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October 10, 2019

File #34286.009

Mr. Howard Caine – SR-6J
Remedial Project Manager
Waste Management Division
USEPA Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Ms. Mae Willkom
Wisconsin Department of Natural Resources
1300 W. Clairemont Avenue
Eau Claire, Wisconsin 54702

Re: MRDS SVE System Third Trial Seasonal Shutdown Assessment Report
National Presto Industries, Inc., Superfund Site, Eau Claire, Wisconsin
USEPA CERCLIS ID WID006196174
WDNR BRRTS 02-09-000267 and FID 609038320

Dear Howard and Mae:

On behalf of National Presto Industries, Inc. (NPI), Gannett Fleming Inc. (GF) is submitting this letter report assessing the third trial seasonal shutdown of the Melby Road Disposal Site soil vapor extraction (MRDS SVE) system at NPI's Superfund site in Eau Claire, Wisconsin. The first three trial seasonal shutdowns were conducted from December 2016 through June 2017, December 2017 through June 2018, and December 2018 through June 2019, respectively, following protocol presented in GF's April 14, 2016, *Modified Cold Weather Operation Assessment* report, as approved by Howard. GF's:

- August 2017 *MRDS SVE System Trial Seasonal Shutdown Assessment* report presented results from the first trial shutdown.
- August 2018 *MRDS SVE System Second Trial Seasonal Shutdown Assessment* report provided results from the second trial shutdown.
- The July 2019 *NPI Monthly Progress Report for June 2019* stated that GF would submit this third assessment report on NPI's behalf.

A completed certification page for this submittal is also attached.

Background Information on the MRDS SVE System

Between 1966 and 1970, waste forge compound was landfilled at the MRDS in trenches up to 20 feet deep. In its pure form, the forge compound consisted of approximately equal parts of graphite, asphalt, and mineral oil and was used to manufacture military ordnance (i.e., shells and

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projectiles). The waste forge compound that was generated contained metals, volatile organic compounds (VOCs), and semi-volatile organic compounds. The primary chemical of concern associated with the waste forge compound is 1,1,1-trichloroethane (TCA), a solvent that was used to remove the forge compound from the projectile manufacturing equipment. As described in GF's July 14, 1999, status report, a vapor-phase concentration of 12 micrograms per liter ($\mu\text{g}/\ell$) was established as the threshold value corresponding to the 40 $\mu\text{g}/\ell$ NR 140 preventive action limit (PAL) for dissolved-phase TCA in groundwater. Applying the same formula to trichloroethylene (TCE), a vapor-phase threshold value of 0.10 $\mu\text{g}/\ell$, corresponding to the 0.5 $\mu\text{g}/\ell$ PAL for dissolved-phase TCE in groundwater, is calculated. It should be noted that the groundwater clean-up goals for the site are now the NR 140 Enforcement Standard/ federal Maximum Concentration Limit (ES/MCL), which are 10 times the PAL for TCE and 5 times the PAL for TCA. Hence, the corresponding vapor-phase thresholds are 1.0 and 60 $\mu\text{g}/\ell$ for TCE and TCA, respectively. Based on analytical results from long-term monitoring, other VOCs that have contributed ≥ 10 percent of the mass per liter of MRDS exhaust gas emissions include 1,1-dichloroethane (DCA) and tetrachloroethylene (PCE).

During the summer of 1998 before the SVE system began operating, about 20,000 cubic yards of waste forge compound/soil from other areas on the NPI site were consolidated at the MRDS, and a multi-layer cap that included a synthetic geomembrane and geosynthetic clay liners was installed over the top of the material to prevent precipitation from infiltrating through it and the underlying waste. The capped area covers approximately 10 acres. The average depth to the water table is approximately 70 feet below the bottom of the multi-layer cap, and the native soil above the water tables consists of sand and gravel. Correspondence describing the details of the placement of the waste forge compound/soil and installation of the multi-layer cap is on file with the United States Environmental Protection Agency (USEPA) and the Wisconsin Department of Natural Resources (WDNR).

Figure 1 shows the layout of the SVE system, which consists of 12 vent wells, VW-1 through VW-12; three vacuum blowers; one condensate knock-out tank; a sump; and associated underground piping. The blowers and the condensate knock-out tank are housed in the SVE equipment building, and the sump is located beneath the SVE equipment building shown on Figure 1. As described in GF's first status report, a start-up test of the SVE system was conducted on October 14, 1998, and the system began operating full time on October 28, 1998. As stipulated in the May

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1996 Record of Decision (ROD), the MRDS SVE was designed and installed to reduce the volume of VOCs in on-site soils and create a vapor barrier to prevent future releases of VOCs into the groundwater. To prevent stagnation zones from developing between any pair of wells long term, only 9 of the 12 vent wells operate at a time, and a different set of 3 wells is turned off each month, when the system is operating.

