has not been detected since the March 2016 sampling event. Cis-1,2-DCE has been detected infrequently since the initial sampling event in January 2010 (0.46 µg/L), and was measured in September 2019 at a concentration of 0.48 J µg/L.

Figure 14 presents concentrations measured at TP-01, with the most recent data collected in the Third Quarter 2019. The TCE concentration observed in September 2019 (14.4 µg/L) was below the initial concentration observed in January 2010 (65 µg/L) which was also the maximum concentration observed to date. Concentrations of cis-1,2-DCE have generally decreased from an initial value of 190 µg/L in January 2010 to the lowest concentration measured in September 2019 of 3.75 J µg/L. PCE concentrations have remained below 1.0 µg/L since September 2013 and have not been detected since March 2017.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The intent of the groundwater treatment system at GM-38 is to remove contaminant mass and reduce elevated VOC concentrations to levels similar to those in the surrounding aquifer, and in doing so minimize the impacts on downgradient water supply wells and currently unaffected portions of the aquifer. Based on the removal of VOCs by the GWTP and decreasing contaminant concentration trends observed in the recovery wells and several of the monitoring wells, progress toward these goals is apparent. Based on the concentrations in the groundwater wells, the GWTP should continue to be operated. In accordance with the O&M Manual, the groundwater sampling frequency for the eight monitoring wells has been reduced to semi-annually. Water levels for the 14 monitoring wells will continue to be monitored on a quarterly basis.

5.0 REFERENCES

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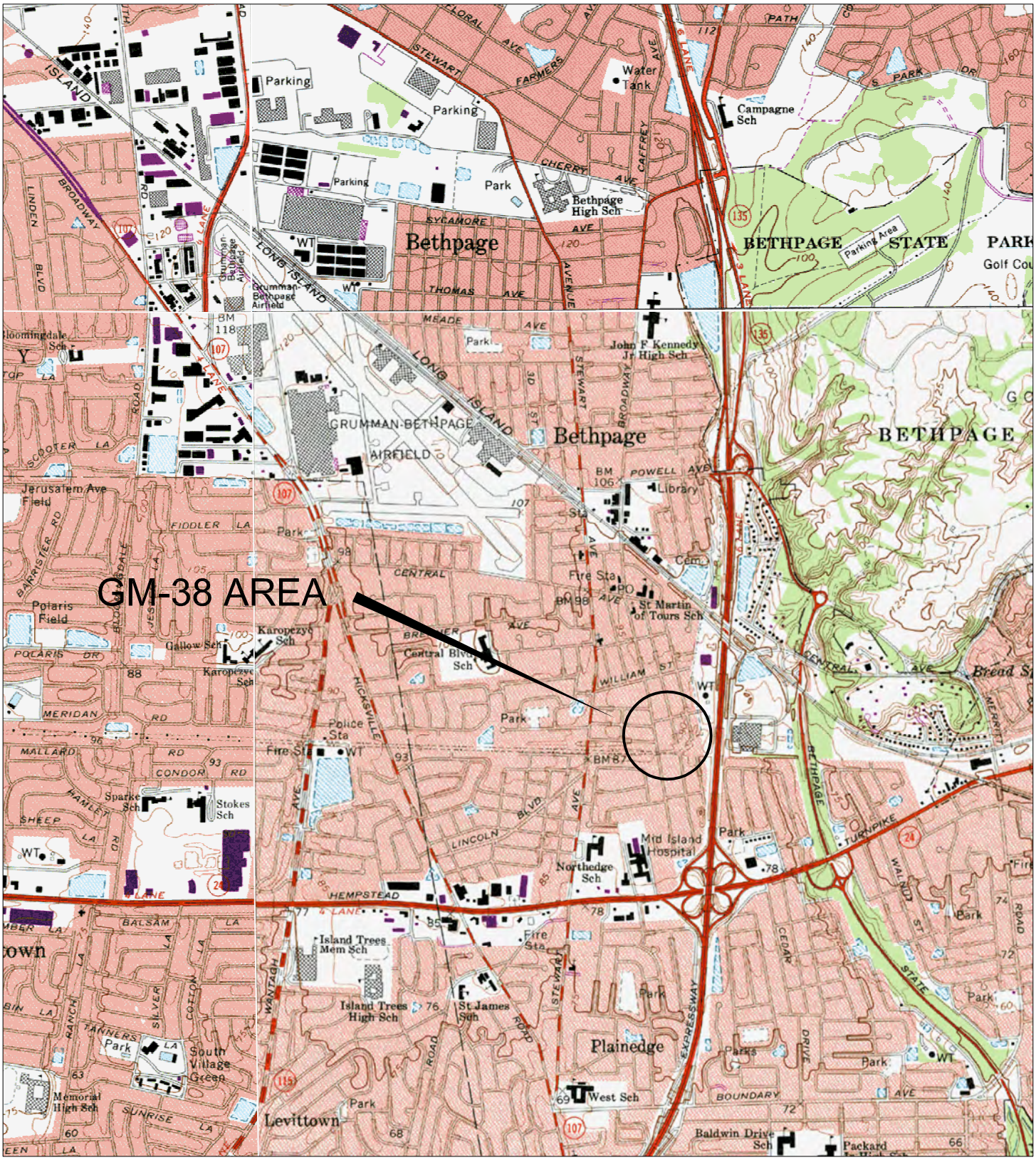
Tetra Tech EC, Inc. (TtEC). 2010a. *Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan)*, *UFP-SAP for Operations, Maintenance, and Monitoring of the Groundwater Treatment Plant, GM-38 Area, Naval Weapons Industrial Reserve Plant, Bethpage, New York.* September.

FIGURES



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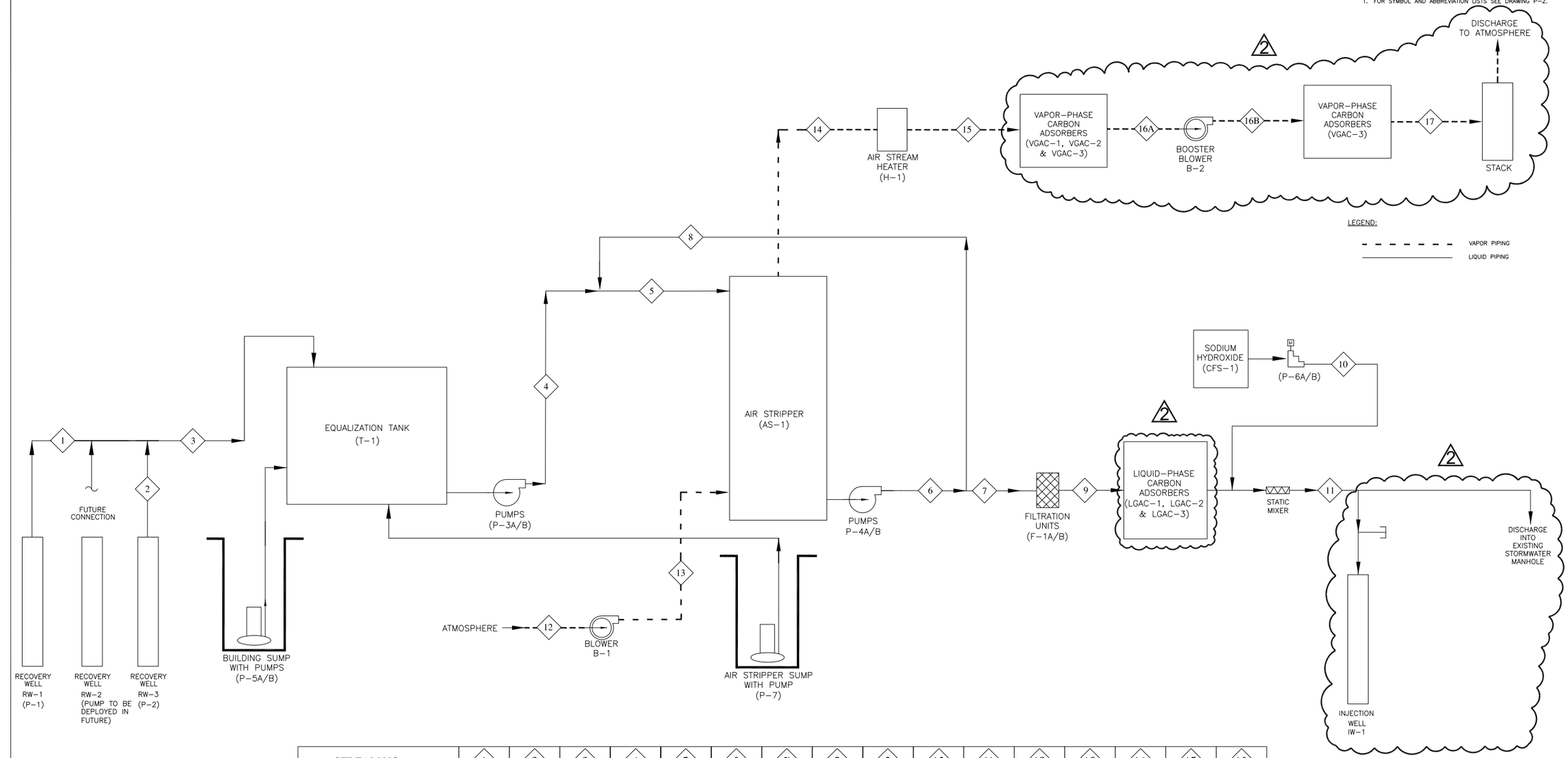
NOTES:

1. FOR SYMBOL AND ABBREVIATION LISTS SEE DRAWING P-2.



STREAM NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COMPOSITION (UG/L, UNLESS OTHERWISE NOTED)																
BENZENE	4	4	4	4	3	-	-	-	-		-					
TOLUENE	15	15	15	15	12	-	-	-	-		-					
XYLENES, TOTAL	16	16	16	16	12	-	-	-	-		-					
1,2-DICHLOROETHANE	3	3	3	3	2.8						2.7 E-07					
cis 1,2-DICHLOROETHENE	1100	1100	1100	1100	1008	0.10	0.10	0.10	0.10		1.0 E-04					
VINYL CHLORIDE	300	300	300	300	275	0.03	0.03	0.03	0.03		2.7 E-05					
TETRACHLOROETHENE (PCE)	900	900	900	900	825	0.08	0.08	0.08	0.08		8.2 E-05					
TRICHLOROETHENE (TCE)	3400	3400	3400	3400	3117	3.12	3.12	3.12	3.12		3.1 E-03					
WATER FLOW RATE (GPM)	800	300	1100	1100	1200	1200	1100	100	1100	1.1 gpd	1100					
TEMPERATURE (°F)	55	55	55	55	55	55	55	55	55	60	55					
PRESSURE (PSIG)												-0.27	1.50	1.36	1.18	0.53
DENSITY (lb/ft^3)										95.5		0.077	0.085	0.084	0.082	0.079
MASS FLOW RATE (lb/hr)	400364	150136	550500	550500	600545	600545	550500	50,045	550500	0.59	550500	36,960	40,800	40,320	39,360	37,920
RELATIVE HUMIDITY (%)												50	50	100	50	50
STATIC PRESSURE (PSIA)												0.214	0.214	0.214	0.275	0.275
pH (S.U.)	5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	14	7.0					
VAPOR FLOW RATE (CFM)												8000	8000	8000	8000	8000
TOTAL VAPOR VOC (PPMV)												-	-	25.5	25.5	1.2
TOTAL VAPOR VOC (LBS/HR)												-	-	3.18	3.18	0.15

TETRA TECH ENGINEERING CORPORATION PC

REV	DESCRIPTION	PREP BY	DATE	APPRVD
0	FINAL DESIGN	DL	05/05/06	BKB
1	ADDED RECOVERY WELL RW-3 CHANGED RW-2 TO FUTURE CONNECTION	DLB	03/31/08	BKB
2	REVISED BASED ON VENDOR SUBMITTALS. DRAWING UPDATES FOR CONSTRUCTION	DLB	02/24/09	BKB

DSGN: DR: CHK:
SCHD: CH ENG: (TITLE)
SUBMITTED BY: (PRIN MEMBER) (DATE)
NORTHDIV DIV: HO: RO: FPC: DIR:
OFFICER IN CHARGE
APPROVED
DATE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANTDIV
NAVAL FACILITIES ENGINEERING COMMAND NORTHEAST
LESTER, PENNSYLVANIA
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

ENGINEERING FIELD ACTIVITY - NORTHEAST

GM-38 AREA
GROUNDWATER TREATMENT PLANT
PROCESS FLOW DIAGRAM - GROUNDWATER AND OFF-GAS TREATMENT

EFANE FOR COMMANDER, NAVFAC
DATE
APPROVED

THIS DRAWING PRODUCED ON AUTOCAD
DO NOT REVISE MANUALLY

SAT TO DATE 05/05/06
CODE I.D. NO. 80091
SCALE : AS SHOWN
SPEC. NO.
CONSTRN. CONTR. NO. N62472-99-D-0032
NAVFAC DRAWING NO. Figure 2
SHEET OF
SIZE: D
DIS. SH. NO. 1-4

Legend

- Monitoring Well (Monitored by Navy)
- Monitoring Well (Monitored by Northrop Grumman)
- Recovery Well
- Injection Well

SOPHIA STREET
NORTH WINDHORST
NORTH HERMAN AVENUE
LEROY AVENUE
ARTHUR AVENUE
MAIN STREET (BROADWAY)
SOUTH WINDHORST
SOUTH HERMAN AVENUE
WILSON LANE
(SEAFORD-OYSTER BAY EXPRESSWAY - RTE 135)
RECHARGE BASIN
GROUNDWATER TREATMENT PLANT

RW3-MW-4
RW3-MW-3
RW3-MW-1
RW3-MW-2
RW-3
GM-38D
GM-38D-2
RW2-MW-1
RW2-MW-2
RW2-MW-3
RW-2
TP-1
RW1-MW-3
RW1-MW-2
RW1-MW-1
RW-1
IW-1
IW1-MW-1

0 160
APPROXIMATE SCALE IN FEET

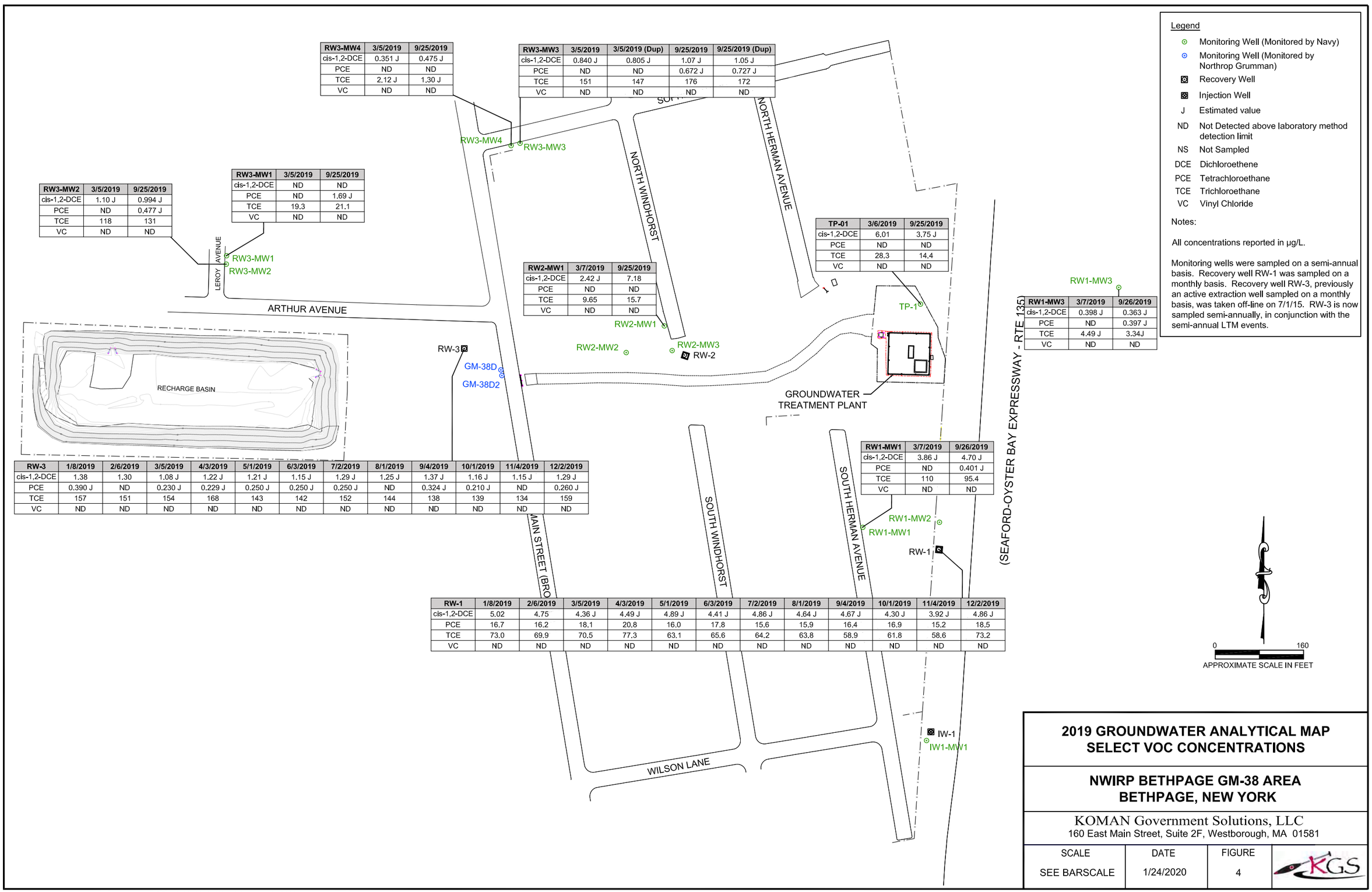
SITE MAP

NWIRP BETHPAGE GM-38 AREA
BETHPAGE, NEW YORK

KOMAN Government Solutions, LLC
180 Gordon Drive, Suite 110, Exton, PA 19341

SCALE	DATE	FIGURE
SEE BARSCALE	01/15/2018	3

X:\HS_Environmental\Bethpage-GM38\As-Built-PM.dwg 4/26/2016



RW3-MW4	3/5/2019	9/25/2019
cis-1,2-DCE	0.351 J	0.475 J
PCE	ND	ND
TCE	2.12 J	1.30 J
VC	ND	ND

RW3-MW3	3/5/2019	3/5/2019 (Dup)	9/25/2019	9/25/2019 (Dup)
cis-1,2-DCE	0.840 J	0.805 J	1.07 J	1.05 J
PCE	ND	ND	0.672 J	0.727 J
TCE	151	147	176	172
VC	ND	ND	ND	ND

RW3-MW2	3/5/2019	9/25/2019
cis-1,2-DCE	1.10 J	0.994 J
PCE	ND	0.477 J
TCE	118	131
VC	ND	ND

RW3-MW1	3/5/2019	9/25/2019
cis-1,2-DCE	ND	ND
PCE	ND	1.69 J
TCE	19.3	21.1
VC	ND	ND

RW2-MW1	3/7/2019	9/25/2019
cis-1,2-DCE	2.42 J	7.18
PCE	ND	ND
TCE	9.65	15.7
VC	ND	ND

TP-01	3/6/2019	9/25/2019
cis-1,2-DCE	6.01	3.75 J
PCE	ND	ND
TCE	28.3	14.4
VC	ND	ND

RW1-MW3	3/7/2019	9/26/2019
cis-1,2-DCE	0.398 J	0.363 J
PCE	ND	0.397 J
TCE	4.49 J	3.34J
VC	ND	ND

RW1-MW1	3/7/2019	9/26/2019
cis-1,2-DCE	3.86 J	4.70 J
PCE	ND	0.401 J
TCE	110	95.4
VC	ND	ND

RW-3	1/8/2019	2/6/2019	3/5/2019	4/3/2019	5/1/2019	6/3/2019	7/2/2019	8/1/2019	9/4/2019	10/1/2019	11/4/2019	12/2/2019
cis-1,2-DCE	1.38	1.30	1.08 J	1.22 J	1.21 J	1.15 J	1.29 J	1.25 J	1.37 J	1.16 J	1.15 J	1.29 J
PCE	0.390 J	ND	0.230 J	0.229 J	0.250 J	0.250 J	0.250 J	ND	0.324 J	0.210 J	ND	0.260 J
TCE	157	151	154	168	143	142	152	144	138	139	134	159
VC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

RW-1	1/8/2019	2/6/2019	3/5/2019	4/3/2019	5/1/2019	6/3/2019	7/2/2019	8/1/2019	9/4/2019	10/1/2019	11/4/2019	12/2/2019
cis-1,2-DCE	5.02	4.75	4.36 J	4.49 J	4.89 J	4.41 J	4.86 J	4.64 J	4.67 J	4.30 J	3.92 J	4.86 J
PCE	16.7	16.2	18.1	20.8	16.0	17.8	15.6	15.9	16.4	16.9	15.2	18.5
TCE	73.0	69.9	70.5	77.3	63.1	65.6	64.2	63.8	58.9	61.8	58.6	73.2
VC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend

- Monitoring Well (Monitored by Navy)
- Monitoring Well (Monitored by Northrop Grumman)
- Recovery Well
- Injection Well
- J — Estimated value
- ND — Not Detected above laboratory method detection limit
- NS — Not Sampled
- DCE — Dichloroethene
- PCE — Tetrachloroethane
- TCE — Trichloroethane
- VC — Vinyl Chloride

Notes:

All concentrations reported in µg/L.

Monitoring wells were sampled on a semi-annual basis. Recovery well RW-1 was sampled on a monthly basis. Recovery well RW-3, previously an active extraction well sampled on a monthly basis, was taken off-line on 7/1/15. RW-3 is now sampled semi-annually, in conjunction with the semi-annual LTM events.

2019 GROUNDWATER ANALYTICAL MAP SELECT VOC CONCENTRATIONS

NWIRP BETHPAGE GM-38 AREA BETHPAGE, NEW YORK

KOMAN Government Solutions, LLC
160 East Main Street, Suite 2F, Westborough, MA 01581

SCALE	DATE	FIGURE
SEE BARSCALE	1/24/2020	4

X:\HS_Environmental\Bethpage-GM38\2020\BP_GM38_2019-GW-VOC.dwg 1/24/2020

Figure 5
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW1

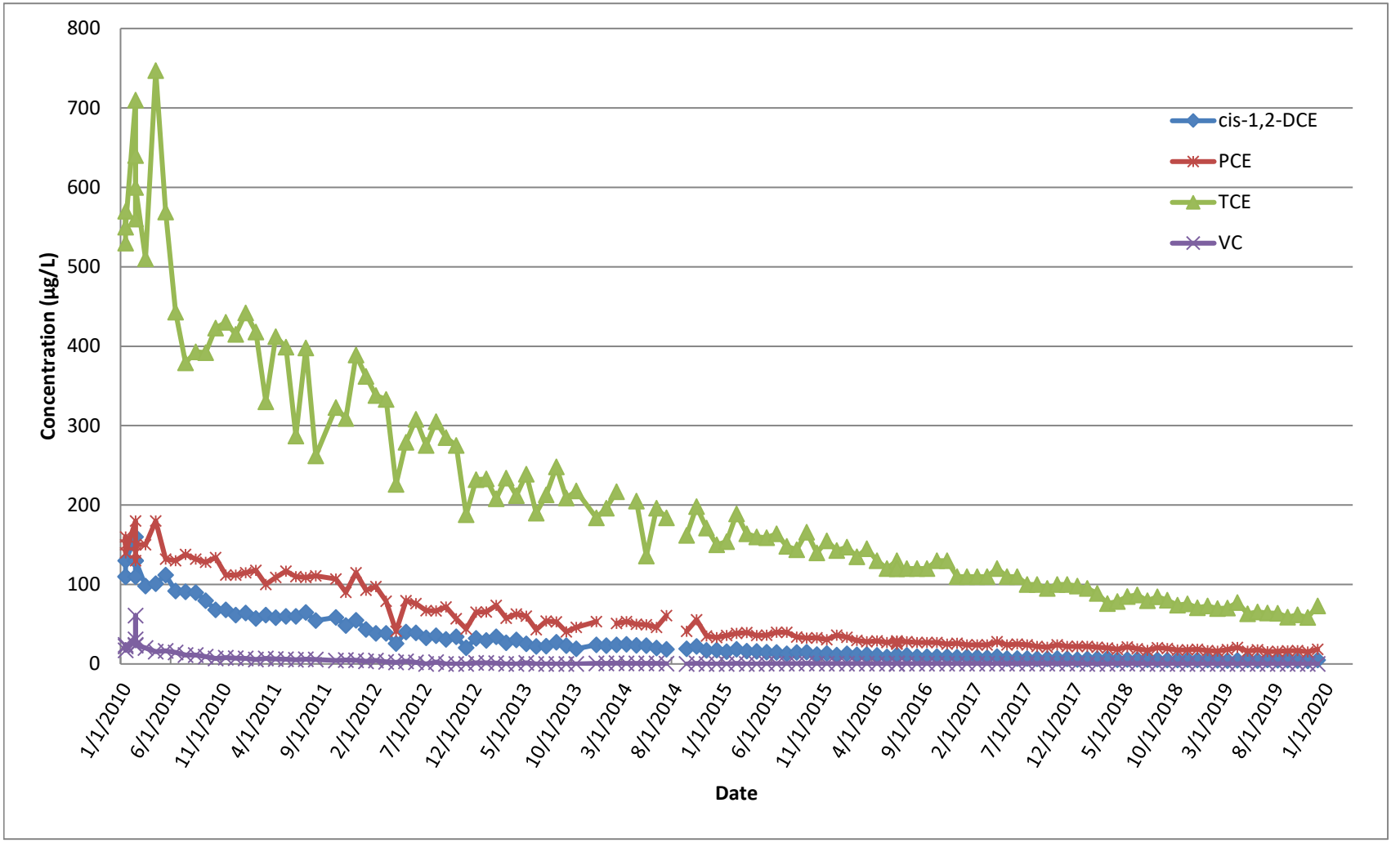


Figure 6a
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW3

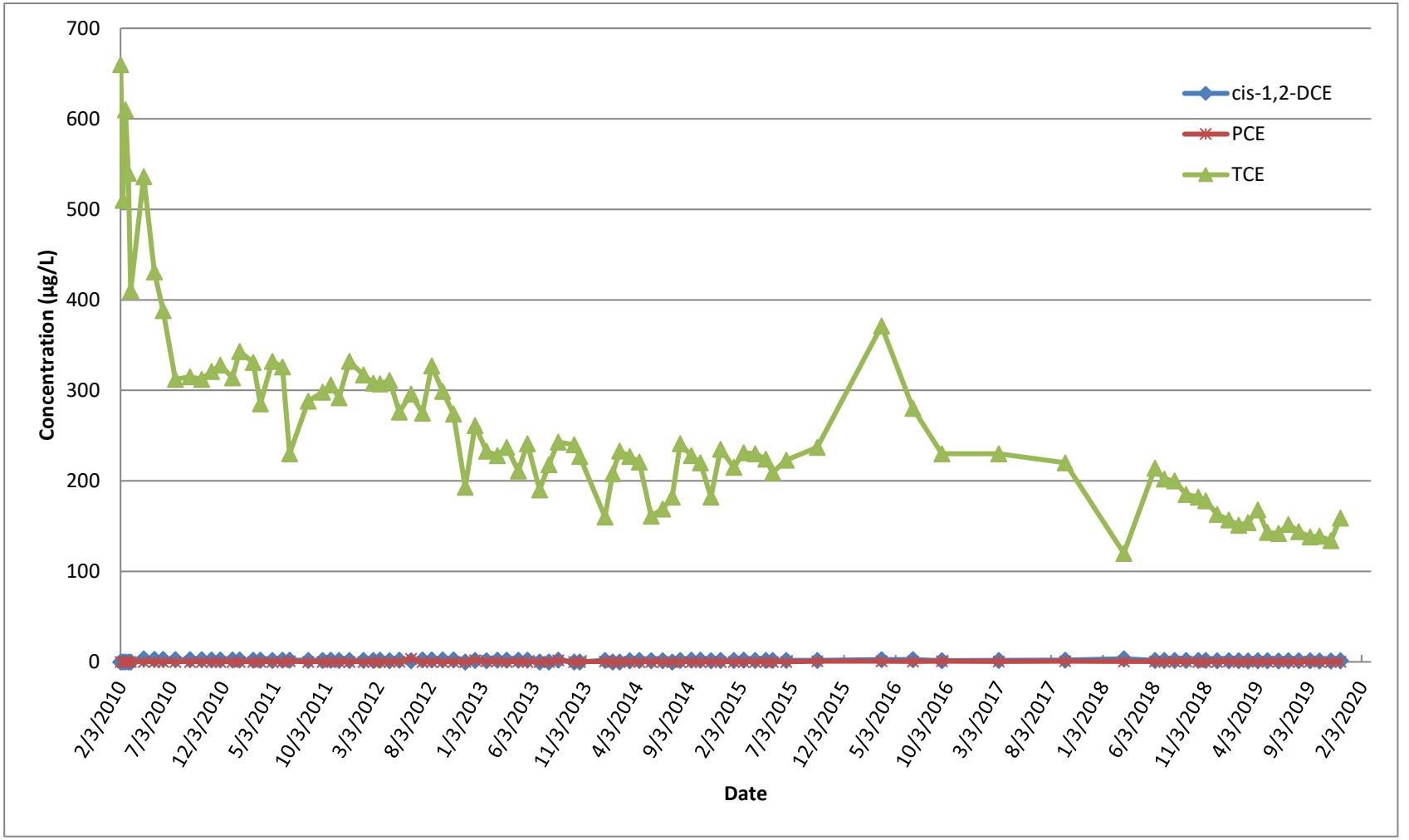


Figure 6b
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW3

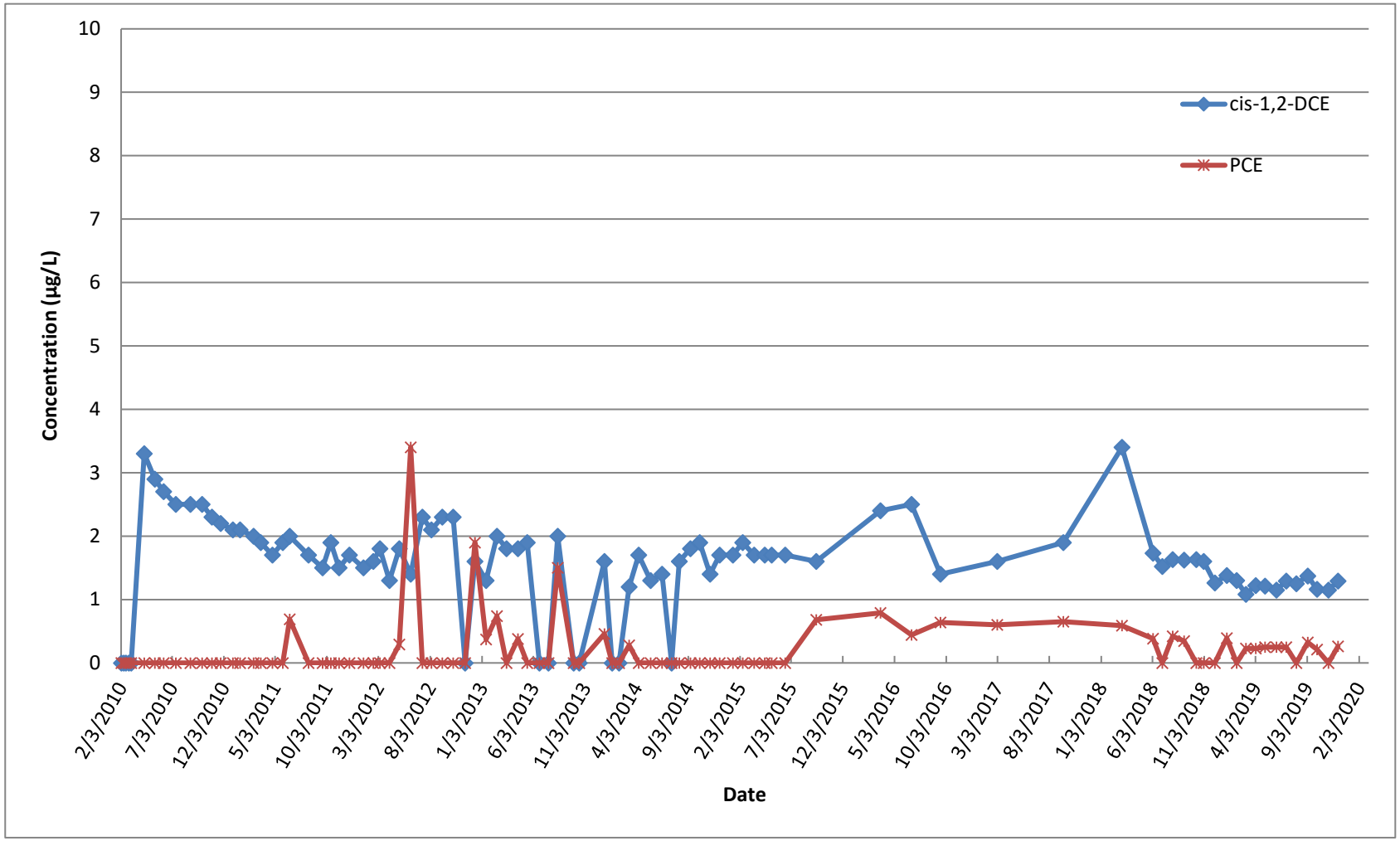


Figure 7
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW1-MW1

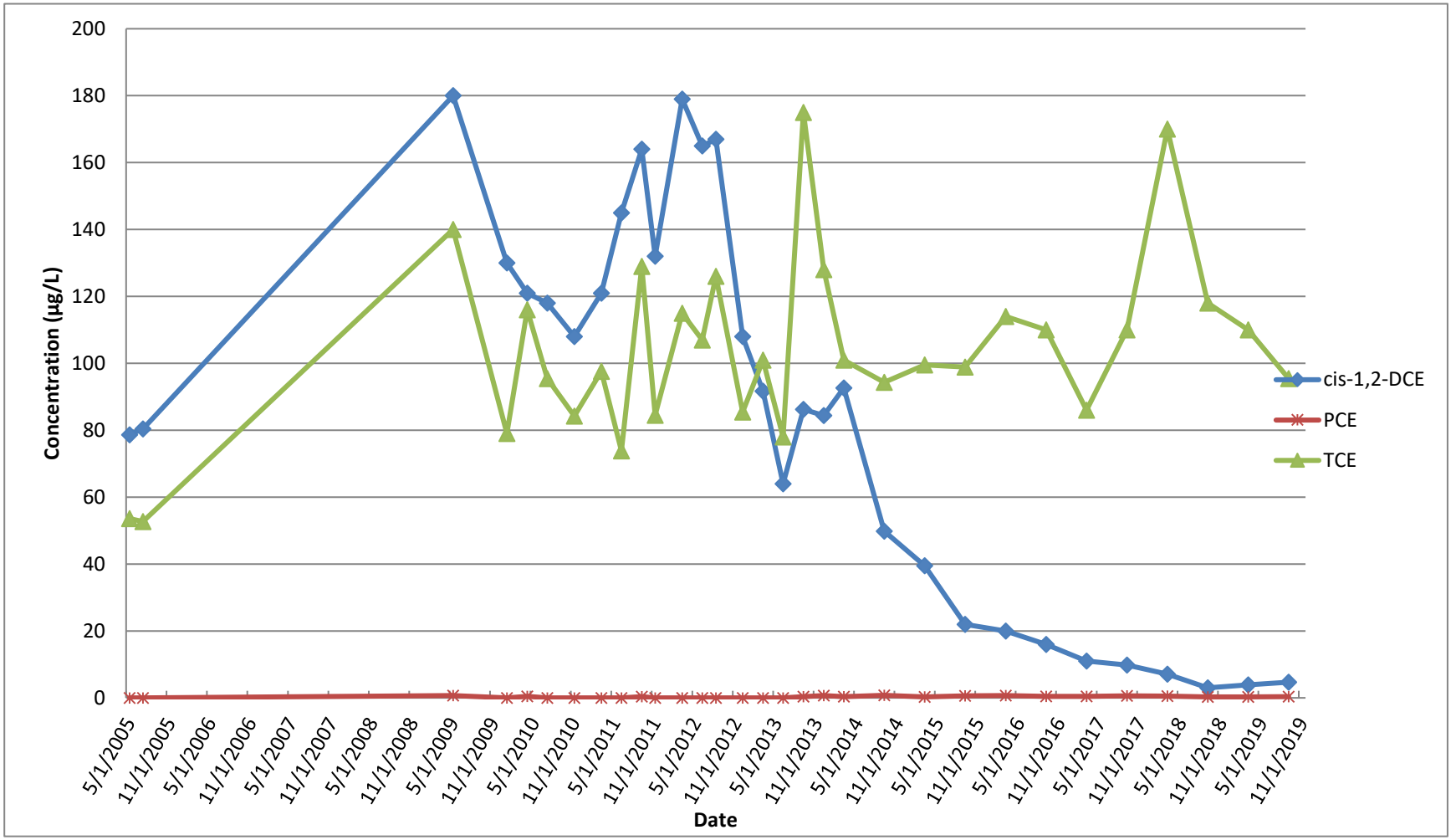


Figure 8
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW1-MW3

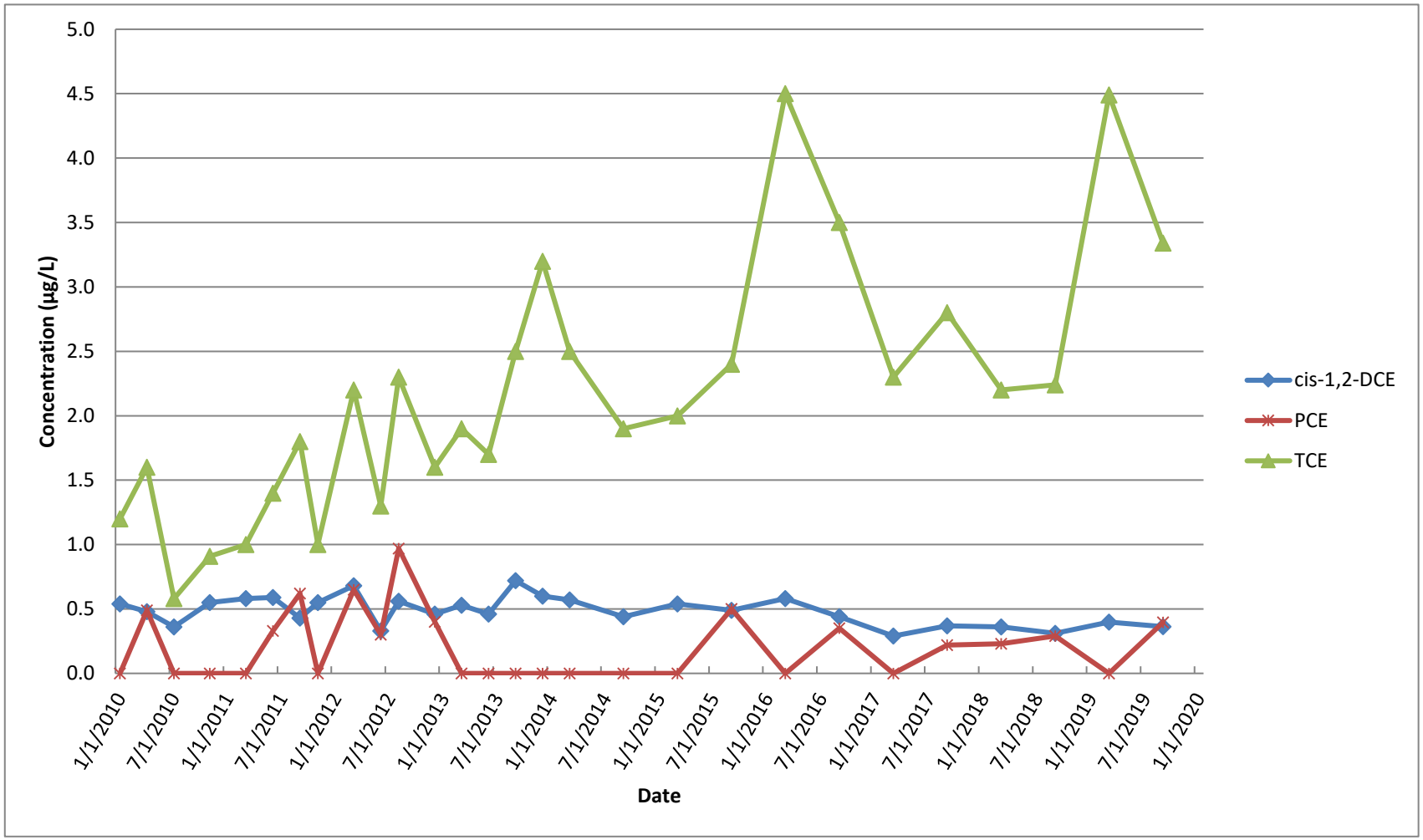


Figure 9
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW2-MW1

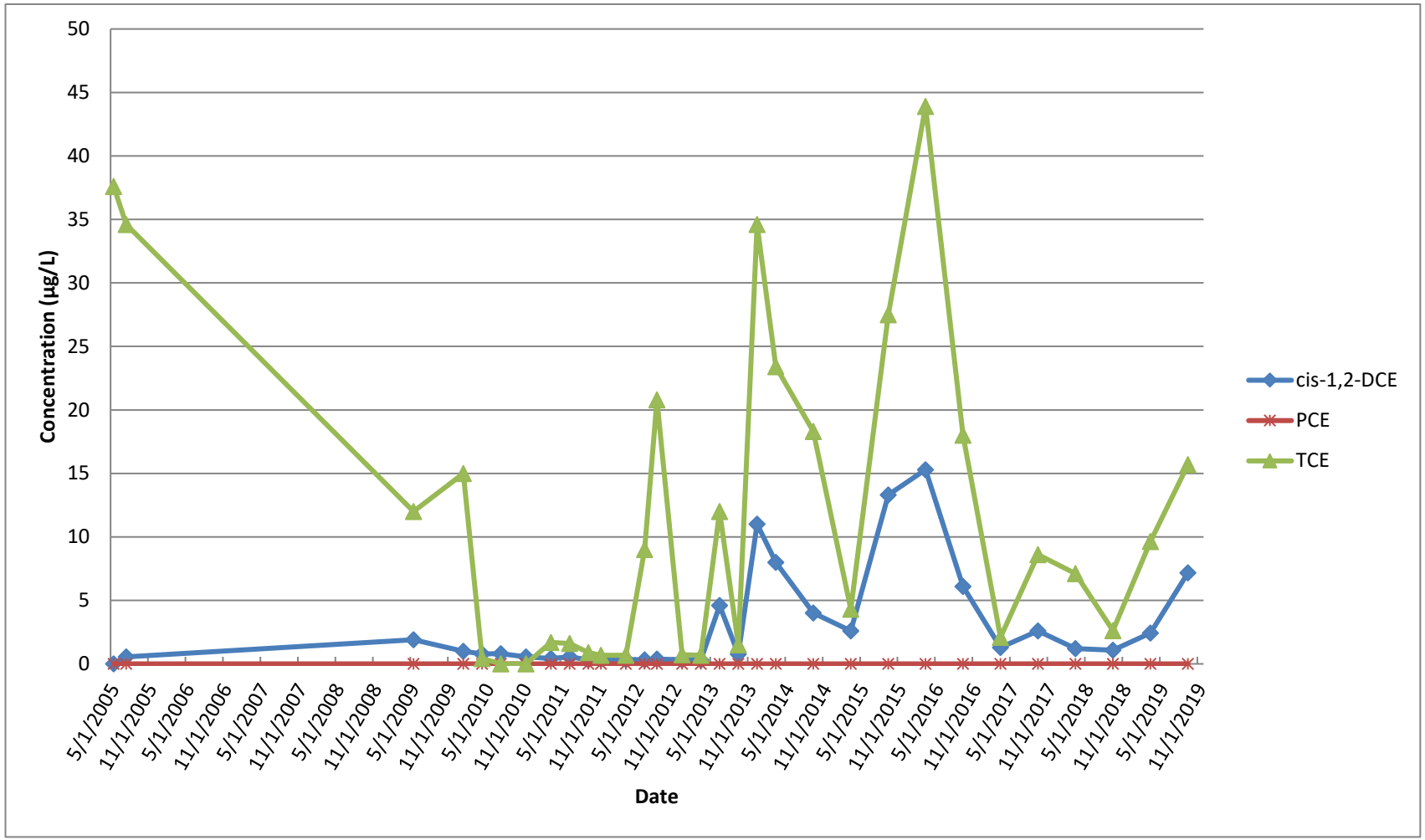


Figure 10
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW3-MW1

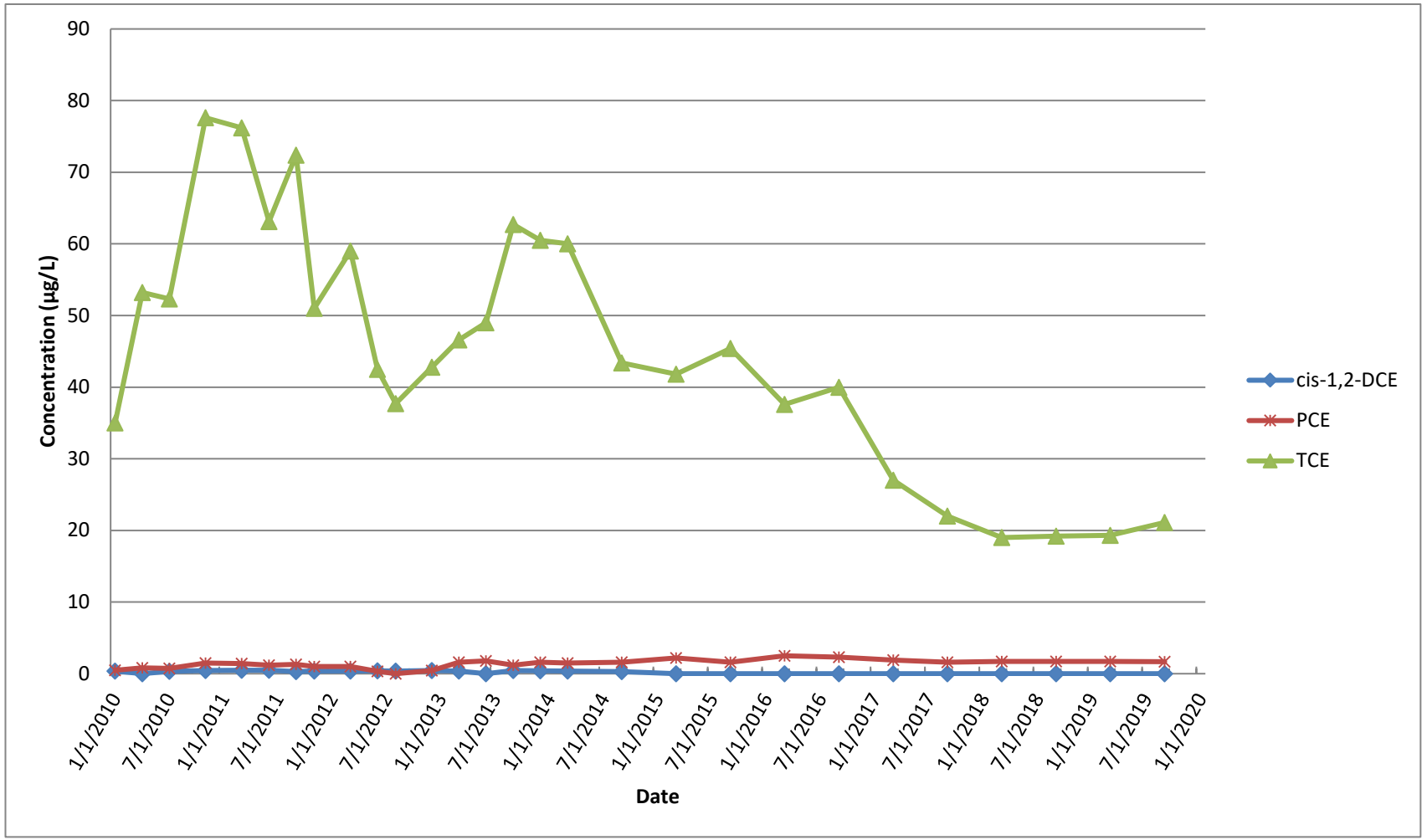


Figure 11
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW3-MW2

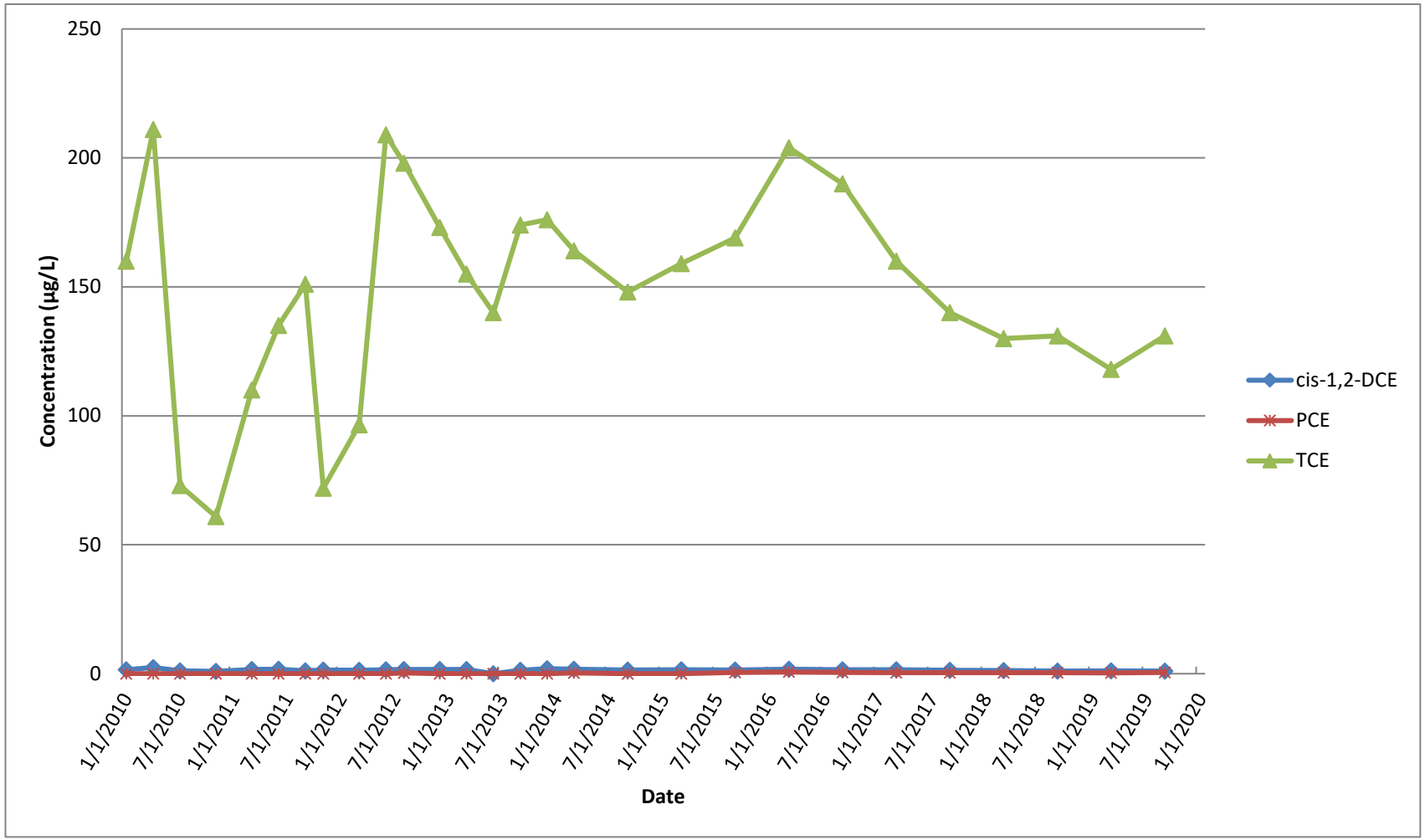


Figure 12
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW3-MW3

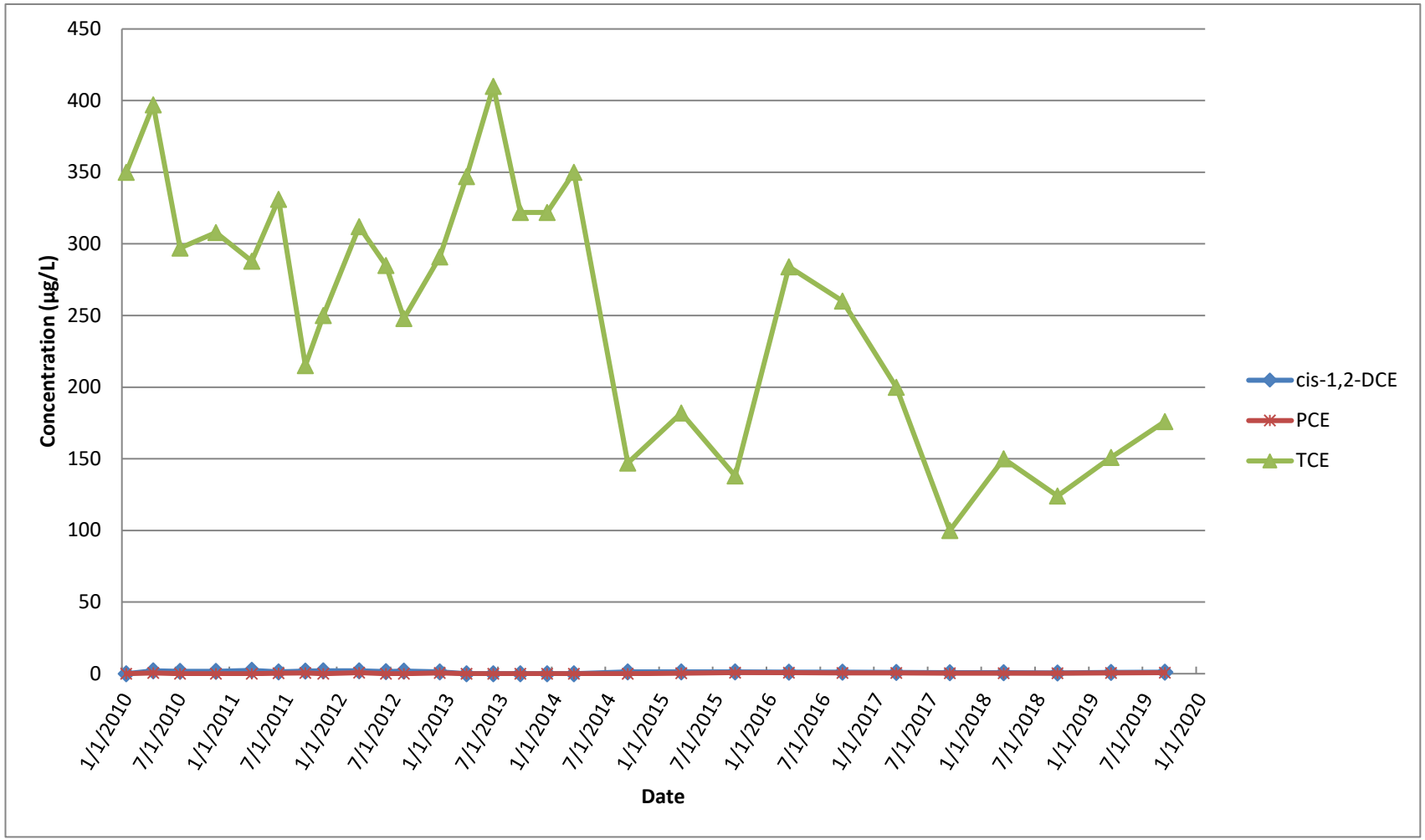


Figure 13
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

RW3-MW4

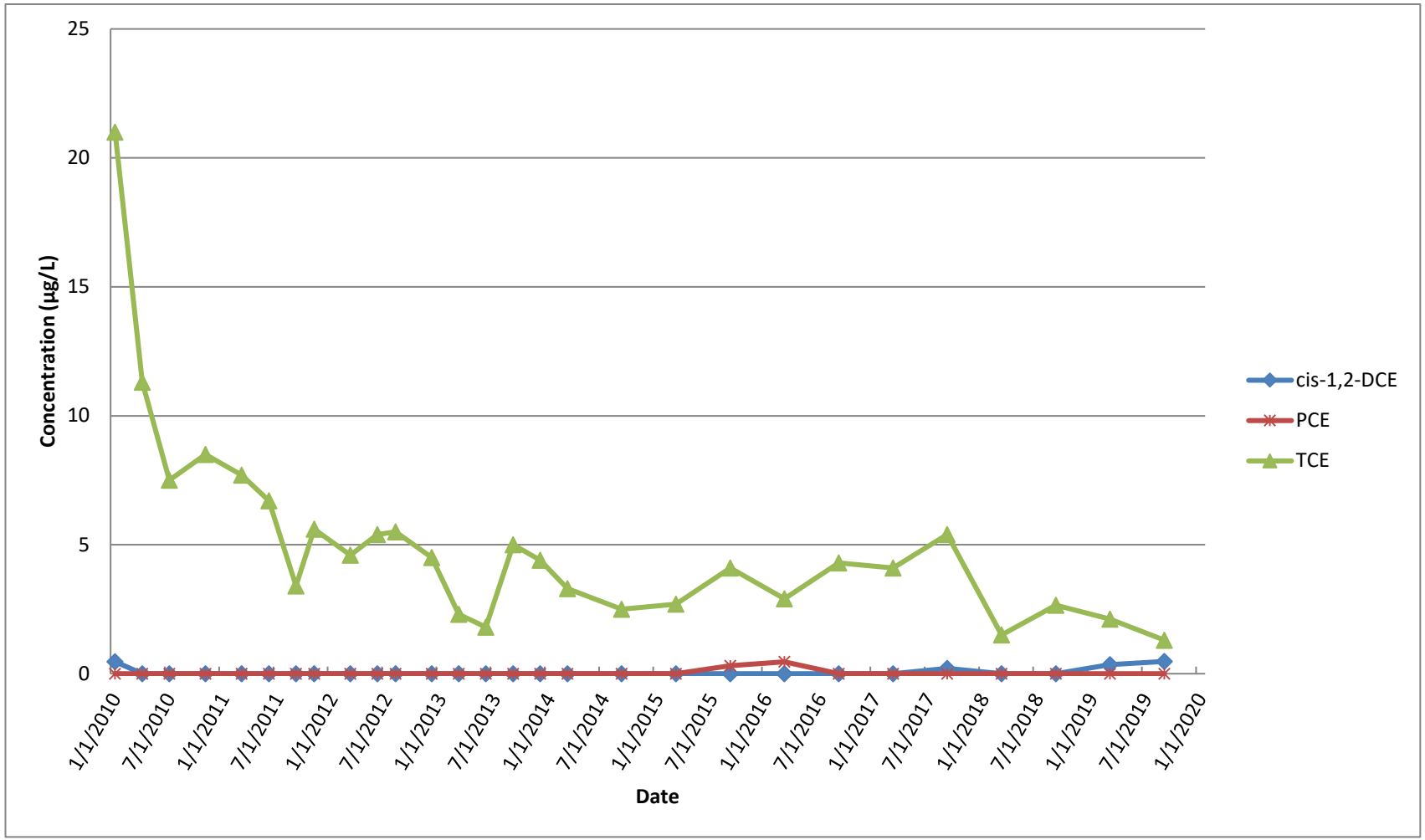
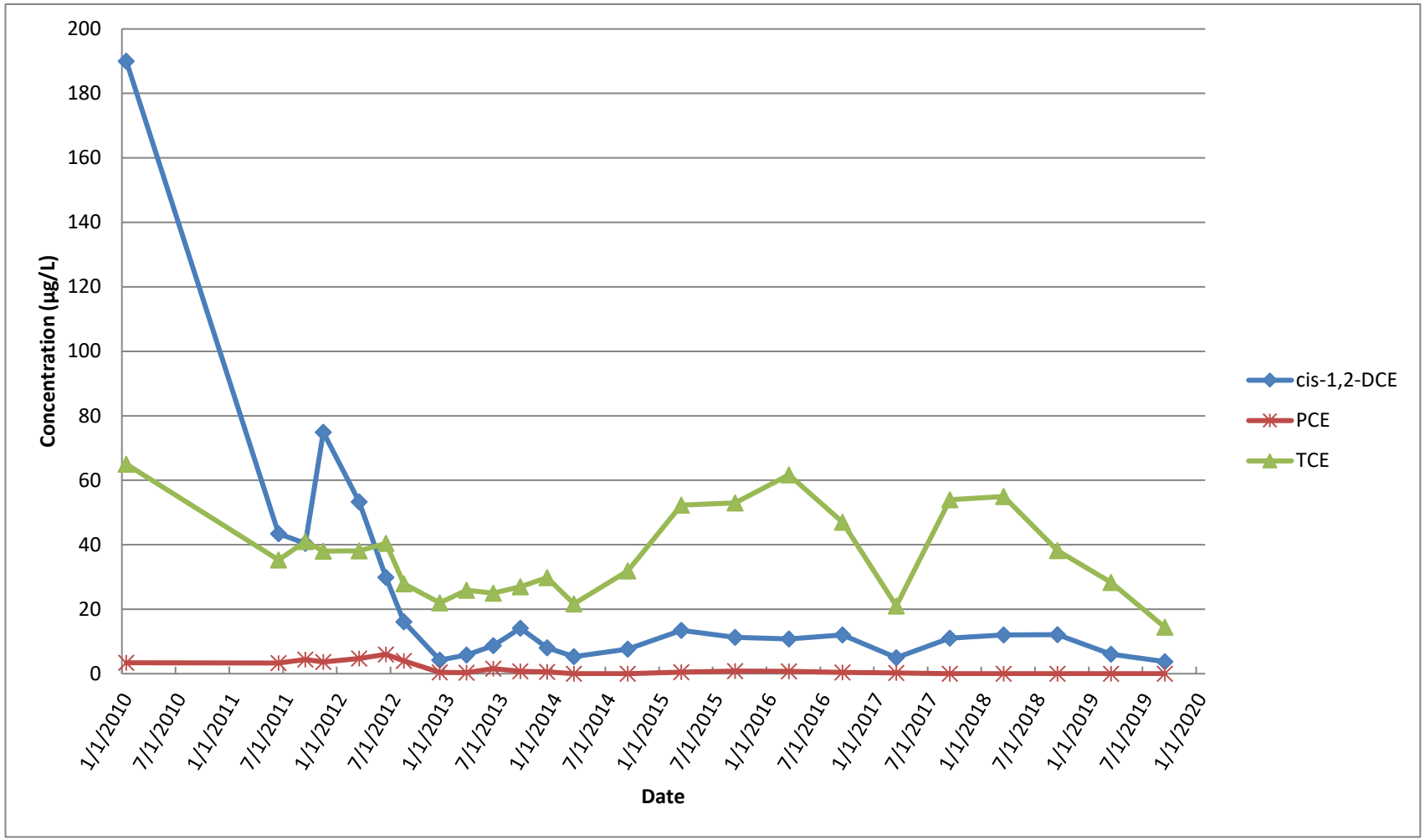


Figure 14
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs

TP-01



TABLES

Table 1
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Discharge Monitoring Results
Fourth Quarter 2019

SPDES Parameters	Daily Maximum Goal	Units	October 2019									
Process Stream			RW-1	RW-3	Combined Influent	Treated Effluent	Treated Effluent DUPLICATE	Air Stripper Effluent (ASE)	Bag Filter Effluent (BFE)	Liquid Carbon 1 Effluent (LC1)	Liquid Carbon 2 Effluent (LC2)	Liquid Carbon 3 Effluent (LC3)
Well Depth		ft	445	530	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Screened Interval		ft	335-395 410-430	392-412 442-504	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Date			10/1/2019 [2]									
Average Flowrate	1100	GPM	636	169	805	856	NR	NR	814	NR	NR	NR
Total Flow		gallons	28,409,000	7,543,700	35,952,700	38,208,800	NR	NR	36,348,700	NR	NR	NR
pH	5.5 - 8.5	SU	5.14	5.43	5.20	6.43	6.44	6.38	6.40	6.42	6.43	6.43
Chloroform	NA	µg/L	0.347 J	0.356 J	0.35 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.27 J	2.01 J	1.43 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.676 J	0.944 J	0.732 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	4.30 J	1.16 J	3.64 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	16.9	0.210 J	13.40	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.410 J	0.540 J	0.437 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	5	µg/L	61.8	139	78.0	0.270 J	0.277 J	0.964 J	0.782 J	ND (1.0)	ND (1.0)	ND (1.0)
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	0.617 J	0.13 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.4	6.2	3.2	NS	NS	NS	NS	NS	NS	NS
Mercury	0.00025	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	NA	mg/L	ND (1.0)	1.0	0.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

Table 1
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Discharge Monitoring Results
Fourth Quarter 2019

SPDES Parameters	Daily Maximum Goal	Units	November 2019									
Process Stream			RW-1	RW-3	Combined Influent	Treated Effluent	Treated Effluent DUPLICATE	Air Stripper Effluent (ASE)	Bag Filter Effluent (BFE)	Liquid Carbon 1 Effluent (LC1)	Liquid Carbon 2 Effluent (LC2)	Liquid Carbon 3 Effluent (LC3)
Well Depth		ft	445	530	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Screened Interval		ft	335-395 410-430	392-412 442-504	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Date			11/4/2019 [3]									
Average Flowrate	1100	GPM	613	161	775	821	NR	NR	786	NR	NR	NR
Total Flow		gallons	26,494,234	6,965,796	33,460,030	35,459,550	NR	NR	33,976,110	NR	NR	NR
pH	5.5 - 8.5	SU	5.09	5.35	5.14	6.12	6.11	5.91	5.94	6.04	6.06	6.02
Chloroform	NA	µg/L	0.257 J	0.295 J	0.26 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.27 J	2.08 J	1.44 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.687 J	0.954 J	0.743 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	3.92 J	1.15 J	3.34 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	15.2	ND (1.0)	12.04	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.459 J	0.482 J	0.464 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	5	µg/L	58.6	134	74.3	0.226 J	0.213 J	0.817 J	0.770 J	ND (1.0)	ND (1.0)	ND (1.0)
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	0.570 J	0.12 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.6	6.1	3.3	NS	NS	NS	NS	NS	NS	NS
Mercury	0.00025	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	NA	mg/L	ND (1.0)	7.3	1.5	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

Table 1
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Discharge Monitoring Results
Fourth Quarter 2019

SPDES Parameters	Daily Maximum Goal	Units	December 2019									
Process Stream			RW-1	RW-3	Combined Influent	Treated Effluent	Treated Effluent DUPLICATE	Air Stripper Effluent (ASE)	Bag Filter Effluent (BFE)	Liquid Carbon 1 Effluent (LC1)	Liquid Carbon 2 Effluent (LC2)	Liquid Carbon 3 Effluent (LC3)
Well Depth		ft	445	530	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Screened Interval		ft	335-395 410-430	392-412 442-504	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Date			12/2/19									
Average Flowrate	1100	GPM	616	159.5	776	832	NR	NR	785	NR	NR	NR
Total Flow		gallons	27,514,266	7,121,604	34,635,870	37,137,950	NR	NR	35,023,590	NR	NR	NR
pH	5.5 - 8.5	SU	5.04	5.37	5.11	6.45	6.44	6.37	6.39	6.40	6.42	6.44
Chloroform	NA	µg/L	0.300 J	0.320 J	0.30 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.34 J	2.50 J	1.58 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.920 J	1.22 J	0.982 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	4.86 J	1.29 J	4.13 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	18.5	0.260 J	14.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.550 J	0.590 J	0.558 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	5	µg/L	73.2	159	90.8	ND (1.0)	0.300 J	1.11 J	1.17 J	ND (1.0)	0.220 J	ND (1.0)
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	0.650 J	0.13 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.2	5.4	2.9	NS	NS	NS	NS	NS	NS	NS
Mercury	0.00025	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	NA	mg/L	ND (1.0)	8.4	1.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

Notes:
J - Estimated result between laboratory method detection limit and reporting limit
NA - Not Applicable
ND - Not detected above laboratory method detection limit. Limit of detection (LOD) given in parentheses.
NR - Not Recorded
gpm - gallons per minute

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.
(2) 1,4-Dioxane was collected on 7 October 2019.
(3) pH reading for well RW-3 was collected on 18 November 2019.

Table 2
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
2019 Annual Flow Summary

Monthly Flow Totals		
Month	**Total GWTP Influent Flow (gal)**	**Total GWTP Effluent Flow (gal)**
Jan-19	37,299,300	39,585,100
Feb-19	33,549,100	35,553,500
Mar-19	35,195,966	37,299,439
Apr-19	35,447,734	37,628,461
May-19	36,845,000	39,069,200
Jun-19	36,670,454	38,359,733
Jul-19	35,452,746	38,303,667
Aug-19	35,837,267	37,880,288
Sep-19	34,783,733	37,250,313
Oct-19	35,952,700	38,208,800
Nov-19	33,460,030	35,459,550
Dec-19	34,635,870	37,137,950
Annual Flow Summary		
	GWTP Influent	**GWTP Effluent**
2019 Total (gal)	425,129,900	451,736,001
2019 Monthly Average (gal)	35,427,492	37,644,667
2019 Effective Flowrate (gpm)	809	859
2019 Average Flowrate (gpm)	817	869

Notes:
gpm = gallons per minute
Effective Flowrate = total flow volume (gal) / total time period (min)
Average Flowrate = total flow volume (gal) / total system run time (min)

Table 3
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
2019 Mass Removal Summary

	Total Flow (gal)			CCl_4			1,1-DCA			1,2-DCA			1,1-DCE			cis-1,2-DCE		
Month	GWTP Effluent	GWTP Influent	2019 Cumulative Influent	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)
Jan-19	39,585,100	37,299,300	37,299,300	0.00	0.0000	0.0000	1.48	0.4606	0.4606	0.181	0.0563	0.0563	0.930	0.2895	0.2895	4.24	1.3197	1.3197