Individual vent well and SVE exhaust samples are collected in Tedlar bags and Summa canisters to measure performance and compliance monitoring criteria. The samples in the Tedlar bags are field-screened for VOCs and methane using a portable flame-ionization detector (FID). These FID readings serve as a screening tool and are used to identify the occasional elevated reading in a well and to determine whether these readings are due primarily to methane or VOCs. The Summa canisters are currently submitted to Pace Analytical (Pace) in Minneapolis, Minnesota, and the air samples are analyzed for 1,1-DCA, PCE, TCA, and TCE, as approved by both agencies. For the purpose of this report, 1,1-DCA, PCE, TCA, and TCE will hereafter be referred to as the NPI VOCs. Pace analyzes for the NPI VOCs by gas chromatography/mass spectrometry (GC/MS) using Method TO-15. Prior to June 2016, exhaust gas samples were analyzed for the 34 VOCs on the USEPA target compound list (TCL).

Field screening of the individual vent wells and SVE exhaust gas has typically resulted in 0.0 parts per million volume (ppmv) readings. When a positive reading has occurred, it has routinely been attributable to the presence of methane. Historically, 10 of the 34 VOCs on USEPA's target compound list (TCL VOCs) have been detected at or above 0.1 µg/ℓ in the exhaust gas samples analyzed in the laboratory. In a November 20, 2014, letter from Howard, the USEPA approved monitoring of the vent wells and SVE exhaust quarterly rather than monthly. However, submittal of one-page monthly reports is still required. Quarterly sampling began in 2015. Cumulative emissions of total VOCs from the SVE system in 2018 were approximately 0.71 pound. Since the SVE system began operation in October 1998, the estimated cumulative emissions have been approximately 169 pounds. See GF's June 2019 *Annual Interim Remedial Action Status Report – 2018* for additional details on emissions.

Between October 28, 1998, and October 11, 1999, all three blowers operated continuously to extract approximately 1,710 actual cubic feet per minute (acfm) of soil gas from nine vent wells at a time. This produced an average soil gas extraction rate of 190 acfm per well. Vacuum readings

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on the SVE vent well manifold in the equipment building ranged from 18 to 25 inches of water column (inch wc).

Based on the first-year performance of the SVE system, the USEPA and WDNR approved the use of a single blower, and two of the three blowers were shut down on October 11, 1999. The agencies allowed NPI to turn two of the three blowers off because the vapor-phase concentrations of VOCs under the capped area had decreased to the point where their effects on groundwater were negligible. The contingency plan calls for NPI to resume operating all three blowers if vapor-phase VOC concentrations rebound such that impacts to groundwater are likely.

Since October 11, 1999, the system has operated with one blower running at an average flow rate of approximately 570 acfm. With nine vent wells open, this produces an average soil gas extraction rate of 63 acfm per well. Manifold vacuum readings in the equipment building have ranged from 4 to 32 inches wc.

In addition, after operation of the system began in October 1998, NPI periodically field-screened soil gas at 17 monitoring points, comprised of 4 interior locations (MP-1, MP-3, MP-5, and MP-6) and 13 perimeter locations (MP-10, MP-11, MP-12, and MP-14 through MP-23). Field-screening of the soil gas at the interior and perimeter monitoring points was discontinued in January 2000 and July 2001, respectively, because VOC concentrations in the soil gas were low to non-detect and collection of additional data was not necessary.

Because the multi-layer cap prevents precipitation from infiltrating through it and the underlying waste, the primary driving force behind the downward migration of VOCs to the groundwater has been eliminated. Isolated under the cap, the waste now releases previously sorbed VOCs only by diffusion, a relatively slow process. In addition, there is a low-level source of methane under the cap. Since October 1999, the system has continued to operate with just one blower running. It captures the vapor-phase VOCs diffusing from the forge compound before they reach the groundwater and controls the methane being generated.

There are also two groundwater extraction wells (EW-1R and EW-2) and three groups of nested groundwater monitoring wells (MW-5A/B, MW-62A/B/C, and MW-63A/B) in the MRDS area, as shown on Figure 1. The monitoring wells and piezometers are sampled periodically for five

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VOCs: TCA, TCE, PCE, 1,1-DCA, and 1,1-dichloroethene (1,1-DCE). When EW-1R and EW-2 are not pumping, groundwater beneath the site flows to the north-northwest.