Feb-19	35,553,500	33,549,100	70,848,400	0.00	0.0000	0.0000	1.47	0.4115	0.8722	0.000	0.0000	0.0563	0.830	0.2324	0.5218	4.30	1.2038	2.5235
Mar-19	37,299,439	35,195,966	106,044,366	0.00	0.0000	0.0000	1.37	0.4024	1.2745	0.170	0.0499	0.1063	0.760	0.2232	0.7450	3.68	1.0808	3.6042
Apr-19	37,628,461	35,447,734	141,492,100	0.00	0.0000	0.0000	1.25	0.3697	1.6443	0.000	0.0000	0.1063	0.899	0.2659	1.0109	3.80	1.1240	4.7283
May-19	39,069,200	36,845,000	178,337,100	0.00	0.0000	0.0000	1.59	0.4888	2.1331	0.000	0.0000	0.1063	0.927	0.2850	1.2959	4.14	1.2729	6.0011
Jun-19	38,359,733	36,670,454	215,007,554	0.00	0.0000	0.0000	1.55	0.4743	2.6074	0.170	0.0520	0.1583	0.864	0.2644	1.5603	3.68	1.1261	7.1272
Jul-19	38,303,667	35,452,746	250,460,300	0.00	0.0000	0.0000	1.57	0.4645	3.0719	0.216	0.0639	0.2222	0.930	0.2751	1.8355	4.14	1.2248	8.3519
Aug-19	37,880,288	35,837,267	286,297,567	0.00	0.0000	0.0000	1.50	0.4486	3.5204	0.166	0.0496	0.2718	0.900	0.2691	2.1046	3.93	1.1752	9.5272
Sep-19	37,250,313	34,783,733	321,081,300	0.00	0.0000	0.0000	1.74	0.5050	4.0255	0.000	0.0000	0.2718	0.967	0.2807	2.3853	4.00	1.1610	10.6882
Oct-19	38,208,800	35,952,700	357,034,000	0.00	0.0000	0.0000	1.43	0.4290	4.4545	0.000	0.0000	0.2718	0.732	0.2196	2.6049	3.64	1.0920	11.7802
Nov-19	35,459,550	33,460,030	390,494,030	0.00	0.0000	0.0000	1.44	0.4021	4.8565	0.000	0.0000	0.2718	0.743	0.2075	2.8123	3.34	0.9326	12.7128
Dec-19	37,137,950	34,635,870	425,129,900	0.00	0.0000	0.0000	1.58	0.4566	5.3132	0.000	0.0000	0.2718	0.982	0.2838	3.0961	4.13	1.1936	13.9064
2019 Totals	**451,736,001**	**425,129,900**			**0.0000**			**5.3132**			**0.2718**			**3.0961**			**13.9064**	

	Total Flow (gal)			trans-1,2-DCE			PCE			1,1,1-TCA			TCE			VC		
Month	GWTP Effluent	GWTP Influent	2019 Cumulative Influent	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2019 Cumulative Mass Removal (lb)
Jan-19	39,585,100	37,299,300	37,299,300	0.00	0.0000	0.0000	13.22	4.1146	4.1146	0.647	0.2014	0.2014	90.9	28.2920	28.2920	0.00	0.0000	0.0000
Feb-19	35,553,500	33,549,100	70,848,400	0.00	0.0000	0.0000	12.81	3.5862	7.7008	0.546	0.1529	0.3542	86.9	24.3277	52.6197	0.00	0.0000	0.0000
Mar-19	37,299,439	35,195,966	106,044,366	0.00	0.0000	0.0000	14.39	4.2262	11.9270	0.545	0.1601	0.5143	87.8	25.7862	78.4059	0.00	0.0000	0.0000
Apr-19	37,628,461	35,447,734	141,492,100	0.00	0.0000	0.0000	16.49	4.8776	16.8047	0.570	0.1686	0.6829	96.3	28.4849	106.8908	0.00	0.0000	0.0000
May-19	39,069,200	36,845,000	178,337,100	0.00	0.0000	0.0000	12.80	3.9354	20.7401	0.598	0.1839	0.8667	79.3	24.3810	131.2717	0.00	0.0000	0.0000
Jun-19	38,359,733	36,670,454	215,007,554	0.00	0.0000	0.0000	13.86	4.2411	24.9812	0.541	0.1655	1.0323	82.7	25.3059	156.5776	0.00	0.0000	0.0000
Jul-19	38,303,667	35,452,746	250,460,300	0.00	0.0000	0.0000	12.50	3.6979	28.6791	0.640	0.1893	1.2216	81.9	24.2289	180.8065	0.00	0.0000	0.0000
Aug-19	37,880,288	35,837,267	286,297,567	0.00	0.0000	0.0000	12.58	3.7620	32.4411	0.587	0.1755	1.3972	80.6	24.1029	204.9094	0.00	0.0000	0.0000
Sep-19	37,250,313	34,783,733	321,081,300	0.00	0.0000	0.0000	13.12	3.8081	36.2492	0.469	0.1361	1.5333	75.0	21.7689	226.6784	0.00	0.0000	0.0000
Oct-19	38,208,800	35,952,700	357,034,000	0.00	0.0000	0.0000	13.40	4.0201	40.2693	0.437	0.1311	1.6644	78.0	23.4005	250.0789	0.00	0.0000	0.0000
Nov-19	35,459,550	33,460,030	390,494,030	0.00	0.0000	0.0000	12.04	3.3616	43.6309	0.464	0.1296	1.7939	74.3	20.7451	270.8239	0.00	0.0000	0.0000
Dec-19	37,137,950	34,635,870	425,129,900	0.00	0.0000	0.0000	14.75	4.2630	47.8939	0.558	0.1613	1.9552	90.8	26.2429	297.0668	0.00	0.0000	0.0000
2019 Totals	**451,736,001**	**425,129,900**			**0.0000**			**47.8939**			**1.9552**			**297.0668**			**0.0000**	

2019 Cumulative Mass (VOCs) Removed (lbs) **369.50**

2019 Average Monthly Mass (VOCs) Removed (lbs) **30.79**

Notes:
CCl_4 = carbon tetrachloride
DCA = dichloroethane
TCA = trichloroethane
DCE = dichloroethene
TCE = trichloroethene
PCE = tetrachloroethene

Mass removal (lb) = Influent Concentration (ug/L) * Influent Flow (gal) * (2.20462 lb/kg) * (3.785 L/gal) * (10^9 ug/kg)

Table 4
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
Fourth Quarter 2019

DAR Parameters	Discharge Goal [3]	Units	October 2019				
Process Stream			Influent (VCI1)	Effluent	Effluent Duplicate	VC12	VC23
Sampling Date			10/1/19				
Average Flowrate		CFM	NR	9,079	NR	NR	NR
Total Flow [1]		ft^3	NR	405,270,608	NR	NR	NR
Total Flow [2]		m^3	NR	11,475,986	NR	NR	NR
1,2-Dichloroethane	NA	$\mu g/m^3$	ND	ND	ND	ND	ND
cis 1,2-Dichloroethene	≤ 100,000 [4]	$\mu g/m^3$	42	73	72	46	64
trans 1,2-Dichloroethene		$\mu g/m^3$	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)	≤ 100,000	$\mu g/m^3$	42	73	72	46	64
Toluene	N/A	$\mu g/m^3$	ND	ND	ND	ND	1.8 J
Total Xylene	N/A	$\mu g/m^3$	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	N/A	$\mu g/m^3$	ND	ND	ND	ND	ND
Trichloroethene	≤ 2600	$\mu g/m^3$	980	ND	ND	1100	98
Vinyl Chloride	≤ 560	$\mu g/m^3$	ND	ND	ND	ND	ND
Tetrachloroethene	≤ 5100	$\mu g/m^3$	150	ND	3.4 J	8	16

Notes:
NA - Not applicable
ND - Not detected
NR - Not recorded
NS - Not sampled
SGC - Short-term Guideline Concentration
$\mu g/m^3$ - micrograms per cubic meter
CFM - cubic feet per minute
DAR - Division of Air Rescources
(1) Total Flow (ft^3) = avg flowrate (cfm) * operational time (min)
(2) Total Flow (m^3) = total flow (ft^3) * $(0.3048^3)m^3/ft^3$
(3) Disharge goal approved by NYSDEC's letter dated 10/31/2013.
(4) Discharge goal is for total 1,2-Dichloroethene.

Table 4
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
Fourth Quarter 2019

DAR Parameters	Discharge Goal [3]	Units	November 2019				
Process Stream			Influent (VCI1)	Effluent	Effluent Duplicate	VC12	VC23
Sampling Date			11/4/19				
Average Flowrate		CFM	NR	9,070	NR	NR	NR
Total Flow [1]		ft^3	NR	391,828,943	NR	NR	NR
Total Flow [2]		m^3	NR	11,095,360	NR	NR	NR
1,2-Dichloroethane	NA	$\mu g/m^3$	1.9 J	ND	ND	ND	ND
cis 1,2-Dichloroethene	≤ 100,000 [4]	$\mu g/m^3$	48	63	63	48	71
trans 1,2-Dichloroethene		$\mu g/m^3$	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)	≤ 100,000	$\mu g/m^3$	48	63	63	48	71
Toluene	N/A	$\mu g/m^3$	ND	ND	ND	ND	ND
Total Xylene	N/A	$\mu g/m^3$	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	N/A	$\mu g/m^3$	ND	ND	ND	ND	ND
Trichloroethene	≤ 2600	$\mu g/m^3$	1200	ND	ND	1100	8.9
Vinyl Chloride	≤ 560	$\mu g/m^3$	ND	ND	ND	ND	ND
Tetrachloroethene	≤ 5100	$\mu g/m^3$	160	ND	ND	11	ND

Notes:
NA - Not applicable
ND - Not detected
NR - Not recorded
NS - Not sampled
SGC - Short-term Guideline Concentration
$\mu g/m^3$ - micrograms per cubic meter
CFM - cubic feet per minute
DAR - Division of Air Rescources
(1) Total Flow (ft^3) = avg flowrate (cfm) * operational time (min)
(2) Total Flow (m^3) = total flow (ft^3) * (0.3048^3)m^3/ft^3
(3) Disharge goal approved by NYSDEC's letter dated 10/31/2013.
(4) Discharge goal is for total 1,2-Dichloroethene.

Table 4
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
Fourth Quarter 2019

DAR Parameters	Discharge Goal [3]	Units	December 2019				
Process Stream			Influent (VCI1)	Effluent	Effluent Duplicate	VC12	VC23
Sampling Date			12/2/19				
Average Flowrate		CFM	NR	8,911	NR	NR	NR
Total Flow [1]		ft^3	NR	378,259,821	NR	NR	NR
Total Flow [2]		m^3	NR	10,711,125	NR	NR	NR
1,2-Dichloroethane	NA	$\mu g/m^3$	1.6 J	1.4 J	1.2 J	1.7 J	1.6 J
cis 1,2-Dichloroethene	≤ 100,000 [4]	$\mu g/m^3$	42	62	60	38	66
trans 1,2-Dichloroethene		$\mu g/m^3$	0.8 J	1.2 J	1.2 J	ND	1.5 J
1,2-Dichloroethene (total)	≤ 100,000	$\mu g/m^3$	43	64	61	38	68
Toluene	N/A	$\mu g/m^3$	0.35 J	ND	ND	ND	ND
Total Xylene	N/A	$\mu g/m^3$	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	N/A	$\mu g/m^3$	1.5 J	ND	ND	ND	ND
Trichloroethene	≤ 2600	$\mu g/m^3$	920	1.0 J	0.61 J	900	1.4 J
Vinyl Chloride	≤ 560	$\mu g/m^3$	ND	ND	ND	ND	ND
Tetrachloroethene	≤ 5100	$\mu g/m^3$	150	ND	ND	ND	1.0 J

Notes:
NA - Not applicable
ND - Not detected
NR - Not recorded
NS - Not sampled
SGC - Short-term Guideline Concentration
$\mu g/m^3$ - micrograms per cubic meter
CFM - cubic feet per minute
DAR - Division of Air Rescources
(1) Total Flow (ft^3) = avg flowrate (cfm) * operational time (min)
(2) Total Flow (m^3) = total flow (ft^3) * (0.3048^3)m^3/ft^3
(3) Disharge goal approved by NYSDEC's letter dated 10/31/2013.
(4) Discharge goal is for total 1,2-Dichloroethene.

Table 5
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Stack Emissions
Fourth Quarter 2019

DAR Parameters	Discharge Goal (1)	Units	October 2019	November 2019	December 2019
Sampling Date			10/1/19	11/4/19	12/2/19
Average Flowrate	N/A	CFM	9,079	9,070	8,911
Total Flow	N/A	ft^3	405,270,608	391,828,943	378,259,821
Total Flow	N/A	m^3	11,475,986	11,095,360	10,711,125
Trichloroethene	≤ 0.09	lb/hr	0.00000	0.000000	0.00003
Vinyl Chloride	≤ 0.02	lb/hr	0.00000	0.00000	0.00000
1,2 Dichloroethene	≤ 11	lb/hr	0.00248	0.00214	0.00203
1,2-Dichloroethane	N/A	lb/hr	0.00000	0.00000	0.00004
Toluene	N/A	lb/hr	0.00000	0.00000	0.00000
Total Xylene	N/A	lb/hr	0.00000	0.00000	0.00000
1,1,2-Trichloroethane	N/A	lb/hr	0.00000	0.00000	0.00000
Tetrachloroethene	≤ 0.18	lb/hr	0.00000	0.00000	0.00000

Notes:
NA - Not applicable
lb/hr - pounds per hour
DAR - Divison of Air Resources
CFM - Cubic feet per minute
Stack Emissions (lb/hr) = average flowrate (cfm) * ($0.3048^{\wedge 3}$)m^3/ft^3 * conc.(ug/m^3) * 1 lb/453592370 ug * 60 min/hr

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

Table 6
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
2019 Air Emission Summary

	TCE Effluent Emission Rate		VC Effluent Emission Rate		1,2-DCE Effluent Emission Rate		PCE Effluent Emission Rate	
Month	**lb/hr**	**lb/mo**	**lb/hr**	**lb/mo**	**lb/hr**	**lb/mo**	**lb/hr**	**lb/mo**
Jan-19	0.00023	0.171120	0.00000	0.000000	0.00168	1.249920	0.00000	0.000000
Feb-19	0.00000	0.000000	0.00000	0.000000	0.00211	1.417920	0.00000	0.000000
Mar-19	0.00004	0.029760	0.00002	0.014880	0.00195	1.450800	0.00000	0.000000
Apr-19	0.00002	0.014400	0.00000	0.000000	0.00244	1.756800	0.00000	0.000000
May-19	0.00004	0.029760	0.00003	0.022320	0.00265	1.971600	0.00000	0.000000
Jun-19	0.00027	0.194400	0.00003	0.021600	0.00262	1.886400	0.00000	0.000000
Jul-19	0.00006	0.044640	0.00000	0.000000	0.00248	1.845120	0.00008	0.059520
Aug-19	0.00005	0.037200	0.00002	0.014880	0.00220	1.636800	0.00000	0.000000
Sep-19	0.00000	0.000000	0.00000	0.000000	0.00279	2.008800	0.00000	0.000000
Oct-19	0.00000	0.000000	0.00000	0.000000	0.00248	1.845120	0.00000	0.000000
Nov-19	0.00000	0.000000	0.00000	0.000000	0.00214	1.540800	0.00000	0.000000
Dec-19	0.00003	0.023614	0.00000	0.000000	0.00203	1.511295	0.00000	0.000000

	TCE	**VC**	**1,2-DCE**	**PCE**
Discharge Goal (lb/yr)	**770**	**170**	**98,000**	**1,500**
2019 Total Emissions (lb/yr)	**0.54**	**0.07**	**20.12**	**0.06**

Notes:
lb/hr = pounds per hour
lb/mo = pounds per month
lb/yr = pounds per year
DCE = dichloroethene
PCE = tetrachloroethene
TCE = trichloroethene
VC = vinyl chloride

Emissions = average flowrate (cfm) * ($0.3048^{\wedge 3}$)m^3/ft^3 * conc.(mg/m^3) * 0.000001 g/mg * 0.002205 lbs/g *
60 min/hr * operational time (hr)

Table 7
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Level Measurements
Fourth Quarter 2019

Monitoring Well ID	Date	Well Elevation (ft amsl)	Total Depth (ft)	Screen Interval (ft)	Depth to Water (ft)	Groundwater Elevation (ft amsl)
RW1-MW1	12/24/2019	85.86	435	395-435	32.19	53.67
RW1-MW2	12/24/2019	87.35	435	395-435	35.49	51.86
RW1-MW3	12/24/2019	80.34	435	395-435	25.14	55.20
RW2-MW1	12/24/2019	90.75	510	470-510	35.47	55.28
RW2-MW2	12/24/2019	90.15	510	470-510	35.86	54.29
RW2-MW3	12/24/2019	89.75	510	470-510	34.97	54.78
RW3-MW1	12/24/2019	92.22	350	330-350	36.97	55.25
RW3-MW2	12/24/2019	91.98	495	475-495	36.52	55.46
RW3-MW3	12/24/2019	92.98	340	320-340	38.04	54.94
RW3-MW4	12/24/2019	92.92	495	475-495	37.24	55.68
TP-01	12/24/2019	85.91	470	450-470	32.61	53.30
IW1-MW1	12/24/2019	89.41	150	20-150	36.41	53.00
RW-1	NA	91.37	340	320-340	NA	NA
RW-3	NA	91.57	495	475-495	NA	NA

Notes:
amsl - above mean sea level
ft - feet
NA - Not Applicable

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	RW1-MW1																																		
Sample Date	5/4/2005	7/22/2005	5/27/2009	1/21/2010	4/21/2010	7/28/2010	11/10/2010	3/25/2011	6/14/2011[1]	6/14/2011	9/28/2011	11/30/2011	3/8/2012	6/6/2012	6/6/2012	8/21/2012	12/4/2012	3/13/2013	6/19/2013[2]	9/17/2013	12/16/2013	3/24/2014	3/24/2014	9/22/2014	3/25/2015	9/15/2015	3/22/2016	9/14/2016	3/1/2017	9/12/2017	3/5/2018	9/11/2018	3/7/2019	9/26/2019
Comments										Duplicate					Duplicate								Duplicate												
Well Depth (Ft)	435																																		
Screened Interval (Ft)	395-435																																		
VOCS (EPA 624) ug/L [3]																																			
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	30 R	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	R	R	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	0.32J	ND	ND	ND	0.17J	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	2.0 R	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR
Chloroform	ND	0.7J	1.1	ND	0.70J	0.65J	0.56J	0.55J	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.55 J	0.39 J	ND	ND	0.48 J	0.48 J	0.50 J	0.58 J	0.55 J	0.500 J	0.573 J	ND	
Chloromethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	0.74J	0.79J	3.3	2.9J	2.8	2.8	3.0	3.6	1.6 J	4.2 J	4.0 J	4.1	5.2	4.8	4.3	5.3	4.9	5.3	4.8 J	4.7 J	5.2	5.3	5.3	4.1 J	5.1	5.1	6.5	7.0	6.6	7.7	7.5	7.67	7.89	6.30	
1,2-dichloroethane	ND	ND	0.29J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35 J	0.26 J	0.220 J	ND	0.227 J	
1,1-dichloroethene	1.3	2.8	3.1	1.7J	1.9	1.7	1.7	1.9	0.85 J	2.1 J	2.3 J	2.1	2.7	2.5	2.3	2.8	2.0	2.8	ND	2.5	2.6	2.8	2.7	2.2 J	2.2 J	1.9	2.2	1.8	1.6	2.1	2.4	2.16	2.19 J	1.79 J	
cis-1,2-dichloroethene	78.6	80.4	180D	130	121	118	108	121	55.8 J	145 J	164	132	179	165	145	167	108	91.7	64	86.2 J	84.4	92.6 J	94.2	49.8	39.5	22.0	20.0	16	11	9.8	7.1	3.00	3.86 J	4.70 J	
trans-1,2-dichloroethene	2.0	1.3J	2.8	4J	2.9	2.1	1.3	4.2	0.71 J	2.0 J	2.0 J	1.7	3.0	3.7	2.6	2.4	1.8	1.7	ND	ND	1.4	1.4	1.4	1.0	0.79 J	0.50 J	0.51 J	0.42 J	0.26 J	0.35 J	0.20 J	ND	ND	ND	
1,2-dichloropropane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	1.75J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Isopropylbenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	0.72J	ND	0.42J	ND	ND	ND	ND	ND	0.36 J	ND	ND	ND	ND	ND	ND	ND	ND	0.35 J	0.67 J	0.33 J	0.37 J	0.76 J	0.30 J	0.62 J	0.67 J	0.45 J	0.46 J	0.59 J	0.50 J	0.300 J	ND	0.401 J	
Toluene	ND	0.33J	0.68	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	0.71J	ND	0.52J	0.43J	0.53J	0.79J	ND	0.63 J	1.1 J	0.66 J	0.96 J	0.98 J	0.89 J	0.99 J	0.88 J	1.1	ND	1.2	1.5	ND	ND	ND	ND	ND	ND	1.0	0.94 J	1	1.2	0.920 J	1.16 J	0.988 J	
1,1,2-trichloroethane	ND	ND	0.58J	NR	ND	ND	ND	ND	NR	NR	ND	0.33 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	53.6	52.7	140.0	79.0	116	95.4	84.2	97.6	26.6 J	73.8 J	129	84.5	115	107	102	126	85	101	78	175	128	101	103	94.3	99.5	98.9	114	110	86	110	170	118	110	95.4	
Vinyl chloride	ND	ND	1.6	ND	ND	ND	0.17J	ND	ND	0.38 J	0.29 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	NR	ND	0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	NR	2.8	2.8	6.0	4.0	4.0	4.0	ND	6	ND	11	16	9	5	6	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	RW1-MW2				RW1-MW3																													
Sample Date	5/4/2005	7/22/2005	5/28/2009	6/18/2013[2]	1/20/2010	4/21/2010	7/29/2010	11/10/2010	3/25/2011	6/14/2011	9/28/2011	11/30/2011	3/8/2012	6/7/2012	8/22/2012	12/7/2012	3/14/2013	6/19/2013[2]	9/17/2013	12/17/2013	3/25/2014	9/23/2014	3/25/2015	9/14/2015	3/21/2016	9/14/2016	3/1/2017	9/13/2017	3/5/2018	9/12/2018	3/7/2019	9/26/2019
Comments																																		
Well Depth (Ft)	435				435																													
Screened Interval (Ft)	395-435				395-435																													
VOCS (EPA 624) ug/L [4]																																		
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	30 R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	R	R	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	ND	ND	ND	NR	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.41 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	ND	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR
Chloroform	ND	1.4	ND	ND	0.67J	0.80J	0.47J	0.69J	0.73J	NR	0.97 J	ND	0.73 J	0.64 J	ND	1.2 J	ND	0.82	ND	ND	0.74 J	0.67 J	0.79 J	ND	0.79 J	0.80 J	0.61 J	0.69 J	0.67 J	0.720 J	0.725 J	ND		
Chloromethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.29 J	ND	ND	ND	ND	ND	ND	D	ND	ND		
cyclohexane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,2-dibromo-3-chloro-propane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,2-dibromomethane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,2-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,3-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,4-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,1-dichloroethane	4.6	5.5	3.4	3.9	2.4	4.6	1.5	2.3	2.4	9.3	10.1 J	2.1	8.4	5.7	9.4	9.3	8.5	10	9.7 J	8.1	8.6	6.1 J	8.1	7.7	7.4	7.0	4.5	4.4	4.1	3.47	4.14 J	2.86 J		
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,1-dichloroethene	3.2	12.3	ND	ND	0.42J	1.10	ND	0.28J	ND	1.8	2.2 J	ND	1.8	0.86 J	2.4	2.2	1.7	1.8	1.6	1.9	2.1	1.6 J	2.3 J	2.3	2.5	1.7	1.1	1.2	0.97 J	0.950 J	1.08 J	0.888 J		
cis-1,2-dichloroethene	181.0	47.6	160.0	120	0.54J	0.48J	0.36J	0.55J	0.58J	0.59 J	0.43 J	0.55 J	0.68 J	0.33 J	0.56 J	0.46 J	0.53 J	0.46 J	0.72 J	0.60 J	0.57 J	0.44 J	0.54 J	0.49 J	0.58 J	0.44 J	0.29 J	0.37 J	0.36 J	0.310 J	0.398 J	0.363 J		
trans-1,2-dichloroethene	2.5	7.6	2.5	1.9 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,2-dichloropropane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
cis-1,3-dichloropropene	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
trans-1,3-dichloropropene	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,4-dioxane	4.01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND		
2-hexanone	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Isopropylbenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
methyl acetate	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Methylene chloride	1.0	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
4-methyl-2-pentanone	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
styrene	ND	ND	ND	NR	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	0.23 J	ND	ND	ND	0.20 J	ND	ND	ND	ND	ND	ND	0.25 J	ND	ND	ND	ND	ND	ND	ND		
1,2,4-trichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Tetrachloroethene	ND	134.0	19.0	5.9	ND	049J	ND	ND	ND	0.33 J	0.62 J	ND	0.65 J	0.30 J	0.97 J	0.40 J	ND	ND	ND	ND	ND	ND	ND	0.50 J	ND	0.35 J	ND	0.22 J	0.23 J	0.290 J	ND	0.397 J		
Toluene	0.32J	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,1,1-trichloroethane	1.3	1.0	ND	ND	0.41J	0.98J	ND	0.26J	0.33J	1.6	2.7 J	ND	ND	1.1 J	1.9	1.7	1.4	1.8	1.5	2.0	1.7	1.2 J	1.5	1.6	2.1	1.6	1	1.1	0.87 J	0.810 J	1.27 J	0.711 J		
1,1,2-trichloroethane	ND	0.65J	ND	ND	0.62J	0.60J	0.36J	0.55J	0.41J	NR	0.57 J	0.63 J	0.70 J	0.61 J	0.56 J	0.54 J	0.61 J	0.46 J	ND	0.55 J	0.46 J	0.46 J	0.43 J	0.44 J	0.47 J	0.41 J	0.51 J	0.35 J	0.37 J	0.400 J	0.296 J	0.284 J		
Trichloroethene	158.0	198.0	200.0	64	1.2	1.6	0.58J	0.91J	1.0	1.4	1.8 J	1.0 J	2.2	1.3	2.3	1.6	1.9	1.7	2.5	3.2	2.5	1.9	2.0	2.4	4.5	3.5	2.3	2.8	2.2	2.24	4.49 J	3.34 J		
Vinyl chloride	12.9	187.0	4.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
xylenes (total)	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Mercury (EPA 245.1) ug/L	NR	NR	0.20	NR	NR	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
TSS (SM20 2540D) mg/L	NR	NR	4.0	NR	NR	8.0	<4.0	<4.0	<4.0	ND	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	1.8	2.1	5.6	7.1	2.7	8.6	2.2		

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	RW2-MW1																																RW2-MW2		
Sample Date	5/4/2005	7/20/2005	5/27/2009	1/18/2010	4/21/2010	7/28/2010	11/3/2010	3/24/2011	6/14/2011	9/27/2011	11/29/2011	3/7/2012	6/6/2012	8/21/2012	12/7/2012	3/13/2013	6/17/2013[1]	9/17/2013	12/17/2013	12/17/2013	3/25/2014	9/23/2014	3/26/2015	9/14/2015	3/21/2016	3/21/2016	9/15/2016	3/1/2017	9/13/2017	3/5/2018	9/11/2018	3/7/2019	9/25/2019	5/4/2005	7/21/2005	6/17/2013[1]
Comments																				Duplicate						Duplicate										
Well Depth (Ft)	510																																510		
Screened Interval (Ft)	470-510																																470-510		
VOCS (EPA 624) ug/L [4]																																			
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	30 R	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR
Acetone	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND
Benzene	ND	ND	ND	ND	0.15J	0.69J	0.58J	0.30J	NR	0.22 J	0.27 J	0.22 J	ND	ND	0.68 J	0.54 J	ND	0.59 J	ND	ND	0.21 J	0.21 J	0.56 J	ND	ND	0.18 J	ND	0.51 J	ND	ND	0.250 J	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	R	R	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	R	R	ND
carbon disulfide	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.0 J	1.6 J	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	NR	NR	ND
Chloroethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	2.0 R	2.0 R	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	NR	NR	NR	NR
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	0.38 J	ND	ND	ND	2.9	ND	ND	ND	2.8 J	1.5	0.46 J	2.2	3.4	3.5	2.4	0.25 J	2	1.0	0.550 J	2.03 J	ND	ND	0.55
Chloromethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.68 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR
1,2-dibromomethane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR
1,2-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR
1,3-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR
1,4-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	0.53J	0.93J	1.2J	0.82J	0.60J	0.58J	0.42J	ND	0.61 J	0.64 J	ND	0.50 J	4.2	4.8	0.58 J	0.52 J	7.0	ND	5.8	6.4	5.1	ND	2.1	6.3	8.7	8.5	6.4	1.7	6.6	6.5	2.75	7.81	6.03	ND	0.78J	4.9
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	1.9 J	1.7 J	1.3	0.69 J	0.41 J	1.4	1.4	1.3	0.93 J	ND	0.71 J	0.39 J	0.330 J	0.552 J	0.627 J	ND	ND	0.32 J
1,1-dichloroethene	ND	0.58J	0.55J	0.63J	ND	ND	ND	ND	ND	ND	ND	ND	0.55 J	0.95 J	0.19 J	ND	1.9	ND	2.6	2.6	1.8	1.3 J	0.61 J	2.6	3.7	3.4	1.6	0.27 J	1.3	1.5	0.470 J	1.67 J	1.87 J	ND	0.41J	0.72
cis-1,2-dichloroethene	ND	0.55J	1.9	1.0	0.78J	0.80J	0.55J	0.43J	0.56 J	0.32 J	0.39 J	0.34 J	0.32 J	0.39 J	0.33 J	0.29 J	7.7	0.77 J	11.0 J	11.1 J	8.0	4.0	2.6	13.3	15.3	15.0	6.1	1.3	2.6	1.2	1.09	2.42 J	7.18	0.33J	0.41J	4.6
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	5.34	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	7.45J	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
2-hexanone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND
isopropylbenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND
styrene	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	0.85J	1.0	ND	0.52J	0.49J	0.50J	ND	NR	0.24 J	0.29 J	0.19 J	ND	ND	0.27 J	ND	ND	0.31 J	ND	ND	ND	ND	0.26 J	ND	0.20 J	ND	ND	ND	ND	ND	ND	ND	ND	0.33J	0.53J	ND
1,1,1-trichloroethane	ND	0.37J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.33 J	ND	ND	0.84	ND	0.94 J	0.94 J	ND	0.39 J	ND	ND	ND	ND	0.56 J	ND	0.49 J	0.43 J	ND	0.761 J	0.712 J	ND	ND	0.34 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	D	ND	ND
Trichloroethene	37.6	34.6	12.0	15.0	0.42J	ND	ND	1.7	1.6	0.89 J	0.67 J	0.67 J	9.0	20.8	0.73 J	0.67 J	14	1.5	34.6	33.5	23.4	18.3	4.3	27.5	43.9	44.2	18	2.1	8.6	7.1	2.61	9.65	15.7	7.8	13.8	12
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	1.4J	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR
Mercury (EPA 245.1) ug/L	NR	NR	0.05J	NR	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR
TSS (SM20 2540D) mg/L	NR	NR	2260.0	NR	58.0	<4.0	<4.0	<4.0	181	5	36	6	25	12	10	ND	13	12	30	24	12	6	17	11	24	26	3.8	13.8	8.7	12.1	7.6	24.2	14	NR	NR	NR

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	RW2-MW3				RW3-MW1																																	
Sample Date	5/3/2005	7/20/2005	5/28/2009	6/18/2013[1]	1/19/2010	4/22/2010	7/29/2010	11/9/2010	3/25/2011	3/25/2011	6/14/2011	9/27/2011	11/30/2011	11/30/2011	3/7/2012	6/7/2012	8/22/2012	12/6/2012	3/14/2013	6/20/2013[1]	6/20/2013[2]	9/18/2013	12/17/2013	3/25/2014	9/23/2014	3/25/2015	9/15/2015	3/22/2016	9/14/2016	3/2/2017	9/12/2017	3/6/2018	9/11/2018	3/5/2019	9/25/2019
Comments										Duplicate				Duplicate							Duplicate																	
Well Depth (Ft)	510				350																																	
Screened Interval (Ft)	470-510				330-350																																	
VOCS (EPA 624) ug/L [4]																																						
Acrolein	NR	NR	30 R	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	30 R	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	R	R	ND	ND	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	0.19J	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	NR
Chloroform	ND	ND	ND	ND	ND	ND	ND	0.20J	ND	ND	NR	ND	ND	ND	ND	ND	ND	0.63 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	0.68J	0.31J	1.4	7.4	1.6	1.5	1.7	1.4	1.3	1.3	1.1	1.0 J	0.96 J	0.93 J	0.90 J	0.80 J	0.87 J	0.98 J	1.2	ND	ND	1.2 J	1.2	1.1	0.69 J	0.64 J	0.76 J	0.40 J	0.33 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	ND	ND	ND	ND	0.27J	ND	ND	ND	ND	ND	ND	0.57 J	ND	ND	0.43 J	ND	ND	0.50 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	0.42J	ND	1.2	1.3	1.2	1.2	1.2	1.1	0.85 J	0.65 J	0.64 J	0.66 J	0.47 J	0.19 J	0.54 J	0.65 J	0.68 J	ND	ND	0.57 J	0.69 J	0.74 J	0.43 J	0.42 J	0.41 J	0.29 J	0.21 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-dichloroethene	0.40J	0.66J	2.3	ND	0.37J	ND	0.32J	0.45J	0.47J	0.45J	0.48 J	0.31 J	0.36 J	0.43 J	0.37 J	0.39 J	0.36 J	0.44 J	0.38 J	ND	ND	0.43 J	0.41 J	0.38 J	0.30 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	7.42J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Isopropylbenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	0.49J	0.81J	0.73J	1.5	1.4	1.6	1.2	1.3 J	1.0	1.1	1.0	0.33 J	ND	0.44 J	1.6	1.8 J	1.7 J	1.2	1.6	1.5	1.6	2.2	1.6	2.5	2.3	1.9	1.6	1.7	1.71	ND	1.69 J	ND	1.69 J	ND	1.69 J
Toluene	ND	0.50J	0.39J	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	0.26 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	ND	ND	0.98J	0.84J	1.2	1.1	1.1	0.78 J	1.0 J	0.59 J	0.63 J	0.58 J	0.54 J	0.42 J	0.34 J	0.49 J	ND	ND	0.61 J	0.66 J	0.66 J	0.39 J	0.35 J	0.36 J	0.30 J	0.21 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	16.2	20.6	18.0	60	35.0	53.2	52.3	77.6	76.2	77.9	63.1	72.4 J	51.0	55.2	59.0	42.5	37.7	42.8	46.6	49	48	62.7	60.5	60.0	43.4	41.8	45.4	37.6	40	27	22	19	19.2	19.3	21.1	19.3	21.1	19.3	21.1
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	NR	ND	NR	NR	<0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.04 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	NR	14.8	NR	NR	<4.0	<4.0	<4.0	<4.0	<4.0	5160	ND	ND	ND	NR	17	ND	ND	16	ND	9.5 J	ND	15	14	8	12	ND	ND	ND	3.3	2.9	1.3	3.3	16.4	16	3.3	16.4	16

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	RW3-MW2																																			
Sample Date	1/19/2010	1/19/2010	4/22/2010	7/29/2010	11/9/2010	11/9/2010	3/25/2011	6/14/2011	9/27/2011	11/30/2011	3/8/2012	6/7/2012	8/22/2012	8/22/2012	12/4/2012	12/4/2012	3/14/2013	6/20/2013[2]	9/17/2013	12/17/2013	3/25/2014	9/23/2014	9/23/2014	3/25/2015	9/14/2015	3/22/2016	9/14/2016	9/14/2016	3/2/2017	3/2/2017	9/12/2017	3/6/2018	9/11/2018	3/5/2019	9/25/2019
Comments		Duplicate				Duplicate								Duplicate		Duplicate							Duplicate					Duplicate		Duplicate						
Well Depth (Ft)	495																																			
Screened Interval (Ft)	475-495																																			
VOCS (EPA 624) ug/L [4]																																				
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	30 R	30 R	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	NR	NR
Chloroform	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	0.23 J	ND	ND	0.62 J	0.64 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27 J	0.24 J	0.23 J	0.26 J	0.24 J	0.24 J	0.23 J	ND	ND	ND	ND
Chloromethane	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	ND	ND	0.54J	ND	ND	ND	ND	0.52 J	0.37 J	ND	0.41 J	0.66 J	0.74 J	0.73 J	0.69 J	0.71 J	0.68 J	ND	0.65 J	0.59 J	0.62 J	0.51 J	0.51 J	0.56 J	0.47 J	0.52 J	0.39 J	0.34 J	0.39 J	0.47 J	0.36 J	0.29 J	0.290 J	0.364 J	ND
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	1.2	ND	ND	ND	ND	0.57 J	0.45 J	0.27 J	0.27 J	0.36 J	0.49 J	0.49 J	0.40 J	0.43 J	0.53 J	ND	0.29 J	0.45 J	0.44 J	0.38 J	0.33 J	0.33 J	0.30 J	0.46 J	0.31 J	0.37 J	0.25 J	ND	0.26 J	ND	ND	0.256 J	ND
cis-1,2-dichloroethene	1.5J	1.6J	2.4	1.1	0.92J	0.92J	1.6	1.7	1.1	1.4	1.3	1.5	1.6	1.5	1.6	1.6	1.6	ND	1.3 J	1.9	1.7	1.4	1.3	1.5	1.4	1.7	1.5	1.5	1.5	1.3	1.3	1.2	0.990 J	1.10 J	0.994 J	
trans-1,2-dichloroethene	ND	ND	0.43 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	0.69 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28 J	ND	ND	ND	ND	ND	ND	ND	0.29 J	ND	ND	ND	0.52 J	0.66 J	0.48 J	0.54 J	0.44 J	0.38 J	0.43 J	0.38 J	0.430 J	ND	0.477 J	
Toluene	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	0.58J	ND	ND	ND	ND	0.39 J	0.43 J	ND	ND	0.54 J	0.52 J	0.49 J	0.42 J	0.43 J	0.41 J	ND	0.47 J	0.50 J	0.43 J	0.36 J	0.39 J	0.38 J	0.41 J	0.47 J	0.44 J	0.47 J	0.41 J	0.34 J	0.26 J	0.33 J	ND	ND	ND		
1,1,2-trichloroethane	ND	ND	ND	ND	0.25 J	0.27J	ND	NR	0.32 J	0.32 J	0.32 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32 J	0.31 J	0.21 J	0.32 J	0.24 J	0.26 J	ND	ND	0.240 J	0.204 J		
Trichloroethene	160	170	211	73	58.2	60.9	110	135	151	71.9	96.5	209	198	192	173 J	171	155	140	174	176	164	148	151	159	169	204	190	190	160	150	140	130	131	118	131	
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	NR	<0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	NR	5.0	6.0	ND	10.0	10.0	7	6	ND	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	RW3-MW3																																				
Sample Date	1/20/2010	4/22/2010	4/22/2010	7/28/2010	11/3/2010 [1]	3/25/2011	6/15/2011	9/28/2011	11/29/2011	3/7/2012	3/7/2012	6/7/2012	8/22/2012	12/4/2012	3/14/2013	6/21/2013 [2]	9/18/2013	12/17/2013	3/26/2014	9/23/2014	3/25/2015	3/25/2015	9/15/2015	3/21/2016	9/15/2016	3/2/2017	9/12/2017	9/12/2017	3/6/2018	3/6/2018	9/12/2018	9/12/2018	3/5/2019	3/5/2019	9/25/2019	9/25/2019
Comments			Duplicate								Duplicate											Duplicate						Duplicate		Duplicate		Duplicate		Duplicate			Duplicate
Well Depth (Ft)	340																																				
Screened Interval (Ft)	320-340																																				
VOCS (EPA 624) ug/L [4]																																					
Acrolein	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	150 R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0 R	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR
Chloroform	ND	ND	0.40J	0.46J	ND	0.33J	NR	0.48 J	ND	0.42 J	0.42 J	2.3 J	ND	0.88 J	ND	ND	ND	3.4 J	ND	0.27 J	0.40 J	0.33 J	ND	ND	0.48 J	0.45 J	0.35 J	0.27 J	0.33 J	0.37 J	0.400 J	0.400 J	0.420 J	0.370 J	ND	ND
Chloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	ND	1.6	1.6	2.3	1.0	1.5	7.1	3.2 J	1.5	3.3	3.3	2.6 J	ND	4.2	4.5 J	ND	ND	3.7 J	4.9 J	1.3 J	1.8	1.8	1.2	4.0	3.5	2.9	2.5	2.2	2.0	2.3	2.08	2.24	2.21 J	1.97 J	1.85 J	1.80 J
1,2-dichloroethane	ND	0.52J	0.54J	ND	ND	ND	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.30 J	ND	ND	ND	ND	ND	ND	ND	ND	0.255 J	ND
1,1-dichloroethene	ND	1.1	1.3	1.2	ND	0.96J	2.6	1.8 J	0.96 J	1.9	1.9	1.7 J	1.4 J	1.9	2.1 J	ND	ND	ND	2.4 J	0.94 J	1.5 J	1.4 J	1.1	2.4	2.0	1.3	ND	0.78 J	1.1	1.2	1.00	1.14	1.17 J	1.14 J	1.52 J	1.36 J
cis-1,2-dichloroethene	ND	2.1	2.1	1.7	ND	2.3	1.2	1.9	2.1	2.1	2.1	1.4 J	1.8 J	1.2	ND	ND	ND	ND	ND	1.2	1.3	1.3	1.3	1.1	1.1	0.83 J	0.8 J	0.76 J	0.63 J	0.59 J	0.590 J	0.640 J	0.840 J	0.805 J	1.07 J	1.05 J
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	3.2 J	ND	6.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	0.45J	0.49J	ND	ND	ND	0.40 J	0.50 J	ND	0.72 J	0.69 J	ND	ND	0.43 J	ND	ND	ND	ND	ND	0.36 J	0.37 J	0.37 J	0.77 J	0.71 J	0.58 J	0.43 J	0.31 J	0.44 J	0.36 J	0.32 J	0.390 J	0.390 J	ND	ND	0.672 J	0.727 J
Toluene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	0.95J	1.0J	0.72J	ND	0.62J	1.3	1.0 J	0.49 J	0.84 J	0.87 J	ND	ND	0.85 J	ND	ND	ND	ND	ND	0.40 J	0.48 J	0.45 J	0.36 J	1.1	0.75 J	0.69 J	0.46 J	0.38 J	0.61 J	0.57 J	0.550 J	0.530 J	0.594 J	0.599 J	0.518 J	0.467 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	350	397	382	297	8.5	288	331	215 J	250	312	325	285	248	291	347	410	322	322	350	147	182	184	138	284	260	200	100	95	150	160	124	155	151	147	176	172
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.88 J	0.122 J	ND	ND
TSS (SM20 2540D) mg/L	NR	4.0	5.0	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	13	10	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	2.4	3	1.9	4.7 J	2.8 J	5.7	6.0	5.1 J	1.6 J	2.6 J	1.7