Extraction wells EW-1R and EW-2 at the MRDS are currently turned off. An 18-month trial shutdown of EW-1R and EW-2 ended in March 2012. A May 23, 2012, report from GF to the agencies documented the analytical results of six rounds of groundwater sampling from the trial shutdown. The report concluded that the trial shutdown of the extraction wells, an interim remedy prior to construction of a cap and SVE system, did not result in any adverse impacts to groundwater quality at and downgradient from the MRDS. It also concluded that continued operation of the extraction wells was no longer necessary to protect groundwater quality at and downgradient from the MRDS. The USEPA and WDNR verbally agreed with these conclusions in a December 13, 2012, meeting at NPI. The USEPA requested that NPI amend the Operating and Maintenance (O&M) Plan for the MRDS to document the shutdown of EW-1R and E-2 and the agencies' approvals of the long-term shutdown of the extraction wells. The amendment was completed and provided to both agencies via e-mail on July 17, 2013.

Historical Exhaust Gas Analytical Results for the MRDS SVE System

Table 1 summarizes the laboratory analytical results for the 10 TCL VOCs identified in the SVE exhaust at or above 0.1 µg/l since January 2004. Based on Table 1, Figures 2 and 3 both show the concentrations of three select VOCs detected in the SVE exhaust gas (i.e., TCA, TCE, and PCE). Figure 2 shows the VOC concentrations plotted on an arithmetic scale. Figure 3 shows the concentrations plotted on a log scale. Both plots show that VOC concentrations decreased rapidly during the first two months of operation of the SVE system and that they have remained below 1.0 µg/l since January 1999. In addition, as summarized in Table 1, since 08/12/09 (i.e., over the past ten-plus years), the maximum measured TCE concentration was 0.0088 µg/l on 02/25/13, more than two orders of magnitude below the 1.0 µg/l vapor-phase threshold value corresponding to the 5.0 µg/l dissolved-phase ES/MCL for TCE in groundwater.

Modified Cold Weather Operation at the MRDS SVE System (December 2015-March 2016)

Since EW-1R and EW-2 were shut down at the MRDS, the constant flow of water to cascade air stripper #1 (CAS-1) was eliminated. Without the constant flow of pumped water from the extraction wells, the 30-gallon batches of condensate generated through operation of the SVE

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system tend to freeze in the underground pipe running to CAS-1 (located about 250 feet southwest of the MRDS SVE equipment building) during cold weather. To address the issue during the winter of 2014-2015, the SVE system was periodically turned off, the condensate that had accumulated in the sump was pumped into drums, and the drums were emptied into CAS-2R.

Based on the existing multi-layer cap at the MRDS, the extensive unsaturated zone extending 50 feet or more from the bottom of the buried/capped waste forge compound to the top of the water table, consistently low FID readings and laboratory analytical results for VOCs in the MRDS SVE exhaust gas since 2001, and the effective protection of groundwater quality associated with the MW-34/70 area SVE system (without a cap) that is turned off each year during cold weather months, NPI did the following:

1. Installed a variable frequency drive (VFD) in the MRDS SVE equipment building in the fall of 2015 to control the flow from the vacuum blowers.
2. Used the VFD to decrease flow from 570 to 150 acfm starting on December 2, 2015. Operated the system at flows ranging from 150-220 acfm from December 2, 2015, through March 22, 2016. With nine vent wells open, this produced average soil gas extraction rates of 17-24 acfm per well. Manifold vacuum readings in the equipment building decreased to <1 inch wc, and condensate production dropped to zero.
3. Collected SVE exhaust gas samples monthly in December 2015 and January through March 2016 to monitor TCA and TCE concentrations relative to their calculated threshold levels of 12 and 0.10 $\mu\text{g}/\ell$, respectively, and submitted them to Pace for routine analysis.
4. Maintained the existing contingency plan, which calls for NPI to resume operation of all three blowers if vapor-phase TCE/TCA concentrations rebound such that impacts to groundwater are likely (i.e., ≥ 50 percent of a calculated threshold value). Alternatively, in the event vapor-phase VOC concentrations rebounded such that impacts to groundwater may be possible (10-50% of a calculated threshold value), then NPI would resume operation of one blower at 570 acfm.
5. Continued standard O&M of the system and monthly reporting to the agencies, except as described in Items #2 through #4, above.

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6. Used the VFD to increase flow from 150 to 570 acfm and resumed normal operation of the SVE system on March 22, 2016.
7. Submitted an assessment report to the agencies documenting the success of the modified cold weather operation and proposing a trial seasonal shutdown of the MRDS SVE system. See GF's April 2016 *Modified Cold Weather Operation* report for details, including a work plan.