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	RW3-MW4																														
Sample Date	1/20/2010	4/22/2010	7/28/2010	7/28/2010	11/3/2010 [1]	3/24/2011	6/15/2011	9/28/2011	11/29/2011	3/7/2012	6/7/2012	8/22/2012	12/4/2012	3/14/2013	6/21/2013 [2]	9/17/2013	12/17/2013	3/26/2014	9/23/2014	3/25/2015	9/15/2015	3/21/2016	9/15/2016	3/2/2017	9/12/2017	3/6/2018	9/12/2018	3/5/2019	9/25/2019
Comments				Duplicate																											
Well Depth (Ft)	495																														
Screened Interval (Ft)	475-495																														
VOCS (EPA 624) ug/L [3]																															
Acrolein	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	30 R	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR		
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Acetone	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Benzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Bromodichloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Bromoform	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Bromomethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2-butanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
carbon disulfide	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Chlorobenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Dibromochloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Chloroethane	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	NR	NR			
Chloroform	ND	ND	ND	ND	0.32J	ND	NR	0.87 J	ND	0.38 J	ND	ND	0.71 J	ND	1.2	ND	ND	1.2 J	0.38 J	1.2	ND	0.64 J	ND	ND	0.21 J	0.47 J	ND	0.996 J	ND		
Chloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,1-dichloroethane	2.5	0.6	0.54J	0.50J	1.8	0.81	0.78 J	5.4 J	0.84 J	1.8	0.50 J	ND	1.2	3.8	4.6	2.9	4.9	5.5	2.7 J	6.9	0.88 J	4.9	2.0	1.5	2.6	3.9	1.47	6.22	5.72		
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23 J	ND	ND	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.235 J	0.253 J		
1,1-dichloroethene	1.0	ND	ND	ND	0.86J	ND	0.20 J	0.53 J	ND	0.21 J	ND	ND	0.19 J	0.38 J	0.42 J	ND	0.39 J	0.95 J	0.37 J	1.3 J	0.21 J	0.85 J	0.40 J	0.27 J	0.41 J	0.70 J	0.340 J	0.981 J	1.37 J		
cis-1,2-dichloroethene	0.46J	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21 J	ND	ND	0.351 J	0.475 J		
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,2-dichloropropane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
cis-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
trans-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR		
Ethylbenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND		
2-hexanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Methylene chloride	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.43 J	ND	ND	ND	ND	ND	ND	ND		
4-methyl-2-pentanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
styrene	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
1,1,2,2-tetrachloroethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.31 J	0.46 J	ND	ND	ND	ND	ND	ND	ND	ND		
Toluene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
1,1,1-trichloroethane	ND	ND	ND	ND	0.67J	ND	ND	0.66 J	ND	ND	ND	ND	ND	ND	0.29 J	ND	0.39 J	0.48 J	ND	0.60 J	ND	0.48 J	0.24 J	ND	0.26 J	0.40 J	ND	0.481 J	0.668 J		
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Trichloroethene	21	11	7.5	8.0	308	7.7	6.7	3.4 J	5.6	4.6	5.4	5.5	4.5	2.3	1.8	5.0	4.4	3.3	2.5	2.7	4.1	2.9	4.3	4.1	5.4	1.5	2.66	2.12 J	1.30 J		
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
xylenes (total)	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
Mercury (EPA 245.1) ug/L	NR	<0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
TSS (SM20 2540D) mg/L	NR	16.0	<4.0	<4.0	<4.0	<4.0	ND	11	6	5	ND	ND	ND	22	ND	ND	ND	9	5	5	ND	ND	1.4	ND	1.3	ND	ND	1.3	2.7		

Table 8
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Summary of Historical Groundwater Analytical Results
Through Fourth Quarter 2019

Sample ID	TP-01																												IW-1 MW-1		IW-1	RW-3 [3]				
Sample Date	1/21/2010	6/15/2011	9/27/2011	9/27/2011	11/30/2011	3/8/2012	6/6/2012	8/22/2012	12/4/2012	3/13/2013	3/13/2013	6/17/2013[2]	9/17/2013	9/17/2013	12/16/2013	3/25/2014	9/22/2014	3/25/2015	9/14/2015	9/14/2015	3/21/2016	9/14/2016	3/1/2017	9/13/2017	3/5/2018	9/11/2018	3/6/2019	9/25/2019	5/3/2005	6/18/2013[2]	5/27/2009	9/15/2015	3/22/2016	9/15/2016	3/2/2017	9/13/2017
Comments				Duplicate							Duplicate			Duplicate						Duplicate																
Well Depth (Ft)	470																												150		230	530				
Screened Interval (Ft)	450-470																												20-150		200-230	392-412				
VOCS (EPA 624) ug/L [4]																																			
Acrolein	NR	NR	ND	ND	ND	ND	ND	30 R	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND
Acrylonitrile	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	ND	ND	ND	ND	ND
Acetone	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	NR	NR
Benzene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.53 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	R	ND	ND	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	ND	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	ND	ND	ND	ND	ND	ND	ND	2.0 R	2.0 R	NR	ND	ND	ND	ND	ND	ND	2.0 R	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	NR	ND
Chloroform	ND	NR	0.68 J	0.74 J	ND	0.74 J	0.82 J	ND	2.5 J	1.2	1.1	11	5.2 J	ND	7.4	6.8 J	1.9	2.6	1.3	1.3	1.7	1.6	1.2	6.3	2.0	1.08	0.684 J	ND	0.94J	ND	0.98J	ND	0.46 J	0.26 J	ND	0.28 J
Chloromethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	ND	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	ND	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	ND	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR
1,1-dichloroethane	3.6J	5.0	3.7	3.7	2.9	3.7	3.7	3.4	1.1	1.5	1.4	3.2	2.1 J	2.8	1.5	ND	1.3 J	2.5	2.1	2.0	1.8	2.1	0.78 J	1.3	1.2	1.24	0.717 J	0.381 J	0.39J	0.51	0.22J	1.9	2.1	1.8	1.4 J	1.5
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.35 J	0.36 J	0.37 J	0.30 J	ND	ND	ND	ND	0.67 J	0.88 J	0.82 J	0.82 J	0.86 J	0.70 J	0.45 J	0.79	0.79 J	0.650 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	1.7	1.1	1.0	1.0	1.2	1.4	1.1	0.23 J	0.44 J	0.42 J	0.77	0.66 J	0.74 J	0.33 J	0.22 J	0.47 J	1.2 J	0.77 J	0.83 J	0.75 J	0.68 J	0.23 J	0.36 J	0.46 J	0.420 J	ND	ND	ND	ND	ND	1.9	2.5	1.5	1.3 J	1.4
cis-1,2-dichloroethene	190	43.4	40.4	40.2	74.9	53.3	29.9	16.1	4.2	5.8	5.8	8.7	14.1 J	14.7	8.0	5.3	7.6	13.4	11.3	11.6	10.8	12	5	11	12	12.1	6.01	3.75 J	ND	ND	ND	1.6	2.4	1.4	1.6 J	1.9
trans-1,2-dichloroethene	3.0J	1.1	1.0 J	0.92 J	1.1	0.87 J	0.79 J	0.35 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23 J	ND	ND	ND
1,2-dichloropropane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	ND
Ethylbenzene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	ND	NR	NR	NR	NR	NR
Methylene chloride	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.64 J	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	ND	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR
Tetrachloroethene	3.4J	3.3	4.4	4.4	3.6	4.7	6.0	4.0	0.42 J	0.34 J	0.32 J	1.6	0.77 J	1.5 J	0.57 J	ND	ND	0.48 J	0.82 J	0.88 J	0.72 J	0.37 J	0.22 J	ND	ND	ND	ND	ND	ND	0.55	ND	0.68 J	0.79 J	0.64 J	0.60 J	0.65 J
Toluene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19J	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	0.63 J	0.73 J	0.76 J	0.29 J	0.57 J	1.1 J	0.86 J	ND	0.35 J	0.35 J	0.62	0.66 J	0.66 J	0.50 J	ND	ND	ND	ND	ND	ND	0.49 J	0.25 J	0.29 J	0.27 J	ND	ND	ND	0.47	0.92	0.49J	0.96 J	1.3	0.95 J	ND	0.83 J
1,1,2-trichloroethane	ND	NR	0.31 J	0.31 J	0.32 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.30 J	0.49 J	0.29 J	ND	0.45 J
Trichloroethene	65	35.3	41.0	39.6	38.0	38.1	40.4	27.9	22.0	25.9	25.4	25	27.0	26.7	29.8	21.7	31.9	52.3	53.0	53.9	61.7	47	21	54	55	38.2	28.3	14.4	ND	ND	0.17J	237	371	230	230	220
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	0.20	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	63	18	NR	ND	7	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	NR	NR	2.4	ND	ND	ND	2.4	8.1

Note:
VOC analysis changed from SW846 8260B to EPA Method 624 in January 2010.
D = Dilution
J = estimated value
ND = not detected
NR = not reported / required
R = rejected
mg/L - milligrams per liter
µg/L - micrograms per liter

(1) Analytical results presented above for samples collected from RW3-MW3 and RW3-MW4 in November 2010 are not consistent with historical trends, indicating samples may have been switched. For trend analysis, concentrations for RW3-MW3 were used for RW3-MW4 for November 2010 and vise versa.
(2) VOCs were analyzed by USEPA Method 524.2 (as opposed to Method 624) in June 2013 to correlate with samples collected under the Bethpage Regional Plume Comprehensive Groundwater Sampling Plan conducted in June 2013.
(3) RW-3, previously an active extraction well sampled on a monthly basis, was taken off-line on 7/1/15. While off-line, RW-3 was sampled semi-annually in conjunction with the semi-annual LTM events.
(4) Samples were analyzed for TCL VOCs, including tentatively identified compounds (TICs), beginning in March 2016. No TICs were detected, unless otherwise indicated.

Data prior to June 2011 were collected by others.

APPENDIX A

NYSDEC EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS AND MONTHLY DMRS

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 • **FAX:** (518) 402-9029
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

MEMORANDUM

TO: Steven Scharf, DER

FROM: Jean Occidental, DOW, Bureau of Water Permits JO

SUBJECT: Naval Weapons Industrial Reserve Plant (NWIRP); DER Site # 1-01-001

DRAINAGE BASIN: na

DATE: June 6, 2008

In response to your request and the permittee's SPDES Permit Equivalent Application dated April 27, 2008, attached is the effluent criteria for the above noted groundwater remediation discharge.

The Division of Water does not have any regulatory authority over a discharge from a State, PRP, or Federal Superfund Site. The Division of Environmental Remediation will be responsible for ensuring compliance with the attached effluent criteria and approval of all engineering submissions. Additional Condition (1) identifies the contact to send all effluent results, engineering submissions, and modification requests. The Regional Water Engineer should be kept appraised of the status of these discharges and, in accordance with the attached criteria, receive a copy of the effluent results for informational purposes.

If you have any questions, please call me at (518) 402-8116.

Attachment

cc: (w/att) RWE, Region 1
C. Webber
BWP Permit Coordinator

Naval Weapons Industrial Reserve Plant

DER site # 1-01-001
Page 1 of 2

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning: April 1, 2009

and lasting until: April 1, 2014

the discharges from the treatment facility to Groundwater shall be limited and monitored by the operator as specified below:

Outfall and Parameters	Limitations		Units	Minimum Monitoring Requirements	
	Daily Avg.	Daily Max.		Measurement Frequency	Sample Type
Treated Groundwater Remediation Discharge from: Recovery Wells 1, 2, and 3					
Flow	Monitor	1100	GPM	Continuous	Recorder
pH (range)	5.5 - 8.5		SU	Weekly	Grab
1,1-Dichloroethane	NA	5	µg/l	Monthly [1]	Grab
1,2-Dichloroethane	NA	0.6	µg/l	Monthly [1]	Grab
1,1-Dichloroethene	NA	5	µg/l	Monthly [1]	Grab
cis-1,2-Dichloroethene	NA	5	µg/l	Monthly [1]	Grab
trans-1,2-Dichloroethene	NA	5	µg/l	Monthly [1]	Grab
Tetrachloroethene	NA	5	µg/l	Monthly [1]	Grab
1,1,1-Trichloroethane	NA	5	µg/l	Monthly [1]	Grab
Trichloroethene	NA	5	µg/l	Monthly [1]	Grab
Vinyl chloride	NA	2	µg/l	Monthly [1]	Grab
Mercury	NA	0.25	µg/l	Monthly [1]	Grab

Footnotes:

(1) The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations.

Additional Conditions:

(1) Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

Steven Scharf
Division of Environmental Remediation
NYSDEC, 625 Broadway
Albany, NY 12233-7015
Phone: (518) 402-9620

With a copy sent to:

Regional Water Engineer
NYSDEC - Region 1
Building 40, SUNY Campus
Stony Brook, New York 11790-2356
Phone: (631) 444-0354

(2) Only site generated wastewater is authorized for treatment and discharge.

(3) Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

(4) Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the department prior to use.

(5) This discharge and administration of this discharge must comply with the substantive requirements of 6NYCRR Part 750.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau D
625 Broadway, 12th Floor, Albany, NY 12233-7013
P: (518) 402-9676 I F: (518) 402-9773
www.dec.ny.gov

August 31, 2017

Ms. Lora Fly
Remedial Project Manager
Naval Facilities Engineering Command
9324 Virginia Ave.
Bldg. Z-144, Code OPTE3-6
Norfolk, VA 23511

Re: SPDES Permit Equivalent Application,
Naval Weapons Industrial Reserve
Plant Site (NWIRP), Bethpage.
NYSDEC Site No 130003B

Lora:

The Department of the Navy (Navy) has requested to renew the State Pollutant Discharge Elimination System (SPDES) effluent for the GM-38 groundwater extraction and treatment system. The New York State Department Environmental Conservation (NYSDEC) has reviewed this request and has established discharge limits for the GM-38 system. These discharge limits, and associated reporting requirements, are detailed in the attached memorandum from the NYSDEC Division of Water.

Thanks and please do not hesitate to contact me at (518) 402-9478 or jason.pelton@dec.ny.gov with any questions.

Sincerely,

Jason Pelton

Digitally signed by Jason Pelton
DN: cn=Jason Pelton, o=NYSDEC, ou=Division of Environmental Remediation, email=jason.pelton@dec.ny.gov, c=US
Date: 2017.08.31 07:13:24 -04'00'

Jason M. Pelton
Project Manager
Remedial Section B, Remedial Bureau D
Division of Environmental Remediation

ec: B. Caldwell, EnSafe/Resolution Consultants
S. Edwards, NYSDEC
D. Hesler, NYSDEC
C. Haas, NYSDEC Region 1
W. Parish, NYSDEC Region 1
S. Karpinski, NYSDOH
J. DeFranco/J. Lovejoy, NCDOH
L. Thantu, USEPA Region 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water, Bureau of Permits
625 Broadway, Albany, New York 12233-3505
P: (518) 402-8111 | F: (518) 402-9029
www.dec.ny.gov

M E M O R A N D U M

TO: Jason Pelton, DER
FROM: Robert Wither, Chief, South Permits Section, DOW
SUBJECT: Naval Weapons Industrial Reserve Plant, DER Site #1-30-003B
DATE: August 18, 2017

In response to your request received July 13, 2017, attached please find effluent limitations and monitoring requirements for the above noted remediation discharge.

The DOW does not have any regulatory authority over a discharge from a State, PRP, or Federal Superfund Site. DER will be responsible for ensuring compliance with the attached effluent limitations and monitoring requirements, and approval of all engineering submissions. Footnote 1 identifies the appropriate DER contact as the place to send all effluent results, engineering submissions, and modification requests. The Regional Water Engineer should be kept appraised of the status of this discharge and, in accordance with the attached criteria, receive a copy of the effluent results for informational purposes.

If you have any questions, please call me at 518-402-8123.

Attachment (Effluent Limitations and Monitoring Requirements)

cc: Cathy Haas, RWE, Region 1

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning **September 1, 2017** and lasting until **August 31, 2027** the discharges from the wastewater treatment facility to groundwater, Class GA shall be limited and monitored by the operator as specified below:

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements	
	Monthly Avg.	Daily Max		Measurement Frequency	Sample Type
Outfall 001 - Treated Remediation Discharge:					
Flow	Monitor	1100	GPM	Continuous	Recorder
pH (range)	5.5 - 8.5		SU	Monthly	Grab
1,1-Dichloroethanrie	NA	5	µg/l	Monthly	Grab
1,2-Dichloroethane	NA	0.6	µg/l	Monthly	Grab
1,1-Dichloroethene	NA	5	µg/l	Monthly	Grab
cis-1,2-Dichloroethene	NA	5	µg/l	Monthly	Grab
trans-1,2-Dichloroethene	NA	5	µg/l	Monthly	Grab
Tetrachloroethene	NA	5	µg/l	Monthly	Grab
1,1,1-Trichloroethane	NA	5	µg/1	Monthly	Grab
Trichloroethene	NA	5	µg/l	Monthly	Grab
Vinyl Chloride	NA	2	µg/l	Monthly	Grab
Mercury	NA	0.25	µg/l	Monthly	Grab
Chloroform	NA	5	µg/l	Monthly	Grab
Trichlorotrifluoroethane (Freon 113)	NA	5	µg/l	Monthly	Grab
1,4 Dioxane	NA	Monitor	µg/l	Monthly	Grab

Additional Conditions:

1. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

   Jason Pelton
   Division of Environmental Remediation
   NYSDEC
   625 Broadway
   Albany, New York 12233- 7015
   518-402-9870

   With a copy sent to:

   Regional Water Engineer, Region 1
   NYSDEC
   SUNY @ Stony Brook
   50 Circle Road
   Stony Brook, NY 11790-3409

2. Only site generated wastewater is authorized for treatment and discharge.

3. Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

4. Both concentration (mg/l or µg/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH.

5. Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the department prior to use.

6. This discharge and administration of this discharge must comply with the substantive requirements of 6NYCRR Part 750.

OCTOBER 2019

11 November 2019

Mr. Jason Pelton
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
625 Broadway
Albany, NY 12233-7252

Subject: GROUNDWATER DISCHARGE MONITORING/AIR EMISSION REPORT GM-38 AREA, NWIRP BETHPAGE, NY; DER SITE # 1-30-003B-OU 2 OCTOBER 2019 REPORTING PERIOD

Dear Mr. Pelton:

KOMAN Government Solutions, LLC (KGS) is submitting this monthly monitoring report of the groundwater discharge and air emission results for the Groundwater Treatment Plant (GWTP) located at the Former Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, NY, GM-38 Area. This report was prepared in accordance with GWTP operational requirements for DER Site # 1-30-003B-OU 2, and the SPDES Permit Equivalent # 13003B.

GWTP operational data from 1 October to 31 October 2019 are presented in Attachment A. In the October reporting period, the GWTP was offline for approximately 12.4 hours. The plant was offline from the evening of 7 October until the morning of 8 October as the result of a regional power outage. A shorter power outage occurred in the morning of 9 October. The plant was offline on 11 Oct during the backwash effort for the LGACs.

As indicated in Attachment A, all SPDES permitted constituents are in compliance with regulatory guidelines during this reporting period.

Please contact me at 610-400-0636 with any questions or concerns you may have regarding this report.

Sincerely,

KOMAN Government Solutions, LLC

Robert Gregory
Project Manager

Attachment A: Groundwater and Air Sampling Results from October 2019

Cc: S. Edwards, NYSDEC
D. Hesler, NYSDEC

KOMAN Government Solutions, LLC
180 Gordon Drive, Suite 110
Exton, Pennsylvania 19341
Phone (610) 363-3000
Fax (610) 363-3001
www.komangs.com

C. Haas, NYSDEC Region 1
W. Parish, NYSDEC Region 1
R. Wither, NYSDEC Division of Water
J. Pilewski, NYSDEC – Region 1 Water Engineer
S. Karpinski, NYSDOH
J. Lovejoy, NCDH
C. Stein, USEPA Region 2
G. Ennis, Nassau County Department of Public Works
S. Urban, Nassau County Department of Public Works
T. Licata, Town of Oyster Bay
M. Russo, Town of Oyster Bay
L. Fly, NAVFAC Mid-Atlantic
B. Murray, NAVFAC Mid-Atlantic RPM
G. Pearman, NWIRP Bethpage
P. Schauble, KGS
GM-38 Copy

ATTACHMENT A

GROUNDWATER AND AIR SAMPLING RESULTS

OCTOBER 2019

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Discharge Monitoring Report
October 2019

SPDES Parameters			October 2019 [1]			
Process Stream	**Daily Treated Effluent Maximum[1]**	**Units**	**RW-1**	**RW-3 [2]**	**Combined Influent [3] (RW-1 + RW-3)**	**Treated Effluent**
Well Depth	N/A	ft	445	530	N/A	N/A
Screened Interval	N/A	ft bgs	335-395 410-430	392-412 442-504	N/A	N/A
Sampling Date	N/A		10/1/2019 [4]			
Effective Flowrate	1100	GPM	636	169	805	856
Total Flow	N/A	gallons	28,409,000	7,543,700	35,952,700	38,208,800
pH	5.5 - 8.5	SU	5.14	5.43	5.20	6.43
Chloroform	5	µg/L	0.347 J	0.356 J	0.35 J	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.27 J	2.01 J	1.43 J	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.676 J	0.944 J	0.732 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	4.30 J	1.16 J	3.64 J	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	16.9	0.210 J	13.40	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.410 J	0.540 J	0.437 J	ND (1.0)
Trichloroethene	5	µg/L	61.8	139	78.0	0.270 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	0.617 J	0.13 J	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.4	6.2	3.2	NS
Mercury	0.00025	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	1.0	0.2	ND (1.0)

Notes:

J - Estimated result between laboratory method detection limit and reporting limit

D - Concentration is a result of a dilution.

ND - Not detected above laboratory method detection limit. Reporting Limit (RL) given in parentheses.

NR - Not Recorded

N/A - Not Applicable

NS - Not Sampled

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.

(2) Well RW-3 was placed back in operation on 1 June, 2018.

(3) Influent concentrations presented are the weighted average concentrations of RW-1 and RW-3.

(4) 1,4-Dioxane was collected on 7 October 2019.

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
October 2019

DAR Parameters			**October 2019**	
Process Stream	**Units**	**Discharge Goal** [1]	**Influent**	**Effluent**
Sampling Date			10/1/19	
Average Flowrate	CFM	N/A	NR	9,079
Total Flow	ft^3	N/A	NR	405,270,608
Total Flow	m^3	N/A	NR	11,475,986
1,2-Dichloroethane	$\mu g/m^3$	N/A	ND	ND
cis 1,2-Dichloroethene	$\mu g/m^3$	≤ 100,000 [2]	42	73
trans 1,2-Dichloroethene	$\mu g/m^3$		ND	ND
1,2-Dichloroethene (total)	$\mu g/m^3$	≤ 100,000	42	73
Toluene	$\mu g/m^3$	N/A	ND	ND
Total Xylene	$\mu g/m^3$	N/A	ND	ND
1,1,2-Trichloroethane	$\mu g/m^3$	N/A	ND	ND
Trichloroethene	$\mu g/m^3$	≤ 2600	980	ND
Vinyl Chloride	$\mu g/m^3$	≤ 560	ND	ND
Tetrachloroethene	$\mu g/m^3$	≤ 5100	150	ND

Notes:
CFM - cubic feet per minute
DAR - Division of Air Resources
J - Estimated result between laboratory method detection limit and reporting limit
N/A - Not Applicable
NR - Not recorded
(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.
(2) Discharge goal is for total 1,2-Dichloroethene.

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Controlled Stack Emissions
October 2019

DAR Parameters	Units	Discharge Goal [(1)]	October 2019
Sampling Date			10/1/19
Average Flowrate	CFM	N/A	9,079
Total Flow	ft^3	N/A	405,270,608
Total Flow	m^3	N/A	11,475,986
Trichloroethene	lb/hr	≤ 0.09	0.00000
Vinyl Chloride	lb/hr	≤ 0.02	0.00000
1,2 Dichloroethene	lb/hr	≤ 11	0.00248
1,2-Dichloroethane	lb/hr	N/A	0.00000
Toluene	lb/hr	N/A	0.00000
Total Xylene	lb/hr	N/A	0.00000
1,1,2-Trichloroethane	lb/hr	N/A	0.00000
Tetrachloroethene	lb/hr	≤ 0.18	0.00000

Notes:
CFM - cubic feet per minute
DAR - Division of Air Resources
N/A - Not Applicable
(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

NOVEMBER 2019

13 December 2019

Mr. Jason Pelton
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
625 Broadway
Albany, NY 12233-7252

Subject: GROUNDWATER DISCHARGE MONITORING/AIR EMISSION REPORT GM-38 AREA, NWIRP BETHPAGE, NY; DER SITE # 1-30-003B-OU 2 NOVEMBER 2019 REPORTING PERIOD

Dear Mr. Pelton:

KOMAN Government Solutions, LLC (KGS) is submitting this monthly monitoring report of the groundwater discharge and air emission results for the Groundwater Treatment Plant (GWTP) located at the Former Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, NY, GM-38 Area. This report was prepared in accordance with GWTP operational requirements for DER Site # 1-30-003B-OU 2, and the SPDES Permit Equivalent # 13003B.

GWTP operational data from 1 November to 30 November 2019 are presented in Attachment A. No downtime was reporting during the reporting period.

As indicated in Attachment A, all SPDES permitted constituents are in compliance with regulatory guidelines during this reporting period.

Please contact me at 610-400-0636 with any questions or concerns you may have regarding this report.

Sincerely,

KOMAN Government Solutions, LLC

Robert Gregory
Project Manager

Attachment A: Groundwater and Air Sampling Results from November 2019

Cc: S. Edwards, NYSDEC
D. Hesler, NYSDEC
C. Haas, NYSDEC Region 1
W. Parish, NYSDEC Region 1
R. Wither, NYSDEC Division of Water

J. Pilewski, NYSDEC – Region 1 Water Engineer
S. Karpinski, NYSDOH
J. Lovejoy, NCDH
C. Stein, USEPA Region 2
G. Ennis, Nassau County Department of Public Works
S. Urban, Nassau County Department of Public Works
T. Licata, Town of Oyster Bay
M. Russo, Town of Oyster Bay
L. Fly, NAVFAC Mid-Atlantic
B. Murray, NAVFAC Mid-Atlantic RPM
G. Pearman, NWIRP Bethpage
P. Schauble, KGS
GM-38 Copy

ATTACHMENT A

GROUNDWATER AND AIR SAMPLING RESULTS

NOVEMBER 2019

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Discharge Monitoring Report
November 2019

SPDES Parameters			November 2019 (1)			
Process Stream	**Daily Treated Effluent Maximum(1)**	**Units**	**RW-1**	**RW-3 (2)**	**Combined Influent (3) (RW-1 + RW-3)**	**Treated Effluent**
Well Depth	N/A	ft	445	530	N/A	N/A
Screened Interval	N/A	ft bgs	335-395 410-430	392-412 442-504	N/A	N/A
Sampling Date	N/A		11/4/19			
Effective Flowrate	1100	GPM	613	161	775	821
Total Flow	N/A	gallons	26,494,234	6,965,796	33,460,030	35,459,550
pH	5.5 - 8.5	SU	5.09	5.35	5.14	6.12
Chloroform	5	µg/L	0.257 J	0.295 J	0.26 J	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.27 J	2.08 J	1.44 J	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.687 J	0.954 J	0.743 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	3.92 J	1.15 J	3.34 J	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	15.2	ND (1.0)	12.04	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.459 J	0.482 J	0.464 J	ND (1.0)
Trichloroethene	5	µg/L	58.6	134	74.3	0.226 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	0.570 J	0.12 J	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.6	6.1	3.3	NS
Mercury	0.00025	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	7.3	1.5	ND (1.0)

Notes:

J - Estimated result between laboratory method detection limit and reporting limit

D - Concentration is a result of a dilution.

ND - Not detected above laboratory method detection limit. Reporting Limit (RL) given in parentheses.

NR - Not Recorded

N/A - Not Applicable

NS - Not Sampled

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.

(2) Well RW-3 was placed back in operation on 1 June, 2018.

(3) Influent concentrations presented are the weighted average concentrations of RW-1 and RW-3.

(4) pH reading was collected on 18 November 2019.

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
November 2019

DAR Parameters			**November 2019**	
Process Stream	**Units**	**Discharge Goal (1)**	**Influent**	**Effluent**
Sampling Date			11/4/19	
Average Flowrate	CFM	N/A	NR	9,070
Total Flow	ft^3	N/A	NR	391,828,943
Total Flow	m^3	N/A	NR	11,095,360
1,2-Dichloroethane	$\mu g/m^3$	N/A	1.9 J	ND
cis 1,2-Dichloroethene	$\mu g/m^3$	≤ 100,000 (2)	48	63
trans 1,2-Dichloroethene	$\mu g/m^3$		ND	ND
1,2-Dichloroethene (total)	$\mu g/m^3$	≤ 100,000	48	63
Toluene	$\mu g/m^3$	N/A	ND	ND
Total Xylene	$\mu g/m^3$	N/A	ND	ND
1,1,2-Trichloroethane	$\mu g/m^3$	N/A	ND	ND
Trichloroethene	$\mu g/m^3$	≤ 2600	1200	ND
Vinyl Chloride	$\mu g/m^3$	≤ 560	ND	ND
Tetrachloroethene	$\mu g/m^3$	≤ 5100	160	ND

Notes:
CFM - cubic feet per minute
DAR - Division of Air Resources
J - Estimated result between laboratory method detection limit and reporting limit
N/A - Not Applicable
NR - Not recorded
(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.
(2) Discharge goal is for total 1,2-Dichloroethene.

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Controlled Stack Emissions
November 2019

DAR Parameters	Units	Discharge Goal [(1)]	November 2019
Sampling Date			11/4/19
Average Flowrate	CFM	N/A	9,070
Total Flow	ft^3	N/A	391,828,943
Total Flow	m^3	N/A	11,095,360
Trichloroethene	lb/hr	≤ 0.09	0.00000
Vinyl Chloride	lb/hr	≤ 0.02	0.00000
1,2 Dichloroethene	lb/hr	≤ 11	0.00214
1,2-Dichloroethane	lb/hr	N/A	0.00000
Toluene	lb/hr	N/A	0.00000
Total Xylene	lb/hr	N/A	0.00000
1,1,2-Trichloroethane	lb/hr	N/A	0.00000
Tetrachloroethene	lb/hr	≤ 0.18	0.00000

Notes:
CFM - cubic feet per minute
DAR - Division of Air Resources
N/A - Not Applicable
(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

DECEMBER 2019

17 January 2020

Mr. Jason Pelton
New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
625 Broadway
Albany, NY 12233-7252

Subject: GROUNDWATER DISCHARGE MONITORING/AIR EMISSION REPORT GM-38 AREA, NWIRP BETHPAGE, NY; DER SITE # 1-30-003B-OU 2 DECEMBER 2019 REPORTING PERIOD

Dear Mr. Pelton:

KOMAN Government Solutions, LLC (KGS) is submitting this monthly monitoring report of the groundwater discharge and air emission results for the Groundwater Treatment Plant (GWTP) located at the Former Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, NY, GM-38 Area. This report was prepared in accordance with GWTP operational requirements for DER Site # 1-30-003B-OU 2, and the SPDES Permit Equivalent # 13003B.

GWTP operational data from 1 December to 31 December 2019 are presented in Attachment A. The plant was down for approximately 36.5 hours over the course of the reporting period because of the installation of pump 4B and from various backwashing events.

As indicated in Attachment A, all SPDES permitted constituents are in compliance with regulatory guidelines during this reporting period.

Please contact me at 610-400-0636 with any questions or concerns you may have regarding this report.

Sincerely,

KOMAN Government Solutions, LLC

Robert Gregory
Project Manager

Attachment A: Groundwater and Air Sampling Results from December 2019

Cc: S. Edwards, NYSDEC
D. Hesler, NYSDEC
C. Haas, NYSDEC Region 1
W. Parish, NYSDEC Region 1

KOMAN Government Solutions, LLC
180 Gordon Drive, Suite 110
Exton, Pennsylvania 19341
Phone (610) 363-3000
Fax (610) 363-3001
www.komangs.com

~~R. Wither, NYSDEC Division of Water~~
J. Pilewski, NYSDEC – Region 1 Water Engineer
S. Karpinski, NYSDOH
J. Lovejoy, NCDH
~~C. Stein, USEPA Region 2~~
G. Ennis, Nassau County Department of Public Works
~~S. Urban, Nassau County Department of Public Works~~
T. Licata, Town of Oyster Bay
M. Russo, Town of Oyster Bay
L. Fly, NAVFAC Mid-Atlantic
B. Murray, NAVFAC Mid-Atlantic RPM
G. Pearman, NWIRP Bethpage
P. Schauble, KGS
GM-38 Copy

ATTACHMENT A

GROUNDWATER AND AIR SAMPLING RESULTS

DECEMBER 2019

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Discharge Monitoring Report
December 2019

SPDES Parameters			December 2019 [1]			
Process Stream	**Daily Treated Effluent Maximum[1]**	**Units**	**RW-1**	**RW-3 [2]**	**Combined Influent [3] (RW-1 + RW-3)**	**Treated Effluent**
Well Depth	N/A	ft	445	530	N/A	N/A
Screened Interval	N/A	ft bgs	335-395 410-430	392-412 442-504	N/A	N/A
Sampling Date	N/A		12/2/19			
Effective Flowrate	1100	GPM	616	160	776	832
Total Flow	N/A	gallons	27,514,266	7,121,604	34,635,870	37,137,950
pH	5.5 - 8.5	SU	5.04	5.37	5.11	6.45
Chloroform	5	µg/L	0.300 J	0.320 J	0.30 J	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.34 J	2.50 J	1.58 J	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.920 J	1.22 J	0.982 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	4.86 J	1.29 J	4.13 J	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	18.5	0.260 J	14.75	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.550 J	0.590 J	0.558 J	ND (1.0)
Trichloroethene	5	µg/L	73.2	159	90.8	ND (1.0)
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	0.650 J	0.13 J	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.2	5.4	2.9	NS
Mercury	0.00025	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	8.4	1.7	ND (1.0)

Notes:

J - Estimated result between laboratory method detection limit and reporting limit

D - Concentration is a result of a dilution.

ND - Not detected above laboratory method detection limit. Reporting Limit (RL) given in parentheses.

NR - Not Recorded

N/A - Not Applicable

NS - Not Sampled

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.

(2) Well RW-3 was placed back in operation on 1 June, 2018.

(3) Influent concentrations presented are the weighted average concentrations of RW-1 and RW-3.

(4) pH reading was collected on 18 November 2019.

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
December 2019

DAR Parameters			**December 2019**	
Process Stream	**Units**	**Discharge Goal** [1]	**Influent**	**Effluent**
Sampling Date			12/2/19	
Average Flowrate	CFM	N/A	NR	8,911
Total Flow	ft^3	N/A	NR	378,259,821
Total Flow	m^3	N/A	NR	10,711,125
1,2-Dichloroethane	$\mu g/m^3$	N/A	1.6 J	1.4 J
cis 1,2-Dichloroethene	$\mu g/m^3$	≤ 100,000 [2]	42	62
trans 1,2-Dichloroethene	$\mu g/m^3$		0.81 J	1.2 J
1,2-Dichloroethene (total)	$\mu g/m^3$	≤ 100,000	43	64
Toluene	$\mu g/m^3$	N/A	0.35 J	ND
Total Xylene	$\mu g/m^3$	N/A	ND	ND
1,1,2-Trichloroethane	$\mu g/m^3$	N/A	1.5 J	ND
Trichloroethene	$\mu g/m^3$	≤ 2600	920	1.0 J
Vinyl Chloride	$\mu g/m^3$	≤ 560	ND	ND
Tetrachloroethene	$\mu g/m^3$	≤ 5100	150	ND

Notes:
CFM - cubic feet per minute
DAR - Division of Air Resources
J - Estimated result between laboratory method detection limit and reporting limit
N/A - Not Applicable
NR - Not recorded
(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.
(2) Discharge goal is for total 1,2-Dichloroethene.

GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Controlled Stack Emissions
December 2019

DAR Parameters	Units	Discharge Goal (1)	December 2019
Sampling Date			12/2/19
Average Flowrate	CFM	N/A	8,911
Total Flow	ft^3	N/A	378,259,821
Total Flow	m^3	N/A	10,711,125
Trichloroethene	lb/hr	≤ 0.09	0.00003
Vinyl Chloride	lb/hr	≤ 0.02	0.00000
1,2 Dichloroethene	lb/hr	≤ 11	0.00203
1,2-Dichloroethane	lb/hr	N/A	0.00004
Toluene	lb/hr	N/A	0.00000
Total Xylene	lb/hr	N/A	0.00000
1,1,2-Trichloroethane	lb/hr	N/A	0.00000
Tetrachloroethene	lb/hr	≤ 0.18	0.00000

Notes:
CFM - cubic feet per minute
DAR - Division of Air Resources
N/A - Not Applicable
(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

APPENDIX B

NYSDEC AIR DISCHARGE LIMIT DOCUMENTATION

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Action Bureau A, 12th Floor
625 Broadway, Albany, New York 12233-7015
Phone: (518) 402-9620 FAX: (518) 402-9022

Joseph Martens
Commissioner

October 31, 2013

Lora Fly
Remedial Program Manager
NAVFAC Mid-Atlantic
Northeast IPT
9742 Maryland Avenue
Norfolk, VA, 23511-3095

RE: Northrop Grumman, Naval Weapons Industrial Reserve Plant (NWIRP) and Grumman Steel Los Sites, NYSDEC Site No.'s 1-30-003 A & B.

Dear Ms. Fly:

Tetra Tech NUS Inc., on behalf of the Department of the Navy NAVFAC Midlantic, has submitted an application to remove the GM 38 Area Groundwater Extraction and Treatment system impregnated Xeolite[tm] resin from the air discharge treatment system. Currently, the air treatment system uses a combined activated carbon with permanganate impregnated resin treatment train. The New York State Department of Environmental Conservation (NYSDEC) has reviewed the Department of the Navy application and concurs with the findings presented.

The routine monitoring, as detailed in Table 1, clearly indicates that vinyl chloride, one of the main contaminants of concern, has diminished to almost non-detect, and discharge concentrations have dropped to below the limit to require air treatment for the other contaminants as well. However, NAVFAC Midlantic is still proposing activated carbon to reduce the other discharge contaminant levels. Therefore, the NYSDEC hereby approves the proposed changes to the GM 38 Area air treatment. The Xeolite[tm] resin beds will remain in place should reactivation, based on routine monitoring, be required.

If you have any questions in the interim, please contact me at (518)402-9620.

Sincerely,

Steven M. Scharf, P.E.
Project Engineer
Remedial Action Bureau A
Division of Environmental Remediation

EC: J. Swartwout
S. Scharf
W. Parish, Region 1
S. Karpinski, NYSDOH
E. Hannon, NGC
D. Stern, Arcadis
D. Brayack, TTNUS

NOR-01264

November 21, 2011

Mr. Stephen Scharf
New York Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Remedial Action A
625 Broadway, 11th Floor
Albany, New York 12233-7015

Reference: CLEAN Contract No. N62470-08-D-1001
Contract Task Order WE06

Subject: Proposed Modification to Discharge Limits for Off Gas Volatile Organic Compounds (VOCs) for Air Stripping Tower
GM-38 Offsite Groundwater Treatment Plant,
NWIRP Bethpage, New York

Dear Mr. Scharf:

On behalf of the Navy, please find enclosed a copy of the subject document. This document presents an evaluation of current concentrations of off gas VOCs from the GM-38 groundwater treatment plant air-stripping tower (prior to treatment with granular activated carbon). Maximum emission rates were re-evaluated due to decreasing maximum concentrations of target VOCs in un-treated air stripper AS-1 off gas. In addition, breakthrough of target contaminants (e.g., cis-1,2-dichloroethene) is beginning to occur in the granular activated carbon bed. Maximum emission rates were re-evaluated to provide a determination if breakthrough of contaminants would trigger the need for a replacement of the granular activated carbon bed.

Existing Discharge Goals were established in the "Final Operation, Maintenance and Monitoring Plan for Groundwater Treatment Plant GM-38 Area Groundwater Remediation" prepared by Tetra Tech EC (April 2010). Existing goals were based on emission estimates for a 95% reduction (see Attachment A), instead of being based on the original DAR-1 analysis of air stripper off gas. Emission estimates were calculated using the air stripper design flow rate of 8,000 cubic feet per minute (cfm), and previous contaminant discharge rates in pounds per hour (lb/hr). Original emission estimates are provided in Attachment B.

Proposed Revised Discharge Goals were calculated using an average flow rate of 9,200 cfm, January to March 2011 VOC loading rates (taken from the Quarterly Operations Report First Quarter 2011 from ECOR Federal Services), and the Actual Annual % of Annual Guideline Concentrations (AGCs), taken from the revised DAR-1 Model Output. The revised DAR-1 Model Output is provided in Attachment C. Existing Discharge Goals and Proposed Revised Discharge Goals are compared in tabular format in the first page of the attachment. Proposed Revised Discharge Goals for trichloroethene (TCE) are the same as previous. The proposed limit for tetrachloroethene (PCE) is approximately 10 times the previous limit, and vinyl chloride is approximately 2 times the previous limit. Revised Discharge Goals for 1,2-dichloroethene (goals are the same for cis-1,2-dichloroethene) are 100 times greater than previously established limits. It is recommended that these revised limits replace previous discharge goals, and treatment of air stripper off gas by granular activated carbon is recommended to continue for TCE and PCE, with no treatment required for vinyl chloride and 1,2-dichloroethene.

Tetra Tech NUS, Inc.
5700 Lake Wright Drive, Suite 309, Norfolk, VA 23502
Tel 757.461.3768 Fax 757.461.4148 www.ttnus.com

If you have any questions please contact Ms. Lora Fly, NAVFAC Mid-LANT, at (757) 341-2012.

Sincerely,

David D. Brayack, P.E.
Project Manager

Enclosure: (1) Proposed Modification to Discharge Limits for Off Gas Volatile Organic Compounds (VOCs) for Air Stripping Tower
GM-38 Offsite Groundwater Treatment Plant

Distribution:

Mid-Lant, Lora Fly
NYSDEC (Albany), Henry Wilkie
NYSDOH (Troy), Steve Karpinski
NAVAIR, Richard Smith
USEPA, Carol Stein
NGC, Kent Smith
Tetra Tech NUS, Dave Brayack
ECOR Solutions, Al Taormina
Administrative Record
Public Repository
Project File

Tetra Tech NUS, Inc.
5700 Lake Wright Drive, Suite 309, Norfolk, VA 23502
Tel 757.461.3768 Fax 757.461.4148 www.ttnus.com

TABLE 1
COMPARISON OF EXISTING DISCHARGE GOALS WITH ACTUAL EMISSIONS AND PROPOSED DISCHARGE GOALS
AIR STRIPPING TOWER GM-38 OFFSITE GROUNDWATER TREATMENT PLANT
NWIRP BETHPAGE, NEW YORK

	Existing Discharge Goal		Actual January to March 2011 Values (Pre-Off Gas Treatment)		Proposed Revised Discharge Goals based on DAR-1 Analysis	
Chemical	Existing Discharge Loading Rate (pounds (lbs)/hour)[(1)]	Equivalent Existing Discharge Goals ($\mu g/m^3$)[(2)]	Actual Jan-Mar 2011 Concentration ($\mu g/m^3$)[(3)]	Actual VOC Loading Pre-Off Gas Treatment (lbs/hour)[(4)]	Proposed Discharge Loading Rate (lbs/hour)[(5)]	Equivalent Proposed Discharge Goal ($\mu g/m^3$)[(5)]
TCE	0.09	2,600	10,000	0.345	0.09	2,600
PCE	0.02	580	6,800	0.234	0.18	5,100
Vinyl Chloride	0.01	290	76	0.003	0.02	560
1,2-Dichloroethene (total)	0.03	870	750	0.026	11	greater than 100,000

Notes:

[(1)]Existing Discharge Goals are based on the design flow rate of 8,000 cfm. Existing Discharge Goals were taken from the Final Operations and Maintenance Plan for GM-38 Area Groundwater Remediation from Tetra Tech EC. Existing goals were based on emission estimates for a 95% reduction, and not the previous DAR-1 Analysis. Attachment B (provided at the end of this package) provides the original emission estimates.

[(2)]Existing Discharge Goals were calculated using the actual flow rate of 9,200 cfm and the existing discharge loading rate in pounds per hour (lb/hr).

[(3)]Values were taken from the Quarterly Operations Report First Quarter 2011 from ECOR Federal Services. Values were the maximum effluent concentration in off gas from air stripper stack AS-1 prior to treatment with vapor phase granular activated carbon (GAC), for the months of January, February and March 2011.

[(4)]Actual VOC Loading was calculated using an average flow rate of 9,200 cfm and the January-March 2011 concentrations. Existing off gas treatment consists of two stage vapor phase GAC followed by potassium permanganate zeolite media to provide additional treatment for vinyl chloride.

[(5)]Values were calculated using an average flow rate of 9,200 cfm, and the Actual Annual % of the AGCs from the 2011 DAR-1 Model Output to achieve air quality requirements.

ATTACHMENT A

2008 AIR PERMIT SUBMITTAL

New York State Department of Environmental Conservation
Air Permit Application

DEC ID	APPLICATION ID	OFFICE USE ONLY
- -	- /	/ /

Section I - Certification

Title V Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information [required pursuant to 6 NYCRR 201-6.3(d)] I believe the information is, true, accurate and complete I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations

Responsible Official	Title
Signature	Date / /

State Facility Certification

I certify that this facility will be operated in conformance with all provisions of existing regulations.

Responsible Official	Title
Signature	Date / /

Section II - Identification Information

Title V Facility Permit N/A	State Facility Permit N/A
❑ New ❑ Significant Modification ❑ Administrative Amendment ❑ Renewal ❑ Minor Modification General Permit Title:	❑ New ❑ Modification General Permit Title:
☒ Application involves construction of new facility ❑ Application involves construction of new emission unit(s)	

Owner/Firm

Name	US Navy/NAVFAC Midlant		
Street Address	9742 Maryland Ave, Bldg Z-144		
City Norfolk	State VA	Country US	Zip 23511-3095
Owner Classification ☒ Federal ❑ State ❑ Municipal ❑ Corporation/Partnership ❑ Individual			Taxpayer ID

Facility ❑ Confidential

Name	Naval Weapons Industrial Reserve Plant (NWIRP) GM-38 Area	
Location Address	Bethpage	
❑ City / ☒ Town / ❑ Village	Oyster Bay, New York	Zip 11714

Project Description ❑ Continuation Sheet(s)

Air stripping of groundwater to remove VOCs

Owner/Firm Contact Mailing Address

Name (Last, First, Middle Initial)	Fly, Lora		Phone No. (757) 444-0781
Affiliation	Department of the Navy	Title Remedial PM	Fax No. ( )
Street Address	9742 Maryland Ave. Bldg Z-144		
City Norfolk	State VA	Country US	Zip 23511-3095

Facility Contact Mailing Address

Name (Last, First, Middle Initial)	Same		Phone No. ( )
Affiliation		Title	Fax No. ( )
Street Address			
City	State	Country	Zip

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Section III - Facility Information

Classification

❑ Hospital ❑ Residential ❑ Educational/Institutional ❑ Commercial ☒ Industrial ❑ Utility

Affected States (Title V Only) N/A

❑ Vermont ❑ Massachusetts ❑ Rhode Island ❑ Pennsylvania Tribal Land:_____
❑ New Hampshire ❑ Connecticut ❑ New Jersey ❑ Ohio Tribal Land:_____

SIC Codes

9999												

Facility Description ❑ Continuation Sheet(s)

Groundwater Remediation by Air Stripping followed by Vapor-Phase GAC for emission control

Compliance Statements (Title V Only) N/A

I certify that as of the date of this application the facility is in compliance with all applicable requirements: ❑ YES ❑ NO

If one or more emission units at the facility are not in compliance with all applicable requirements at the time of signing this application (the 'NO' box must be checked), the noncomplying units must be identified in the "Compliance Plan" block on page 8 of this form along with the compliance plan information required. For all emission units at this facility that are operating in compliance with all applicable requirements complete the following:

- ❑ This facility will continue to be operated and maintained in such a manner as to assure compliance for the duration of the permit, except those units referenced in the compliance plan portion of Section IV of this application.
- ❑ For all emission units, subject to any applicable requirements that will become effective during the term of the permit, this facility will meet all such requirements on a timely basis.
- ❑ Compliance certification reports will be submitted at least once a year. Each report will certify compliance status with respect to each requirement, and the method used to determine the status.

Facility Applicable Federal Requirements N/A ❑ Continuation Sheet(s)

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause
	CERCLA	all substantive requirements							

Facility State Only Requirements ❑ Continuation Sheet(s)

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- - - - - - - - - -

Section III - Facility Information (continued)

Facility Compliance Certification N/A ❑ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

❑ Applicable Federal Requirement ❑ State Only Requirement	❑ Capping	CAS No.	Contaminant Name
		- -	

Monitoring Information

❑ Ambient Air Monitoring ❑ Work Practice Involving Specific Operations ❑ Record Keeping/Maintenance Procedures

Description

Work Practice Type	Process Material Code	Process Material Description	Reference Test Method

Parameter Code	Parameter Description	Manufacturer Name/Model No.

Limit Upper	Limit Lower	Limit Units Code	Limit Units Description

Averaging Method Code	Averaging Method Description	Monitoring Frequency Code	Monitoring Frequency Description	Reporting Requirements Code	Reporting Requirements Description

Facility Emissions Summary ❑ Continuation Sheet(s)

CAS No.	Contaminant Name	PTE (lbs/yr)	PTE Range Code	Actual (lbs/yr)
NY075 - 00 - 5	PM-10			
NY075 - 00 - 0	PARTICULATES			
7446 - 09 - 5	SULFUR DIOXIDE			
NY210 - 00 - 0	OXIDES OF NITROGEN			
630 - 08 - 0	CARBON MONOXIDE			
7439 - 92 - 1	LEAD			
NY998 - 00 - 0	VOC	117		
NY100 - 00 - 0	HAP	110		
0079 - 01 - 6	Trichloroethylene	99		
00075 - 01 - 4	Vinyl Chloride	3.7		
00540 - 59 - 0	1,2-Dichloroethylene	7.3		
- -				
- -				

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- - -

Section IV - Emission Unit Information

Emission Unit Description

❑ Continuation Sheet(s)

EMISSION UNIT: 0-00EU1

Air Stripper AS-1 for groundwater remediation, provided with activated carbon for emission control. The emission point is stack 00ST-1. The 2-stage VGAC is followed by a 3rd vessel containing a potassium permanganate zeolite media for increased VC capacity.

Building

❑ Continuation Sheet(s)

Building	Building Name	Length (ft)	Width (ft)	Orientation
BLDG-1	Treatment Plant	75	75	0

Emission Point

❑ Continuation Sheet(s)

EMISSION PT.: 00ST1

Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section	
					Length (in)	Width (in)
90	40	15	36	80		
Exit Velocity (FPS)	**Exit Flow (ACFM)**	**NYTM (E) (KM)**	**NYTM (N) (KM)**	**Building**	**Distance to Property Line (ft)**	**Date of Removal**
19	8020			BLDG-1	50	

EMISSION PT.:

Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section	
					Length (in)	Width (in)
Exit Velocity (FPS)	**Exit Flow (ACFM)**	**NYTM (E) (KM)**	**NYTM (N) (KM)**	**Building**	**Distance to Property Line (ft)**	**Date of Removal**

Emission Source/Control

❑ Continuation Sheet(s)

Emission Source ID	Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.
AS-1	I				048	Granular Act. Carbon	Air Stripping Column

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

Emission Source ID	Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Section IV - Emission Unit Information (continued)

Process Information

❑ Continuation Sheet(s)

EMISSION UNIT 0-00EU1 PROCESS PR1

Description

The remedial system is air stripping, using a packed column at a groundwater flow rate of 1,100 gpm (plus 100 gpm recycle, for a total of 1,200 gpm). Vapor phase treatment includes the use of 3 vessels, a 2-stage GAC unit, followed by a 3rd vessel containing a potassium permanganate impregnated zeolite for increased VC capacity. Prior to entering the vapor-phase GAC adsorption system, the humidity of the air stripper exhaust is reduced to approximately 50 percent or less to optimize the efficiency of the vapor-phase GAC.

Air Stripper AS-1: Existing. Type: Vertical, Cylindrical Construction: Aluminum

Packing: 25-foot Jaeger Tripack. Dimensions: 10.0 ft. Dia x 47 ft. H

Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units	
	Quantity/Hr	Quantity/Yr	Code	Description

❑ Confidential ☒ Operating at Maximum Capacity ❑ Activity with Insignificant Emissions	Operating Schedule		Building	Floor/Location
	Hrs/Day	Days/Yr		
	24	365	BLDG-1	Main

Emission Source/Control Identifier(s)

AS-1							

EMISSION UNIT - PROCESS

Description

Source Classification Code (SCC)	Total Thruput		Thruput Quantity Units	
	Quantity/Hr	Quantity/Yr	Code	Description

❑ Confidential ❑ Operating at Maximum Capacity ❑ Activity with Insignificant Emissions	Operating Schedule		Building	Floor/Location
	Hrs/Day	Days/Yr		

Emission Source/Control Identifier(s)

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Section IV - Emission Unit Information (continued)

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements ❑ Continuation Sheet(s)									
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
-													
-													
-													
-													

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements ❑ Continuation Sheet(s)									
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
-													
-													
-													
-													

Emission Unit Compliance Certification ❑ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause
6	NYCRR	212							

☒ Applicable Federal Requirement ❑ State Only Requirement ❑ Capping

Emission Unit	Emission Point	Process	Emission Source	CAS No.	Contaminant Name
0-00EU1	00ST1	PR1	AS-1	00079 - 01 - 6	Trichloroethylene

Monitoring Information

❑ Continuous Emission Monitoring
☒ Intermittent Emission Testing
❑ Ambient Air Monitoring
❑ Monitoring of Process or Control Device Parameters as Surrogate
❑ Work Practice Involving Specific Operations
❑ Record Keeping/Maintenance Procedures

Description

Monthly grab samples analyzed for VOCs from the vapor phase treatment system influent, effluent and two intermediate locations.

Work Practice Type	Process Material Code	Process Material Description	Reference Test Method

Parameter Code	Parameter Description	Manufacturer Name/Model No.
23	Concentration	

Limit Upper	Limit Lower	Limit Units Code	Limit Units Description
3,125		255	micrograms per cubic meter

Averaging Method Code	Averaging Method Description	Monitoring Frequency Code	Monitoring Frequency Description	Reporting Requirements Code	Reporting Requirements Description
01	Instantaneous	05	Monthly	10	Upon Request

DEC ID
- -

Section IV - Emission Unit Information (continued)

Determination of Non-Applicability (Title V Only) N/A ❑ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

Emission Unit	Emission Point	Process	Emission Source	❑ Applicable Federal Requirement ❑ State Only Requirement
-				

Description

Rule Citation

Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause

Emission Unit	Emission Point	Process	Emission Source	❑ Applicable Federal Requirement ❑ State Only Requirement
-				

Description

Process Emissions Summary ❑ Continuation Sheet(s)

EMISSION UNIT	0-00EU1				PROCESS	P R 1
CAS No.	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined
0079 - 01 - 6	Trichloroethylene			95	1.87	02

PTE (lbs/hr)	PTE (lbs/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lbs/hr)	Actual (lbs/yr)
0.09	99			02		

EMISSION UNIT	0-00EU1				PROCESS	P R 1
CAS No.	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined
00075- 01 - 4	Vinyl Chloride			95	0.17	03

PTE (lbs/hr)	PTE (lbs/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lbs/hr)	Actual (lbs/yr)
0.01	3.7			02		

EMISSION UNIT	0-00EU1				PROCESS	P R 1
CAS No.	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined
000540 - 59 - 0	1,2-Dichloroethylene			95	0.6	02

PTE (lbs/hr)	PTE (lbs/yr)	PTE (standard units)	Standard Units	PTE How Determined	Actual (lbs/hr)	Actual (lbs/yr)
0.03	7.3			02		

DEC ID
- - -

Section IV - Emission Unit Information (continued)

EMISSION UNIT 0-00EU1	Emission Unit Emissions Summary		❑ Continuation Sheet(s)	
CAS No.	Contaminant Name			
00107- 06 - 2	1,2-Dichloroethane			
ERP (lbs/yr)	PTE Emissions		Actual	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
13.4	Below Reporting Threshold BRT			
CAS No.	Contaminant Name			
00108 - 88 - 3	Toluene			
ERP (lbs/yr)	PTE Emissions		Actual	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
72.7	BRT	BRT		
CAS No.	Contaminant Name			
01330- 20 - 7	Xylene			
ERP (lbs/yr)	PTE Emissions		Actual	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
77.1	BRT	BRT		
CAS No.	Contaminant Name			
- -	1,1,2-Trichloroethane			
ERP (lbs/yr)	PTE Emissions		Actual	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
	BRT	BRT		

Compliance Plan

❑ Continuation Sheet(s)

For any emission units which are not in compliance at the time of permit application, the applicant shall complete the following

Consent Order — Certified progress reports are to be submitted every 6 months beginning ____/____/____

Emission Unit	Process	Emission Source	Applicable Federal Requirement									
			Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause
-												

Remedial Measure / Intermediate Milestones	R/I	Date Scheduled

DEC ID

Section IV - Emission Unit Information (continued)

Request for Emission Reduction Credits

❑ Continuation Sheet(s)

EMISSION UNIT

Emission Reduction Description

Contaminant Emission Reduction Data

Baseline Period ___/___/___ to ___/___/___

Reduction Date	Reduction Method
/ /	

CAS No.	Contaminant Name	ERC (lbs/yr) Netting	ERC (lbs/yr) Offset
- -			
- -			
- -			

Facility to Use Future Reduction

Name | APPLICATION ID

Location Address

❑ City / ❑ Town / ❑ Village | State | Zip

Use of Emission Reduction Credits

❑ Continuation Sheet(s)

EMISSION UNIT

Proposed Project Description

Contaminant Emissions Increase Data

CAS No.	Contaminant Name	PEP (lbs/yr)
- -		

Statement of Compliance

❑ All facilities under the ownership of this "ownership/firm" are operating in compliance with all applicable requirements and state regulations including any compliance certification requirements under Section 114(a)(3) of the Clean Air Act Amendments of 1990, or are meeting the schedule of a consent order.