Third Trial Seasonal Shutdown of the MRDS SVE System (December 2018-June 2019)

On December 14, 2018, the MRDS SVE system was shut down for a third 6-month trial period, as approved by both agencies. Prior to shutdown, routine quarterly sampling was conducted with a single vacuum blower running at its standard flow rate of 570 acfm. In addition, the SVE system operated for seven days in March 2019 with one blower running and the VFD dialed down to its low-flow setting (<250 acfm) for quarterly sampling.

On June 2, 2019, low-flow operation of the SVE system resumed. On June 9th, the electrical power was off for approximately 2.8 hours due to a local outage, possibly due to a lightning strike. On June 10th, the VFD was adjusted for normal seasonal operation. Since June 2nd, the MRDS SVE system operated continuously with one blower running, except for approximately 2.8 hours on June 9th, as described previously. Data collected between June 2nd and 30th show that the blower ran at average flow rates of 240 and 570 acfm and manifold vacuums were <1 inch wc and steady at 7 inch wc under low and normal flow conditions, respectively, when operating. Additional monitoring performed on June 10th, just before the flow rate was increased from 240 to 570 acfm, included:

- Field screening the 12 vent wells (VW-1 through VW-12) and SVE exhaust gas with a FID for VOCs and methane.
- Collecting samples of the SVE exhaust gas for laboratory analysis of the NPI VOCs.

Everything was done according to GF's April 2016 work plan, with Howard's approval. See GF's August 2017 and August 2018 assessment report for details of the first and second trial seasonal shutdowns, respectively. Copies of the laboratory analytical results and field data sheets are available upon request.

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Assessment of the Trial Seasonal Shutdown Results

The FID readings and lab data collected during the three trial seasonal shutdowns were consistent with historical results when the SVE system was operated at 570 acfm. As anticipated, there was a measureable increase in overall NPI VOC concentrations from December 2016 through June 2017, December 2017 through June 2018, and December 2018 through June 2019 due to the gradual accumulation of vapors from the landfilled waste forge compound under the cap. However, vapor-phase TCA and TCE concentrations remained more than two orders of magnitude below calculated threshold levels corresponding to the ES/MCL for both compounds in groundwater, as summarized in GF's April 2016 work plan. No issues related to the trial seasonal shutdowns were observed.

Table 2 summarizes the June 2016 through June 2019 NPI VOC concentration data and calculated fractional changes and ratios for comparison. Example computations are provided on Page 2 of Table 2. Based on the overall results, GF believes the trial shutdown data support shutting the MRDS SVE down seasonally, like at the MW-34/70 area. Details are described in the following section.

Record of Decision Considerations and Future Work

As required by the May 1996 ROD, NPI installed an SVE system at the MRDS "to remove VOCs from the soils and to provide a vapor barrier to prevent the migration of VOCs into the groundwater." Since October 1998, NPI has operated the MRDS SVE system and met both objectives. However, there is no specific requirement for continuous operation of the system in the May 1996 ROD. In addition, monitoring results from the December 2016 through June 2017, December 2017 through June 2018, and December 2018 through June 2019 trial seasonal shutdowns document that continuous operation of the system is not necessary. The multi-layer cap at the MRDS has essentially eliminated infiltration of precipitation and vertical migration of contaminants and has proven to provide reliable protection of groundwater quality, provided the gradual buildup of vapor-phase TCE and TCA in the vadose zone between the buried waste and water table is periodically addressed. Consequently, going forward, NPI proposes to:

- Continue to operate the MRDS SVE system with one blower running at 570 acfm through November 2019, conduct standard O&M, and provide monthly progress reports to the agencies.

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- In December 2019, turn the blower(s) off and leave the system shut down for six months. In March 2020, the system will operate for about one week with one blower running at 150-240 acfm for quarterly field screening and sampling.
- Resume six-month seasonal operation of the system with one blower running at 570 acfm starting in June 2020.
- Field screen its exhaust gas for VOCs and methane quarterly using a portable FID.
- Collect and analyze exhaust gas samples for TCE; TCA; PCE; and 1,1-DCA quarterly. Analysis for the 34 TCL VOCs will resume if FID readings indicate increasing VOC concentrations.
- Continue to use a contingency plan reflective of the current groundwater standards of 5 and 200 µg/l, respectively, for TCE and TCA. These concentrations correspond to vapor-phase threshold values of 1.0 and 60 µg/l, respectively.

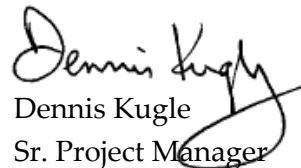
This approach will continue to meet ROD requirements (i.e., remove VOCs from soils and protect groundwater quality) and have the added benefit of reducing the project's environmental footprint. Please let me know if you concur with NPI's proposed path forward, and feel free to contact me at 608-836-1500, ext. 6722, if you have any questions or need additional information.