Source of Emission Reduction Credit - Facility

Name | PERMIT ID

Location Address

❑ City / ❑ Town / ❑ Village | State | Zip

Emission Unit	CAS No.	Contaminant Name	ERC (lbs/yr) Netting	ERC (lbs/yr) Offset
-	- -			
-	- -			
-	- -			

DEC ID
- -

Supporting Documentation

- ☒ P.E. Certification (form attached)
- ❑ List of Exempt Activities (form attached)
- ☒ Plot Plan
- ❑ Methods Used to Determine Compliance (form attached)
- ☒ Calculations
- ❑ Air Quality Model (_____ / _____ / _____)
- ❑ Confidentiality Justification
- ❑ Ambient Air Monitoring Plan (_____ / _____ / _____)
- ❑ Stack Test Protocols/Reports (_____ / _____ / _____)
- ❑ Continuous Emissions Monitoring Plans/QA/QC (_____ / _____ / _____)
- ❑ MACT Demonstration (_____ / _____ / _____)
- ❑ Operational Flexibility: Description of Alternative Operating Scenarios and Protocols
- ❑ Title IV: Application/Registration
- ❑ ERC Quantification (form attached)
- ❑ Use of ERC(s) (form attached)
- ❑ Baseline Period Demonstration
- ❑ Analysis of Contemporaneous Emission Increase/Decrease
- ❑ LAER Demonstration (_____ / _____ / _____)
- ❑ BACT Demonstration (_____ / _____ / _____)
- ❑ Other Document(s): _____ (/ /)

ATTACHMENT B

2008 EMISSION ESTIMATES BASED ON 95% REMOVAL

ATTACHMENT 1
Emission Estimate

POTENTIAL EMISSION ESTIMATES, USED TO DEVELOP 95% REDUCTION OF EMISSION VALUES AS BASED ON INFLUENT GROUNDWATER CONCENTRATIONS (95% REDUCTION OF EMISSION VALUES ARE PROVIDED ON PAGE 7 OF THE 2008 AIR PERMIT APPLICATION PROCESS EMISSIONS SUMMARY)

Feed Water Flow	1,100	gpm: max or normal
	250	m^3/hr
Water Flow Including Recycle	1,200	gpm: max or normal
	273	m^3/hr
Air Flow	8,000	cfm
	13,592	m^3/hr
A/W vol ratio	50	

EXAMPLE EMISSION CALC: Vinyl Chloride
4.8 ug/L x 1000 L/m^3 x 250 m^3 water/13,623 m^3 air = 88 ug/m^3

Name	CAS Number	Toxicity: H/M/L[2]	VOC[3]	HAP[4]	GW Conc.[1] Max ug/L	GW Conc.[1] Avg ug/L	Effluent Conc[1] Max ug/L	Effluent Conc[1] Avg ug/L	Uncontrolled Stripper Exhaust Max lb/day	Avg lb/day	Max lb/hr	Avg lb/hr	Max gm/sec	Avg gm/sec	Max ug/m^3	Avg ug/m^3
1,1,1-Trichloroethane (Methyl Chloroform)	00071-55-6	L	**No**	Yes	3	3.0			0.04	0.04	0.00	0.00	2.08E-04	2.08E-04	55	55
1,1,2-Trichloroethane	00079-00-5	M	Yes	Yes	3.5	0.3			0.05	0.00	0.00	0.00	2.43E-04	2.08E-05	64	6
1,1-Dichloroethane	00075-34-3	L	Yes	Yes	4	0.7			0.05	0.01	0.00	0.00	2.77E-04	4.85E-05	74	13
1,2-Dichloroethane	00107-06-2	M	Yes	Yes	3	1.0	0.3	0.1	0.04	0.01	0.00	0.00	1.87E-04	6.24E-05	55	18
1,1-Dichloroethylene (Vinylidene Chloride)	00075-35-4	M	Yes	Yes	9	1.6			0.12	0.02	0.00	0.00	6.24E-04	1.11E-04	165	29
1,2-Dichloroethylene	00540-59-0	M	Yes	**No**	1,100	31.5	1.3	0.0	14.51	0.42	0.60	0.02	7.62E-02	2.18E-03	20,219	579
Benzene	00071-43-2	H	Yes	Yes	4	0.1			0.05	0.00	0.00	0.00	2.77E-04	6.94E-06	74	2
Carbon Tetrachloride	00056-23-5	H	Yes	Yes	4	0.1			0.05	0.00	0.00	0.00	2.77E-04	6.94E-06	74	2
Chlorobenzene (Monochlorobenzene)	00108-90-7	M	Yes	Yes	1	0.1			0.01	0.00	0.00	0.00	6.94E-05	6.94E-06	18	2
Chloroform	00067-66-3	M	Yes	Yes	2	0.8			0.03	0.01	0.00	0.00	1.39E-04	5.55E-05	37	15
Methyl Tert Butyl Ether	01634-04-4	M	Yes	Yes	2	0.1			0.03	0.00	0.00	0.00	1.39E-04	6.94E-06	37	2
Tetrachloroethylene	00127-18-4	M	Yes	Yes	900	33.8	0.9	0.0	11.88	0.45	0.49	0.02	6.24E-02	2.34E-03	16,543	621
Toluene	00108-88-3	L	Yes	Yes	15	0.7			0.20	0.01	0.01	0.00	1.04E-03	4.85E-05	276	13
Trichloroethylene	00079-01-6	M	Yes	Yes	3,400	411.5	4.5	0.5	44.86	5.43	1.87	0.23	2.35E-01	2.85E-02	62,494	7,564
Vinyl chloride	00075-01-4	H	Yes	Yes	300	4.8	0.0	0.0	3.96	0.06	0.17	0.00	2.08E-02	3.33E-04	5,514	88
Xylenes	01330-20-7	M	Yes	Yes	16	0.2			0.21	0.00	0.01	0.00	1.11E-03	1.39E-05	294	4
Total VOCs					5,764	487.3	7.0	0.6	76.05	6.43	3.17	0.27				
Total HAPs					4,667	458.8	5.7	0.6	61.57	6.05	2.57	0.25				

Total Uncontrolled VOC 2,347 lb/yr
Total Uncontrolled HAP 2,209 lb/yr

1. Source: "GM-38 Groundwater Remedy Analysis Report", February 2003
2. Source: DAR-1 AGC/SGC Tables, NYSDEC Division of Air Resources, Air Toxics Section, September 10, 2007.
3. Source: 6 NYCRR Part 200 1(cg)
4. Source: 6 NYCRR Part 200.1(ag)

ATTACHMENT 1
Emission Estimate

Feed Water Flow	1,100	gpm: max or normal
	250	m^3/hr
Water Flow Including Recycle	1,200	gpm: max or normal
	273	m^3/hr
Air Flow	8,000	cfm
	13,592	m^3/hr
A/W vol ratio	50	

					Controlled Stripper Exhaust				
Name	CAS Number	Toxicity: H/M/L[2]	VOC[3]	HAP[4]	Control by GAC	Max lb/day	Avg lb/day	Max gm/sec	Avg gm/sec
1,1,1-Trichloroethane (Methyl Chloroform)	00071-55-6	L	**No**	Yes	95%	0.00	0.00	1.04E-05	1.04E-05
1,1,2-Trichloroethane	00079-00-5	M	Yes	Yes	95%	0.00	0.00	1.21E-05	1.04E-06
1,1-Dichloroethane	00075-34-3	L	Yes	Yes	95%	0.00	0.00	1.39E-05	2.43E-06
1,2-Dichloroethane	00107-06-2	M	Yes	Yes	95%	0.00	0.00	9.36E-06	3.12E-06
1,1-Dichloroethylene (Vinylidene Chloride)	00075-35-4	M	Yes	Yes	95%	0.01	0.00	3.12E-05	5.55E-06
1,2-Dichloroethylene	00540-59-0	M	Yes	**No**	95%	0.73	0.02	3.81E-03	1.09E-04
Benzene	00071-43-2	H	Yes	Yes	95%	0.00	0.00	1.39E-05	3.47E-07
Carbon Tetrachloride	00056-23-5	H	Yes	Yes	95%	0.00	0.00	1.39E-05	3.47E-07
Chlorobenzene (Monochlorobenzene)	00108-90-7	M	Yes	Yes	95%	0.00	0.00	3.47E-06	3.47E-07
Chloroform	00067-66-3	M	Yes	Yes	95%	0.00	0.00	6.94E-06	2.77E-06
Methyl Tert Butyl Ether	01634-04-4	M	Yes	Yes	95%	0.00	0.00	6.94E-06	3.47E-07
Tetrachloroethylene	00127-18-4	M	Yes	Yes	95%	0.59	0.02	3.12E-03	1.17E-04
Toluene	00108-88-3	L	Yes	Yes	95%	0.01	0.00	5.20E-05	2.43E-06
Trichloroethylene	00079-01-6	M	Yes	Yes	95%	2.24	0.27	1.18E-02	1.43E-03
Vinyl chloride	00075-01-4	H	Yes	Yes	95%	0.20	0.00	1.04E-03	1.66E-05
Xylenes	01330-20-7	M	Yes	Yes	95%	0.01	0.00	5.55E-05	6.94E-07
Total VOCs						3.80	0.32		
Total HAPs						3.08	0.30		

Total Controlled VOC	117	lb/yr
Total Controlled HAP	110	lb/yr

1. Source: "GM-38 Groundwater Remedy Analysis Report", February 2003
2. Source: DAR-1 AGC/SGC Tables, NYSDEC Division of Air Resources, Air Tox
3. Source: 6 NYCRR Part 200.1(cg)
4. Source: 6 NYCRR Part 200.1(ag)

ATTACHMENT C

2011 DISCHARGE GOALS AND 2011 DAR-1 ANALYSIS

Tetra Tech NUS		***STANDARD CALCULATION SHEET***	
CLIENT: US CLEAN	FILE No:	BY: SK	PAGE: 1 of 1
SUBJECT: Calculation of Current Discharge Goals GM-38 Area NWIRP Bethpage, New York		CHECKED BY:	DATE: 9/7/2011

1. Purpose:

To calculate current discharge goals for Trichloroethene (TCE), Tetrachloroethene (PCE), Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total), for treatment of off-gas from the air stripper stack AS-1.

2. Approach:

From the Contaminant Assessment Summary of the DAR-1 Model output for TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total) (see DAR-1 output for analysis inputs), use the Actual Annual % of the Annual Guideline Concentration (AGC), a current average flow rate of 9,200 cubic feet per minute (cfm), and influent chemical emission rates in pounds per hour (lb/hour) and pounds per year (lb/year) to back calculate current discharge goals.

3. Calculation of Current Discharge Goals:

Chemical	Current Actual Annual % of AGC[(1)]	Current Maximum Concentration ($\mu g/m^3$)[(2)]	Current Chemical Emission Rate Prior to Treatment (lb/hour)[(3)]	Current Chemical Emission Rate Prior to Treatment (lb/year)[(3)]	Calculated Discharge Goal (lb/hr)[(4)]	Calculated Discharge Goal (lb/year)[(4)]	Maximum Allowable Concentration ($\mu g/m^3$)[(4)]
TCE	390.6	10,000	0.3446	3,019	0.0882	770	2,600
PCE	132.8	6,800	0.2344	2,053	0.1764	1,500	5,100
Vinyl Chloride	13.49	76	0.0026	22.94	0.0194	170	560
cis 1,2-Dichloroethene	0.2322	750	0.0258	226.4	11.13	98,000	320,000
1,2-Dichloroethene (total)	0.2322	750	0.0258	226.4	11.13	98,000	320,000

Notes:

[(1)]Actual Annual % of the AGCs is from the attached DAR-1 Model Output.

[(2)]Values were taken from the Quarterly Operations Report First Quarter 2011 (June 2011) from ECOR Federal Services. Values were the maximum effluent concentration in off gas from air stripper stack AS-1 for the months of January, February, and March 2011.

[(3)]Chemical Emission Rates were calculated from maximum concentrations and an average flow rate of 9,200 cfm.

[(4)]Discharge Goals are based on a flow of 9,200 cfm, and calculated from the Actual Annual % of the AGCs from the DAR-1 Model Output to achieve air quality requirements. The summary of additional inputs for this model run is provided in the DAR-1 Model Output. Stack height is 40 feet, and the property line was evaluated at a distance of 50 feet.

BETHPAGE SITE GM-38 OFF-SITE GROUNDWATER AIR STRIPPER STACK EMISSIONS
DAR-1 MODEL OUTPUT, POINT SOURCE (STACK EMISSIONS) TYPE
INCLUDES ISCLT MODELING SUMMARY

I. Summary of Inputs for Model Run to Nearest Property Line (50 feet), worst case scenario (highest contaminant concentrations seen in first quarter 2011 in untreated effluent from Air Stripper AS-1 prior to treatment with granular activated carbon (GAC))

Chemical	CAS No. 00079-01-6 (TCE)	CAS No. 00127-18-4 (PCE)	CAS No. 00075-01-4 (Vinyl Chloride)	CAS No. 00156-59-2 (cis 1,2-Dichloroethene)	CAS No. 00540-59-0 (1,2-Dichloroethene, total)
Emission Rate Prior to Treatment[(1)] (lb/hour)	0.3444	0.2342	0.0026	0.0258	0.0258
Emission Rate Prior to Treatment[(1)] (lb/year)	3,017	2,052	22.93	226.0	226.0
Maximum Concentration of Untreated Off Gas ($\mu g/m^3$)[(1)]	10,000	6,800	76	750	750
Annual Guideline Concentration (AGC) ($\mu g/m^3$)	0.5	1.0	0.11	63	63
Short-term Guideline Concentration (SGC) ($\mu g/m^3$)	14,000	1,000	180,000	--	--

HA	Height Above stack/ maximum height of plume (HA, feet)	15
SH	Stack Height/Treatment Building Air Stack (SH, feet)	40
D	Stack Diameter (D, inches)	36
T	Stack Exit Temperature (T, degrees Fahrenheit)	80
V	Stack Exit Velocity (V, ft/sec)	21.69
Q[(2)]	Stack Exit Flow Rate [Q, Actual Cubic Feet per Minute (ACFM)]	9,200
Dpl	Shortest Distance from Source Building (Treatment Building) to Property Line (Dpl, feet) for point sources	50
BW	Building Width (BW, feet) of Source Building (Treatment Building) for point sources	75
BL	Building Length (BL, feet) of Source Building (Treatment Building)	75
Q	Actual Hourly Emission Rate (lbs/hour) for source contaminant	Chemical specific, see above
Qa	Actual Annual Emission Rate (lbs/year) for source contaminant	Chemical specific, see above

[(1)] Emission rates and maximum concentration values were taken from the Quarterly Operations Report First Quarter (June 2011) as provided by ECOR Services, using January, February, and March 2011 maximum rates of untreated off gas from Air Stripper AS-1 in the

GM-38 Treatment Building. Emission rates are based on continuous operation 24 hours per day, 7 days a week, 52 weeks a year, or approximately 8,760 hours of operation.
(2) "Q" is an average value of January and February 2011 monthly flow rates. Effective water and vapor flow rates were reduced during the reporting period of March due to a shutdown of the Treatment Plant on March 23, 2011.

II. Contaminant Assessment Summary of TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):

CONTAMINANT ASSESSMENT SUMMARY OF DAR-1 ANALYSIS 9/ 8/11
Page 1

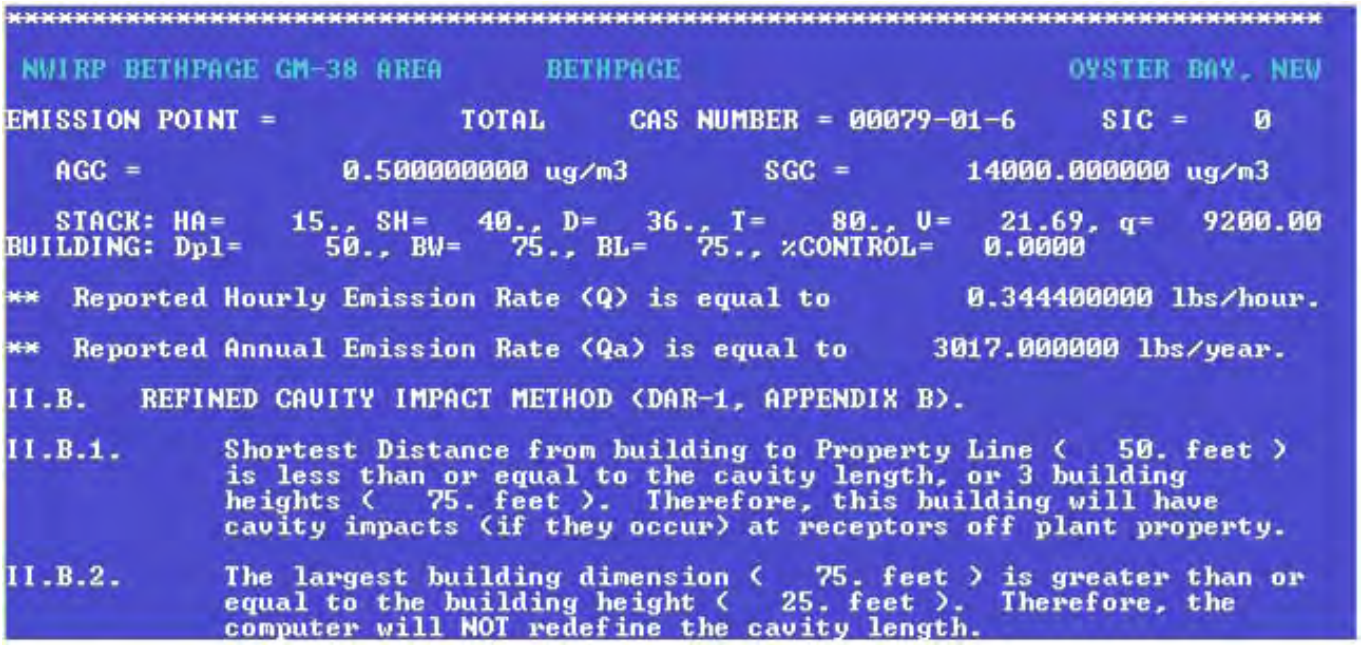
		SHORT-TERM	CAVITY	POINT or AREA SOURCE	
CAS NUMBER	AGC ug/m3	MAXIMUM (Gav,Pt,Area) % OF SGC	ACTUAL ANNUAL % OF AGC	POTENTIAL ANNUAL % OF AGC	ACTUAL ANNUAL % OF AGC
00075-01-4	0.11000000	0.0005	0.0000	13.3889	13.4948
00079-01-6	0.50000000	0.7757	0.0000	390.1734	390.6266
00127-18-4	1.00000000	7.3852	0.0000	132.6635	132.8415
00156-59-2	63.00000000	0.0000	0.0000	0.2320	0.2322
00540-59-0	63.00000000	0.0000	0.0000	0.2320	0.2322
SUMMARY TOTALS		8.1614	0.0000	536.6897	537.4274

III. Contaminant Impact Summary of TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):

CONTAMINANT IMPACT SUMMARY OF DAR-1 ANALYSIS 9/ 8/11
Page 1

		SHORT-TERM	CAVITY	POINT or AREA SOURCE	
CAS NUMBER	AGC ug/m3	MAXIMUM (Gav,Pt,Area) ug/m3	ACTUAL ANNUAL ug/m3	POTENTIAL ANNUAL ug/m3	ACTUAL ANNUAL ug/m3
00075-01-4	0.11000000	0.81988204	0.00000000	0.01472780	0.01484433
00079-01-6	0.50000000	108.60282900	0.00000000	1.95086694	1.95313276
00127-18-4	1.00000000	73.85244750	0.00000000	1.32663476	1.32841504
00156-59-2	63.00000000	8.13575172	0.00000000	0.14614509	0.14630693
00540-59-0	63.00000000	8.13575172	0.00000000	0.14614509	0.14630693

IV. Contaminant Impact Summary Step by Step Menu for TCE:



```
**********************************************************************************
 NWIRP BETHPAGE GM-38 AREA      BETHPAGE                              OYSTER BAY, NEW

EMISSION POINT =           TOTAL     CAS NUMBER = 00079-01-6     SIC =    0

   AGC =            0.500000000 ug/m3        SGC =       14000.000000 ug/m3

   STACK: HA=    15., SH=   40., D=   36., T=    80., V=   21.69, q=   9200.00
BUILDING: Dpl=     50., BW=   75., BL=   75., %CONTROL=   0.0000

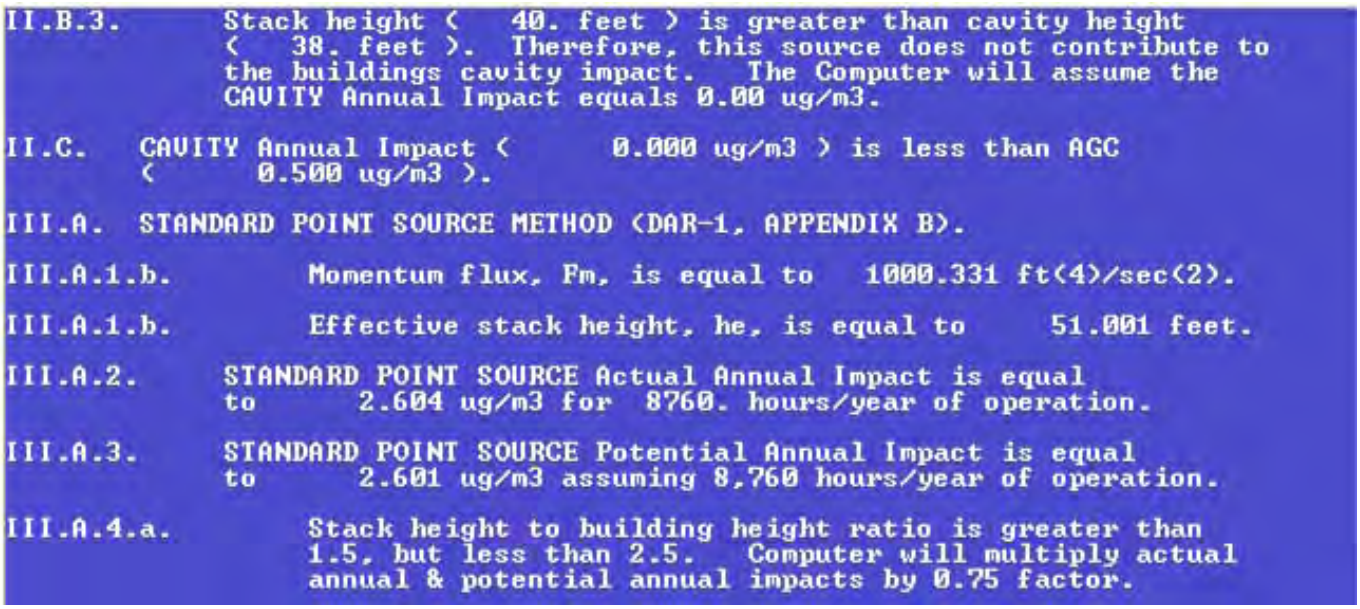
**  Reported Hourly Emission Rate (Q) is equal to         0.344400000 lbs/hour.

**  Reported Annual Emission Rate (Qa) is equal to     3017.000000 lbs/year.

II.B.   REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).

II.B.1.       Shortest Distance from building to Property Line (   50. feet )
              is less than or equal to the cavity length, or 3 building
              heights (   75. feet ).  Therefore, this building will have
              cavity impacts (if they occur) at receptors off plant property.

II.B.2.       The largest building dimension (   75. feet ) is greater than or
              equal to the building height (   25. feet ).  Therefore, the
              computer will NOT redefine the cavity length.
```



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II.B.3.       Stack height (   40. feet ) is greater than cavity height
              (   38. feet ).  Therefore, this source does not contribute to
              the buildings cavity impact.   The Computer will assume the
              CAVITY Annual Impact equals 0.00 ug/m3.

II.C.   CAVITY Annual Impact (      0.000 ug/m3 ) is less than AGC
        (      0.500 ug/m3 ).

III.A.  STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).

III.A.1.b.          Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).

III.A.1.b.          Effective stack height, he, is equal to     51.001 feet.

III.A.2.      STANDARD POINT SOURCE Actual Annual Impact is equal
              to       2.604 ug/m3 for  8760. hours/year of operation.

III.A.3.      STANDARD POINT SOURCE Potential Annual Impact is equal
              to       2.601 ug/m3 assuming 8,760 hours/year of operation.

III.A.4.a.          Stack height to building height ratio is greater than
                    1.5, but less than 2.5.   Computer will multiply actual
                    annual & potential annual impacts by 0.75 factor.
```

```
III.A.5.      STANDARD POINT SOURCE Short-Term Impact is calculated below
              using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D.  STANDARD POINT SOURCE Actual Annual Impact (      1.953 ug/m3 ) is
        greater than AGC (        0.500 ug/m3 ).

        **** Refer to DAR-1 Section III.D.1.  A refined site          ****
        **** specific modeling analyis may be required.                ****

III.D.  STANDARD POINT SOURCE Potential Annual Impact (      1.951 ug/m3 )
        is greater than AGC (        0.500 ug/m3 ).

        **** Potential Annual Impact is based upon 8760 hours/year         ****
        **** operation instead of reported 8760. hours/year.               ****

2.0     DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
        See "Technical Reference for the Screening Procedures of the
        DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2           CAVITY Short-Term Impact is equal to  0.00 ug/m3 as the plume
              escaped the cavity region:  hs(  40. feet) > hc(  26. feet).

II.C.   CAVITY Short-Term Impact (      0.000 ug/m3 ) is less
        than SGC (  14000.000 ug/m3 ).
```

```
2.3           Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).

2.3           Effective stack height, he, is equal to     51.001 feet.

2.4           Maximum non-downwash GEP stack Short-Term Impact (GSTP) is equal
              to        38.826 ug/m3,  for   hs/hb =   1.60

2.5           Maximum downwash Short-Term Impact (GSTD) is equal
              to      129.908 ug/m3, for:  hs/hb =   1.60 and ESH =   51. feet.

2.6           Adjusted maximum downwash Short-Term (GSTD) is equal
              to      108.603 ug/m3,  for:  RF =   0.84

III.D.  Maximum non-cavity Short-Term Impact (CST:       108.603 ug/m3 ) is
        less than the SGC (    14000.000 ug/m3 ) for the point source.

2.7           Maximum Short-Term cavity, point, or area source impact
              (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals      108.603 ug/m3
              and is reported in the ANALYSIS MENU.  This value is less than
              the SGC (    14000.000 ug/m3 ).
```

V. Contaminant Impact Summary Step by Step Menu for PCE:

```
**********************************************************************************
 NWIRP BETHPAGE GM-38 AREA      BETHPAGE                          OYSTER BAY, NEW
EMISSION POINT =          TOTAL     CAS NUMBER = 00127-18-4     SIC =    0
   AGC =            1.000000000 ug/m3        SGC =         1000.000000 ug/m3
   STACK: HA=    15., SH=   40., D=   36., T=    80., V=   21.69, q=   9200.00
BUILDING: Dpl=     50., BW=   75., BL=   75., %CONTROL=   0.0000
**  Reported Hourly Emission Rate (Q) is equal to         0.234200000 lbs/hour.
**  Reported Annual Emission Rate (Qa) is equal to     2052.000000 lbs/year.
II.B.   REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).
II.B.1.       Shortest Distance from building to Property Line (   50. feet )
              is less than or equal to the cavity length, or 3 building
              heights (   75. feet ).  Therefore, this building will have
              cavity impacts (if they occur) at receptors off plant property.
II.B.2.       The largest building dimension (   75. feet ) is greater than or
              equal to the building height (   25. feet ).  Therefore, the
              computer will NOT redefine the cavity length.
```

```
II.B.3.       Stack height (   40. feet ) is greater than cavity height
              (   38. feet ).  Therefore, this source does not contribute to
              the buildings cavity impact.   The Computer will assume the
              CAVITY Annual Impact equals 0.00 ug/m3.
II.C.   CAVITY Annual Impact (      0.000 ug/m3 ) is less than AGC
        (      1.000 ug/m3 ).
III.A.  STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).
III.A.1.b.        Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).
III.A.1.b.        Effective stack height, he, is equal to     51.001 feet.
III.A.2.      STANDARD POINT SOURCE Actual Annual Impact is equal
              to      1.771 ug/m3 for  8762. hours/year of operation.
III.A.3.      STANDARD POINT SOURCE Potential Annual Impact is equal
              to      1.769 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a.        Stack height to building height ratio is greater than
                  1.5, but less than 2.5.   Computer will multiply actual
                  annual & potential annual impacts by 0.75 factor.
```

```
III.A.5.      STANDARD POINT SOURCE Short-Term Impact is calculated below
              using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D.  STANDARD POINT SOURCE Actual Annual Impact (      1.328 ug/m3 ) is
        greater than AGC (        1.000 ug/m3 ).

        **** Refer to DAR-1 Section III.D.1.  A refined site          ****
        **** specific modeling analyis may be required.                ****

III.D.  STANDARD POINT SOURCE Potential Annual Impact (      1.327 ug/m3 )
        is greater than AGC (        1.000 ug/m3 ).

        ***** Potential Annual Impact is based upon 8760 hours/year        *****
        ***** operation instead of reported 8762. hours/year.              *****

2.0     DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
        See "Technical Reference for the Screening Procedures of the
        DAR-1 Software Program, Wade/Sedefian," 1/11/94.

2.2           CAVITY Short-Term Impact is equal to  0.00 ug/m3 as the plume
              escaped the cavity region:  hs(  40. feet) > hc(  26. feet).

II.C.   CAVITY Short-Term Impact (      0.000 ug/m3 ) is less
        than SGC (   1000.000 ug/m3 ).
```

```
2.3           Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).

2.3           Effective stack height, he, is equal to     51.001 feet.

2.4           Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal
              to        26.403 ug/m3,  for   hs/hb =   1.60

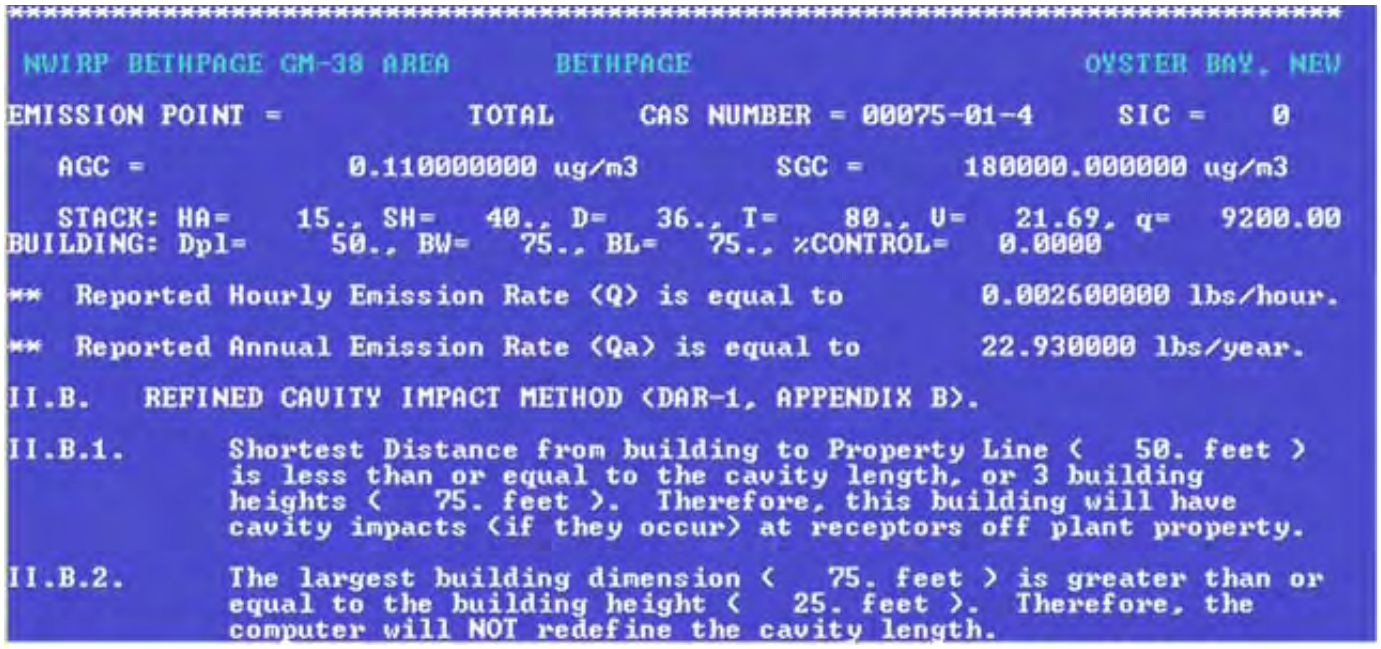
2.5           Maximum downwash Short-Term Impact (CSTD) is equal
              to        88.340 ug/m3, for:  hs/hb =   1.60 and ESH =   51. feet.

2.6           Adjusted maximum downwash Short-Term (CSTD) is equal
              to        73.852 ug/m3,  for:  RF =   0.84

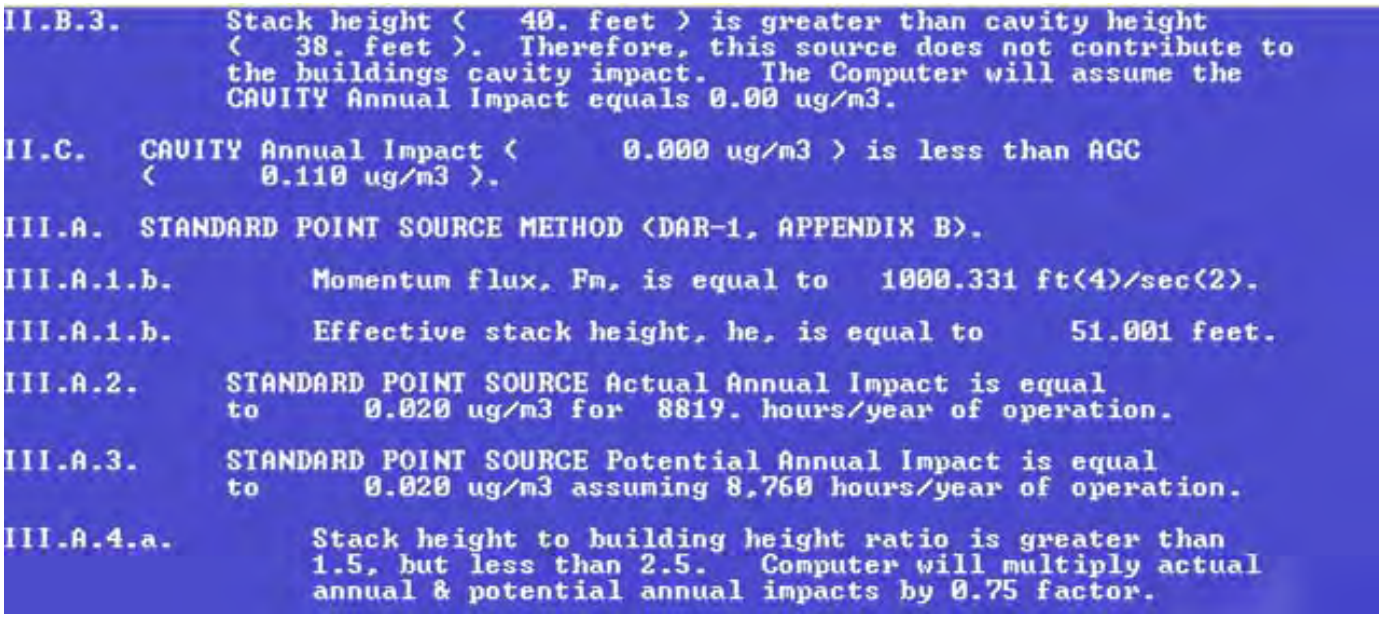
III.D.  Maximum non-cavity Short-Term Impact (CST:        73.852 ug/m3 ) is
        less than the SGC (     1000.000 ug/m3 ) for the point source.

2.7           Maximum Short-Term cavity, point, or area source impact
              (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals       73.852 ug/m3
              and is reported in the ANALYSIS MENU.  This value is less than
              the SGC (     1000.000 ug/m3 ).
```

VI. Contaminant Impact Summary Step by Step Menu for Vinyl Chloride:



```
**********************************************************************
 NWIRP BETHPAGE GM-38 AREA      BETHPAGE                    OYSTER BAY, NEW
EMISSION POINT =          TOTAL     CAS NUMBER = 00075-01-4     SIC =    0
   AGC =            0.110000000 ug/m3        SGC =      180000.000000 ug/m3
   STACK: HA=    15., SH=   40., D=   36., T=    80., V=   21.69, q=   9200.00
BUILDING: Dpl=     50., BW=   75., BL=   75., %CONTROL=   0.0000
**  Reported Hourly Emission Rate (Q) is equal to        0.002600000 lbs/hour.
**  Reported Annual Emission Rate (Qa) is equal to       22.930000 lbs/year.
II.B.   REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).
II.B.1.      Shortest Distance from building to Property Line (   50. feet )
             is less than or equal to the cavity length, or 3 building
             heights (   75. feet ).  Therefore, this building will have
             cavity impacts (if they occur) at receptors off plant property.
II.B.2.      The largest building dimension (   75. feet ) is greater than or
             equal to the building height (   25. feet ).  Therefore, the
             computer will NOT redefine the cavity length.
```



```
II.B.3.      Stack height (   40. feet ) is greater than cavity height
             (   38. feet ).  Therefore, this source does not contribute to
             the buildings cavity impact.   The Computer will assume the
             CAVITY Annual Impact equals 0.00 ug/m3.
II.C.   CAVITY Annual Impact (      0.000 ug/m3 ) is less than AGC
        (      0.110 ug/m3 ).
III.A.  STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).
III.A.1.b.       Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).
III.A.1.b.       Effective stack height, he, is equal to     51.001 feet.
III.A.2.     STANDARD POINT SOURCE Actual Annual Impact is equal
             to      0.020 ug/m3 for  8819. hours/year of operation.
III.A.3.     STANDARD POINT SOURCE Potential Annual Impact is equal
             to      0.020 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a.       Stack height to building height ratio is greater than
                 1.5, but less than 2.5.   Computer will multiply actual
                 annual & potential annual impacts by 0.75 factor.
```

```
III.A.5.      STANDARD POINT SOURCE Short-Term Impact is calculated below
              using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D.  STANDARD POINT SOURCE Actual Annual Impact (      0.015 ug/m3 ) is
        less than AGC (        0.110 ug/m3 ).

III.D.  STANDARD POINT SOURCE Potential Annual Impact (      0.015 ug/m3 )
        is less than AGC (        0.110 ug/m3 ).

        **** Potential Annual Impact is based upon 8760 hours/year        ****
        **** operation instead of reported 8819. hours/year.              ****

2.0     DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
        See "Technical Reference for the Screening Procedures of the
        DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2           CAVITY Short-Term Impact is equal to  0.00 ug/m3 as the plume
              escaped the cavity region:  hs(  40. feet) > hc(  26. feet).

II.C.   CAVITY Short-Term Impact (      0.000 ug/m3 ) is less
        than SGC ( 180000.000 ug/m3 ).

2.3           Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).
```

```
2.3           Effective stack height, he, is equal to     51.001 feet.

2.4           Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal
              to         0.293 ug/m3,  for   hs/hb =   1.60

2.5           Maximum downwash Short-Term Impact (CSTD) is equal
              to         0.981 ug/m3, for:  hs/hb =   1.60 and ESH =   51. feet.

2.6           Adjusted maximum downwash Short-Term (CSTD) is equal
              to         0.820 ug/m3,  for:  RF =   0.84

III.D.  Maximum non-cavity Short-Term Impact (CST:         0.820 ug/m3 ) is
        less than the SGC (   180000.000 ug/m3 ) for the point source.

2.7           Maximum Short-Term cavity, point, or area source impact
              (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals         0.820 ug/m3
              and is reported in the ANALYSIS MENU.  This value is less than
              the SGC (   180000.000 ug/m3 ).
```

VII. Contaminant Impact Summary Step by Step Menu for cis 1,2-Dichloroethene:

```
**********************************************************************************
 NWIRP BETHPAGE GM-38 AREA      BETHPAGE                              OYSTER BAY, NEW
EMISSION POINT =          TOTAL     CAS NUMBER = 00156-59-2     SIC =    0
   AGC =          63.000000000 ug/m3        SGC =           0.000000 ug/m3
   STACK: HA=    15., SH=   40., D=   36., T=    80., V=   21.69, q=   9200.00
BUILDING: Dpl=    50., BW=   75., BL=   75., %CONTROL=   0.0000
**  Reported Hourly Emission Rate (Q) is equal to          0.025800000 lbs/hour.
**  Reported Annual Emission Rate (Qa) is equal to       226.000000 lbs/year.
II.B.   REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).
II.B.1.      Shortest Distance from building to Property Line (   50. feet )
             is less than or equal to the cavity length, or 3 building
             heights (   75. feet ).  Therefore, this building will have
             cavity impacts (if they occur) at receptors off plant property.
II.B.2.      The largest building dimension (   75. feet ) is greater than or
             equal to the building height (   25. feet ).  Therefore, the
             computer will NOT redefine the cavity length.
```

```
II.B.3.      Stack height (   40. feet ) is greater than cavity height
             (   38. feet ).  Therefore, this source does not contribute to
             the buildings cavity impact.   The Computer will assume the
             CAVITY Annual Impact equals 0.00 ug/m3.
II.C.   CAVITY Annual Impact (      0.000 ug/m3 ) is less than AGC
        (     63.000 ug/m3 ).
III.A.  STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).
III.A.1.b.       Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).
III.A.1.b.       Effective stack height, he, is equal to     51.001 feet.
III.A.2.     STANDARD POINT SOURCE Actual Annual Impact is equal
             to      0.195 ug/m3 for  8760. hours/year of operation.
III.A.3.     STANDARD POINT SOURCE Potential Annual Impact is equal
             to      0.195 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a.       Stack height to building height ratio is greater than
                 1.5, but less than 2.5.   Computer will multiply actual
                 annual & potential annual impacts by 0.75 factor.
```

```
III.A.5.      STANDARD POINT SOURCE Short-Term Impact is calculated below
              using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D.  STANDARD POINT SOURCE Actual Annual Impact (      0.146 ug/m3 ) is
        less than AGC (       63.000 ug/m3 ).

III.D.  STANDARD POINT SOURCE Potential Annual Impact (      0.146 ug/m3 )
        is less than AGC (       63.000 ug/m3 ).

        ***** Potential Annual Impact is based upon 8760 hours/year        *****
        ***** operation instead of reported 8760. hours/year.              *****

2.0     DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
        See "Technical Reference for the Screening Procedures of the
        DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2           CAVITY Short-Term Impact is equal to  0.00 ug/m3 as the plume
              escaped the cavity region:  hs(  40. feet) > hc(  26. feet).

II.C.   CAVITY Short-Term Impact is equal to       0.000 ug/m3.
        There is no SGC for this contaminant.

2.3           Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).
```

```
2.3           Effective stack height, he, is equal to     51.001 feet.

2.4           Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal
              to         2.909 ug/m3,  for   hs/hb =   1.60

2.5           Maximum downwash Short-Term Impact (CSTD) is equal
              to         9.732 ug/m3, for:  hs/hb =   1.60 and ESH =   51. feet.

2.6           Adjusted maximum downwash Short-Term (CSTD) is equal
              to         8.136 ug/m3,  for:  RF =   0.84

III.D.  Maximum non-cavity Short-Term Impact (CST) equals        8.136 ug/m3
        for the point source.  There is no SGC for this contaminant.

2.7           Maximum Short-Term cavity, point, or area source impact
              (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals        8.136 ug/m3
              and is reported in the ANALYSIS MENU.
```

VIII. Contaminant Impact Summary Step by Step Menu for 1,2-Dichloroethene (total):

```
**********************************************************************************
 NWIRP BETHPAGE GM-38 AREA      BETHPAGE                          OYSTER BAY, NEW
EMISSION POINT =          TOTAL     CAS NUMBER = 00540-59-0     SIC =    0
   AGC =          63.000000000 ug/m3        SGC =          0.000000 ug/m3
   STACK: HA=    15., SH=   40., D=   36., T=    80., V=   21.69, q=   9200.00
BUILDING: Dpl=    50., BW=   75., BL=   75., %CONTROL=   0.0000
**  Reported Hourly Emission Rate (Q) is equal to       0.025800000 lbs/hour.
**  Reported Annual Emission Rate (Qa) is equal to     226.000000 lbs/year.
II.B.   REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).
II.B.1.      Shortest Distance from building to Property Line (   50. feet )
             is less than or equal to the cavity length, or 3 building
             heights (   75. feet ).  Therefore, this building will have
             cavity impacts (if they occur) at receptors off plant property.
II.B.2.      The largest building dimension (   75. feet ) is greater than or
             equal to the building height (   25. feet ).  Therefore, the
             computer will NOT redefine the cavity length.
```

```
II.B.3.      Stack height (   40. feet ) is greater than cavity height
             (   38. feet ).  Therefore, this source does not contribute to
             the buildings cavity impact.   The Computer will assume the
             CAVITY Annual Impact equals 0.00 ug/m3.
II.C.   CAVITY Annual Impact (      0.000 ug/m3 ) is less than AGC
        (     63.000 ug/m3 ).
III.A.  STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).
III.A.1.b.       Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).
III.A.1.b.       Effective stack height, he, is equal to     51.001 feet.
III.A.2.     STANDARD POINT SOURCE Actual Annual Impact is equal
             to      0.195 ug/m3 for  8760. hours/year of operation.
III.A.3.     STANDARD POINT SOURCE Potential Annual Impact is equal
             to      0.195 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a.       Stack height to building height ratio is greater than
                 1.5, but less than 2.5.   Computer will multiply actual
                 annual & potential annual impacts by 0.75 factor.
```

```
III.A.5.     STANDARD POINT SOURCE Short-Term Impact is calculated below
             using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D.   STANDARD POINT SOURCE Actual Annual Impact (      0.146 ug/m3 ) is
         less than AGC (       63.000 ug/m3 ).

III.D.   STANDARD POINT SOURCE Potential Annual Impact (      0.146 ug/m3 )
         is less than AGC (       63.000 ug/m3 ).

         **** Potential Annual Impact is based upon 8760 hours/year        ****
         **** operation instead of reported 8760. hours/year.              ****

2.0      DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
         See "Technical Reference for the Screening Procedures of the
         DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2          CAVITY Short-Term Impact is equal to  0.00 ug/m3 as the plume
             escaped the cavity region:  hs(  40. feet) > hc(  26. feet).

II.C.    CAVITY Short-Term Impact is equal to       0.000 ug/m3.
         There is no SGC for this contaminant.

2.3          Momentum flux, Fm, is equal to   1000.331 ft(4)/sec(2).
```

```
2.3          Effective stack height, he, is equal to     51.001 feet.

2.4          Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal
             to           2.909 ug/m3,  for   hs/hb =    1.60

2.5          Maximum downwash Short-Term Impact (CSTD) is equal
             to          9.732 ug/m3, for:  hs/hb =   1.60 and ESH =   51. feet.

2.6          Adjusted maximum downwash Short-Term (CSTD) is equal
             to          8.136 ug/m3,  for:  RF =    0.84

III.D.   Maximum non-cavity Short-Term Impact (CST) equals        8.136 ug/m3
         for the point source.  There is no SGC for this contaminant.

2.7          Maximum Short-Term cavity, point, or area source impact
             (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals         8.136 ug/m3
             and is reported in the ANALYSIS MENU.
```

IX. AGCs and SGCs for TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):

AGCs & SGCs

9/ 8/11
Page 1

CAS NUMBER	CONTAMINANT NAME	SGC ug/m3	HOV	AGC ug/m3	HOV	TOX	CODES
00075-01-4	VINYL CHLORIDE	180000.00000	D	0.110000000	E	H	U HA
00079-01-6	TRICHLOROETHYLENE	14000.00000	Z	0.500000000	D	M	U HB
00127-18-4	TETRACHLOROETHYLENE	1000.00000	H	1.000000000	H	M	U HI
00156-59-2	DICHLOROETHYLENE,cis	0.00000		63.000000000	D	M	
00540-59-0	DICHLOROETHYLENE, 12	0.00000		63.000000000	D	M	

X. Contaminant Emissions Summary for TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):'

CONTAMINANT EMISSIONS SUMMARY 9/ 8/11
Page 1

CAS NUMBER	CONTAMINANT NAME	NUM. OF EPs PER CONTAM.	EMISSIONS (lbs/hour)	EMISSIONS (lbs/year)
00075-01-4	VINYL CHLORIDE	1	0.0026000	22.93000
00079-01-6	TRICHLOROETHYLENE	1	0.3444000	3017.00000
00127-18-4	TETRACHLOROETHYLENE	1	0.2342000	2052.00000
00156-59-2	DICHLOROETHYLENE,cis	1	0.0258000	226.00000
00540-59-0	DICHLOROETHYLENE, 12	1	0.0258000	226.00000
SUMMARY TOTALS		5	0.6328000	5543.93000

XI. Meter Grid Modeling Results for Maximum Annual Concentrations of TCE, within 25 meters:

CONCENTRATIONS x 10 (-2) (ug/m3) for 00079-01-6 09/08/11 13:17:58
AGC = 0.500000000 ug/m3

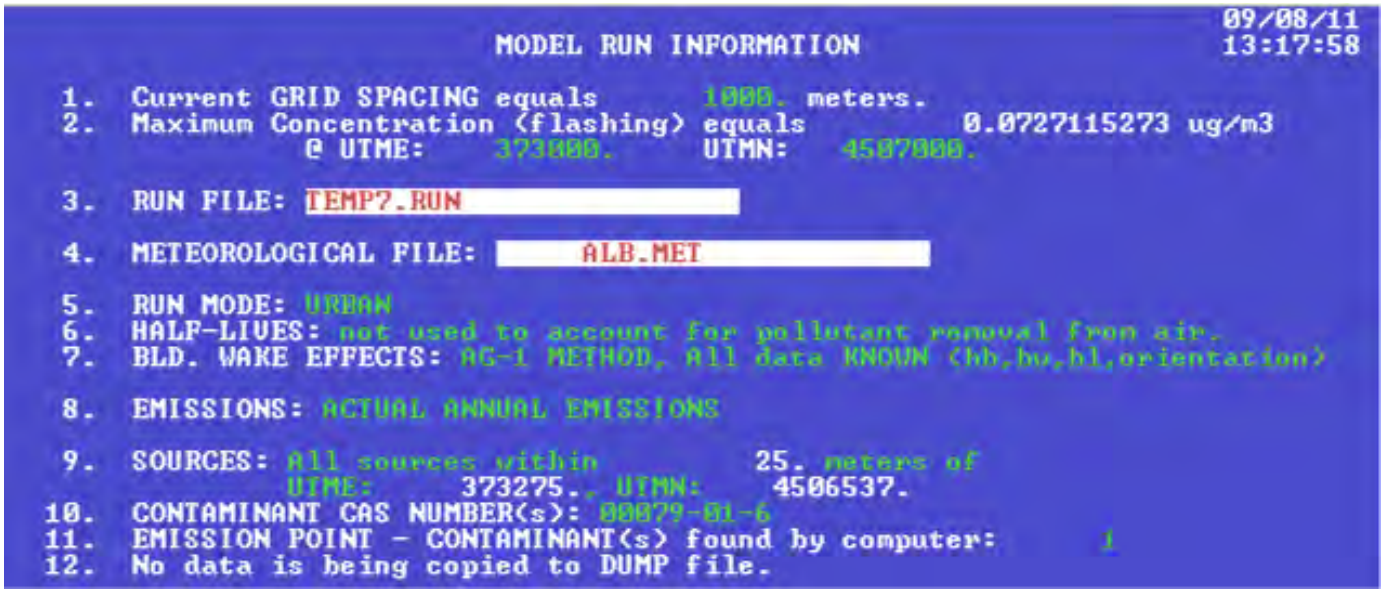
UTMN ▼ \ UTME ▶	367000.	368000.	369000.	370000.	371000.	372000.	373000.	374000.	375000.	376000.	377000.	378000.	379000.
4511000.	0.04		0.06		0.08		0.14		0.23		0.32		0.41
4510000.	0.03		0.05		0.08		0.13		0.25		0.43		0.60
4509000.	0.02		0.03		0.06		0.11		0.24		0.58		1.01
4508000.	0.02		0.03		0.04		0.06		0.18		0.62		2.16
4507000.	0.02		0.03		0.04		0.06		0.11		0.26		7.27
4506000.	0.03		0.03		0.05		0.07		0.13		0.33		2.58
4505000.	0.03		0.04		0.05		0.08		0.20		0.45		0.94
4504000.	0.03		0.04		0.07		0.12		0.20		0.22		0.47

UTMN ▼ \ UTME ▶	380000.	381000.	382000.	383000.	384000.	385000.	386000.	387000.	388000.	389000.	390000.	391000.	392000.
4511000.	0.30		0.14		0.10		0.08		0.06		0.05		0.04
4510000.	0.40		0.17		0.12		0.09		0.07		0.06		0.04
4509000.	0.52		0.22		0.14		0.11		0.08		0.06		0.04
4508000.	0.64		0.31		0.19		0.13		0.11		0.09		0.06
4507000.	1.43		0.60		0.34		0.22		0.15		0.12		0.08
4506000.	2.99		1.12		0.51		0.30		0.20		0.14		0.10
4505000.	0.81		0.60		0.45		0.33		0.23		0.16		0.12
4504000.	0.43		0.33		0.27		0.24		0.20		0.16		0.13

TOP 100 CONTRIBUTORS TO MAXIMUM CONCENTRATION FOR 00079-01-6 09/08/11 13:17:58
@ UTME: 373000. UTMN: 4507000.

Emission Point	Facility Name (shortened)	EP DIR	Distance to Max.(m)	CONC. ug/m3	Percent of Max.
TOTAL	NWIRP BETHPAGE GM-38 AREA	SSE	539.	0.727E-01	100.000
TOTAL OF ALL 1 CONTRIBUTORS				0.727E-01	100.000

XII. ISCLT Model Run Information, within 25 meters:



APPENDIX C

FIELD LOGS

Groundwater L

level Measurement Sheet

Project Site: NWIRP Bethpage – GM-38
Location: Bethpage, NY
Field Crew: R.H

Water Level Meter: Solinst
Weather: 41°F, Sunny, 30.14" Hg, 13 mph N
Time of Low Tide: N/A
Time of High Tide: N/A

Well ID	Time	Depth to Water (ft.)	Total Depth of Well / Screed Interval (ft.)	PID (ppm)	Comments
RW1-MW1	9:10	32.19"	435 / 395-435	---	
RW1-MW2	8:20	35.49"	435 / 395-435	---	
RW1-MW3	10:20	25.14"	435 / 395-435	---	
RW2-MW1	9:22	35.47"	510 / 470-510	---	
RW2-MW2	9:30	35.86"	510 / 470-510	---	
RW2-MW3	9:35	34.97"	510 / 470-510	---	
RW3-MW1	9:40	36.97"	350 / 330-350	---	
RW3-MW2	10:00	36.52"	495 / 475-495	---	
RW3-MW3	9:05	38.04"	340 / 320-340	---	
RW3-MW4	8:50	37.84"	495 / 475-495	---	
TP1	8:10	32.61"	470 / 450-470	---	
IW1-MW1	8:30	36.41"	470 / 450-470	---	
RW-1			Open vault and check integrity of piping, etc.		ok
RW-3			Open vault and check integrity of piping, etc.		ok

Signature: _____

Date: 10-24-2019