Sincerely,

GANNETT FLEMING, INC.



Clifford C. Wright, P.E., P.G.
Project Engineer



Dennis Kugle
Sr. Project Manager

CCW/jec/Enc.

ecc: Mark Wichman (USACE)
Derrick Paul (NPI)
Chelsea Payne (Gannett Fleming)

ENGINEERING AND HYDROGEOLOGIST CERTIFICATIONS

I hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

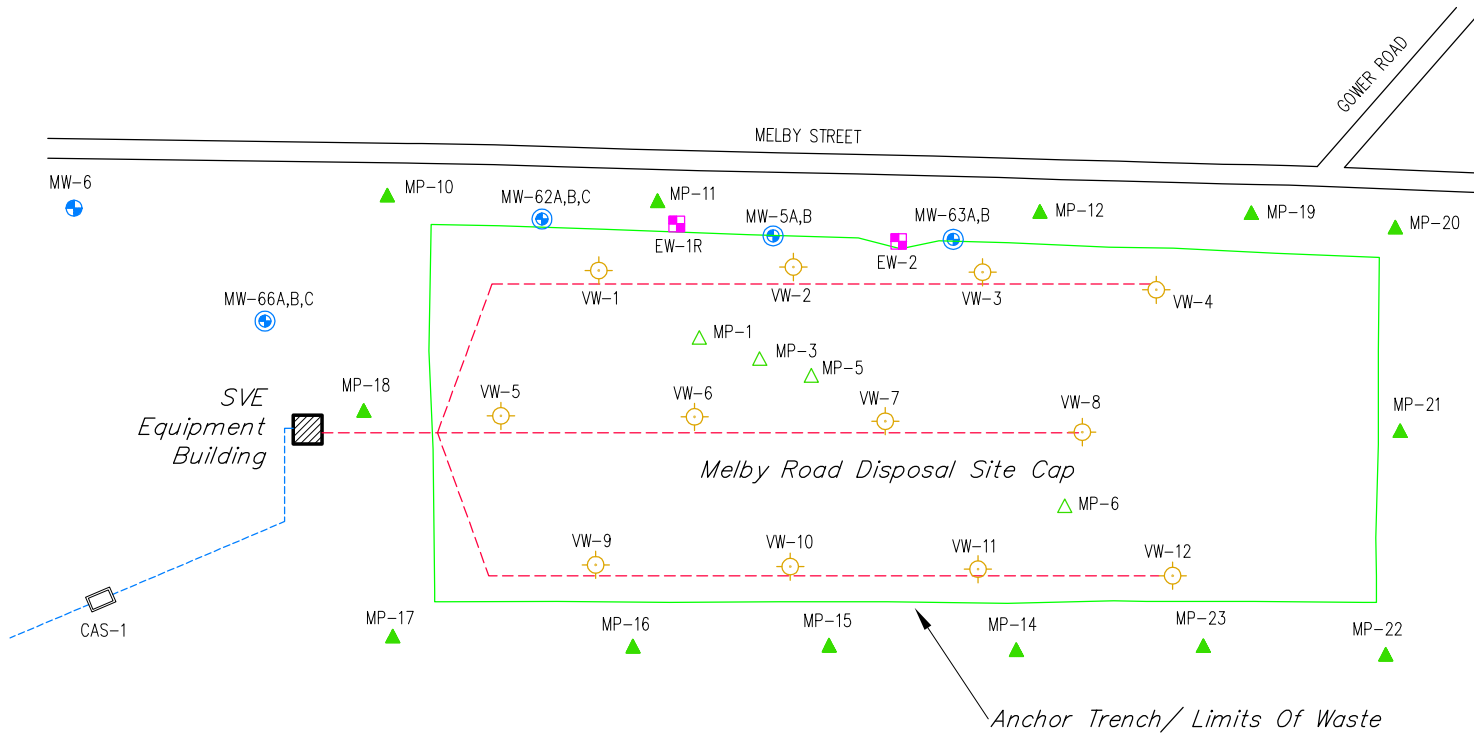
Print Name Clifford C. Wright	Title Project Engineer
Signature <i>Clifford C. Wright</i>	Date

P.E. Seal for E-31265:



I hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Print Name Clifford C. Wright	Title Project Geologist
Signature <i>Clifford C. Wright</i>	Date



LEGEND

- Soil Vapor Extraction Vent Well
- Perimeter Soil Gas Monitoring Point
- Interior Soil Gas Monitoring Point
- Groundwater Monitoring Well Nest
- Groundwater Monitoring Well
- Groundwater Extraction Well
- Cascade Aerator
- Underground Piping For SVE
- Underground Discharge Line For SVE
- Condensate/Pumped Groundwater (When EW-1R/EW-2 Are Operating)

MELBY ROAD DISPOSAL SITE SOIL VAPOR EXTRACTION SYSTEM

NATIONAL PRESTO INDUSTRIES, INC.
EAU CLAIRE, WISCONSIN

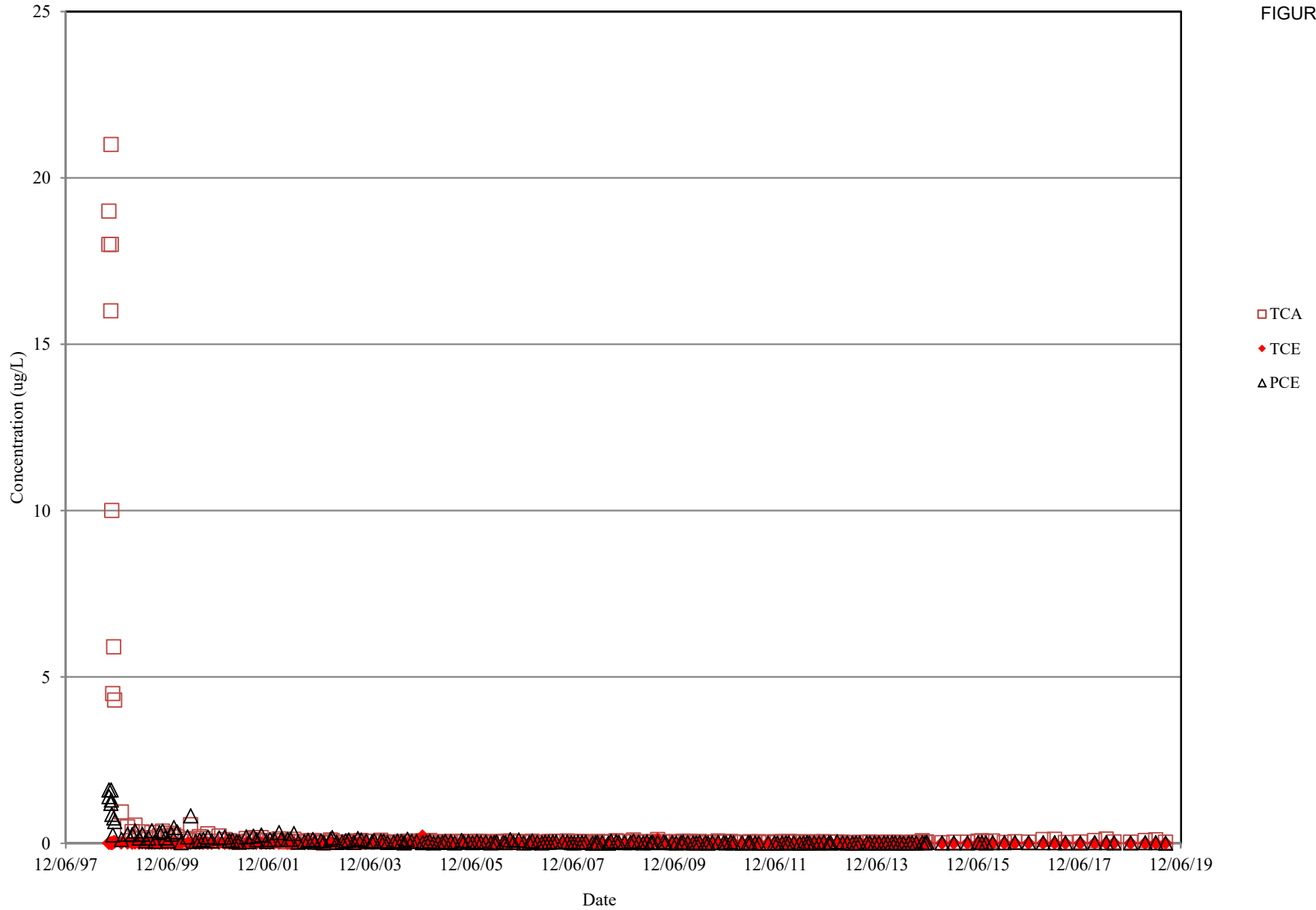
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FIGURE 1

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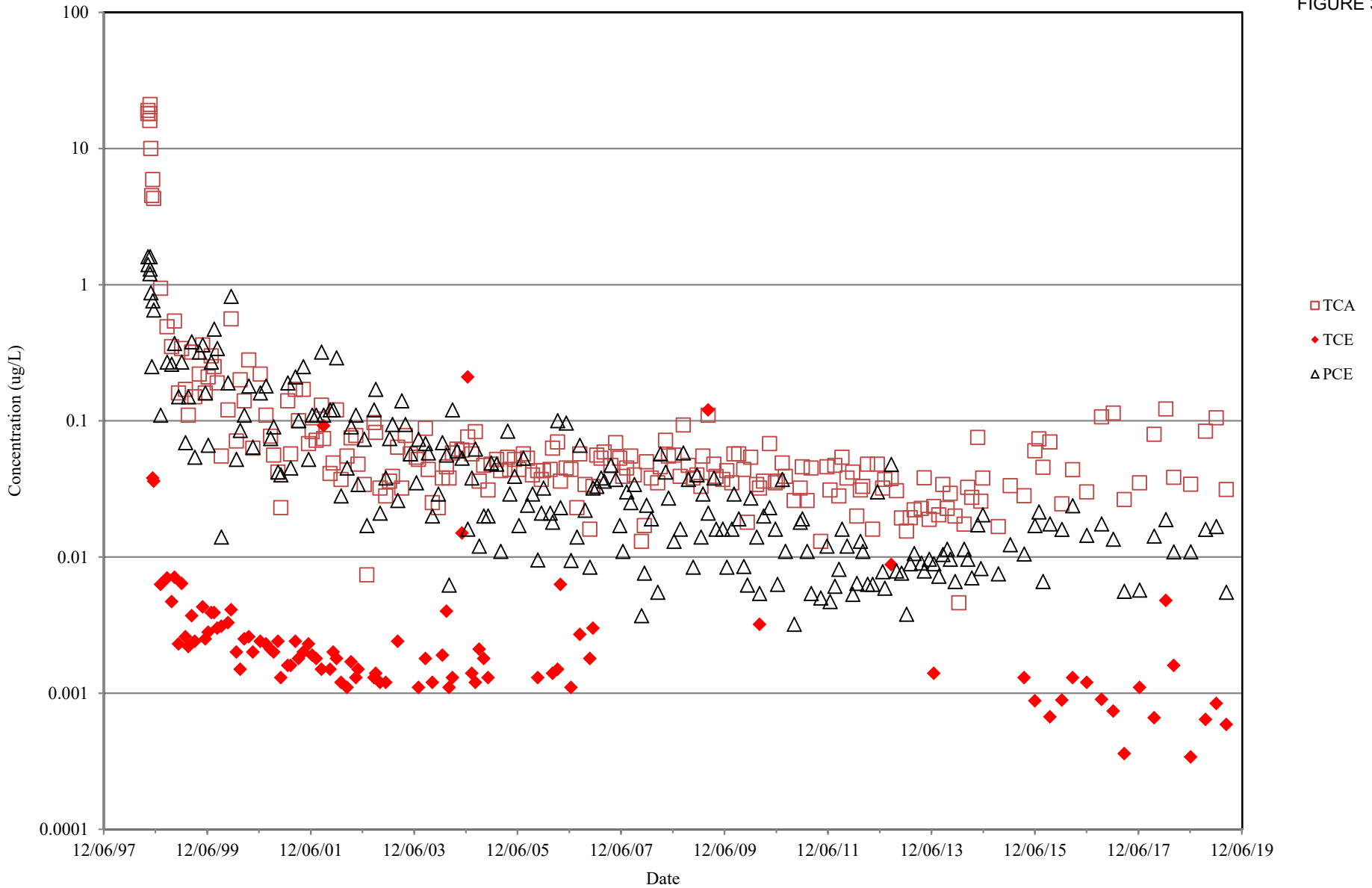
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FIGURE 2



PRIMARY CHLORINATED VOCs IN THE MRDS SVE EXHAUST (ARITHMETIC SCALE)

NATIONAL PRESTO INDUSTRIES, INC.
EAU CLAIRE, WISCONSIN



PRIMARY CHLORINATED VOCs IN THE MRDS SVE EXHAUST (LOG SCALE)

NATIONAL PRESTO INDUSTRIES, INC.
EAU CLAIRE, WISCONSIN

NATIONAL PRESTO INDUSTRIES, INC.
EAU CLAIRE, WISCONSIN

TABLE 1

SUMMARY OF MRDS SVE SYSTEM EXHAUST GAS ANALYTICAL RESULTS (JANUARY 2004 - AUGUST 2019)

Date	Detected Target Compound List Volatile Organic Compound Concentrations ⁽¹⁾											TCL VOCs
	Acetone RQ	2-Butanone RQ	Chloroethane	1,1-DCA	Ethylbenzene	PCE	Toluene RQ	TCA	TCE RQ	Xylenes RQ		
01/07/04	0.019	0.0079	<0.0011	0.010	<0.00087	0.073	0.0018	0.052	0.0011	0.0051	0.1699	
02/24/04	0.024	0.011	<0.0012	0.021	0.093	0.068	0.19	0.088	0.0018	0.44	0.9368	
03/16/04	0.027	0.015	<0.0011	0.011	0.0058	0.058	0.010	0.044	<0.0011	0.046	0.2168	
04/13/04	0.013	0.0067	<0.0011	0.012	0.0011	0.020	0.025	0.025	0.0012	0.0072	0.1112	
05/25/04	0.0055	0.0042	<0.0011	0.0063	0.0014	0.029	0.0087	0.023	<0.0011	0.010	0.0881	
06/23/04	0.055	0.040	<0.0011	0.011	0.015	0.069	0.29	0.038	0.0019	0.059	0.5789	
07/22/04	0.0026	<0.0029	<0.0011	0.014	<0.00087	0.056	<0.0011	0.046	0.0040	<0.0022	0.1226	
08/10/04	0.011	0.0078	<0.0011	0.013	0.0095	0.0062	0.10	0.038	0.0011	0.058	0.2446	
09/02/04	0.044	0.017	<0.0011	0.013	0.0081	0.12	0.023	0.058	0.0013	0.042	0.3264	
10/04/04	0.010	0.0071	<0.0011	0.018	0.0068	0.060	0.013	0.062	<0.0011	0.041	0.2179	
11/08/04	0.025	0.0078	<0.0011	0.017	0.0014	0.053	0.0025	0.061	0.015	0.011	0.1937	
12/20/04	0.019	0.0066	<0.0011	0.022	0.00094	0.016	0.0015	0.076	0.21	0.0022	0.3542	
01/17/05	0.014	0.012	<0.0011	0.011	0.0045	0.038	0.037	0.057	0.0014	0.023	0.1979	
02/11/05	0.016	0.02	<0.0011	0.022	0.0076	0.062	0.0087	0.083	0.0012	0.047	0.2675	
03/10/05	0.013	0.0045	<0.0011	0.012	<0.00087	0.012	0.002	0.036	0.0021	0.0051	0.0867	
04/12/05	0.059	0.14	<0.0011	0.01	0.055	0.02	0.099	0.047	0.0018	0.31	0.7418	
05/12/05	0.044	0.062	<0.0011	0.0091	0.0066	0.02	0.0088	0.031	0.0013	0.046	0.2288	
06/03/05	<0.0019	<0.0024	<0.00087	0.015	<0.00014	0.049	<0.0012	0.048	<0.0018	0.0098	0.1218	
07/12/05	0.010	0.0042	<0.0011	0.015	<0.00087	0.048	0.0025	0.052	<0.0011	<0.0022	0.1317	
08/09/05	0.042	0.062	<0.0011	0.015	0.0010	0.011	0.0026	0.043	<0.0011	0.0095	0.1861	
09/27/05	0.030	<0.0029	<0.0011	0.013	0.00093	0.084	0.0013	0.054	<0.0011	0.0094	0.1926	
10/12/05	0.012	<0.0029	<0.0011	0.01	0.0012	0.029	0.014	0.044	<0.0011	0.0084	0.1186	
11/15/05	0.0036	<0.0029	<0.0011	0.015	<0.00087	0.039	0.0052	0.052	<0.0011	<0.0022	0.1148	
12/15/05	0.0083	0.0031	<0.0011	0.015	0.0022	0.017	0.0022	0.044	<0.0011	0.017	0.1088	
01/17/06	0.022	0.0045	<0.0011	0.0083	0.0017	0.053	0.011	0.057	<0.0011	0.011	0.1685	
02/14/06	0.014	<0.0029	<0.0011	0.012	0.011	0.024	0.0093	0.053	<0.0011	0.069	0.1924	
03/22/06	0.010	0.0041	<0.0011	0.0086	0.0021	0.029	0.0033	0.04	<0.0011	0.016	0.1131	
04/27/06	0.010	0.0036	<0.0011	0.0096	0.0015	0.0095	0.0016	0.043	0.0013	0.010	0.0901	
05/23/06	0.018	0.0037	<0.0011	0.015	0.0030	0.021	0.004	0.037	<0.0011	0.025	0.1267	
06/07/06	0.018	0.0044	<0.0011	0.011	0.00097	0.032	0.0013	0.043	<0.0011	0.0082	0.1189	
07/25/06	0.020	0.014	<0.0011	0.013	<0.00087	0.021	0.0014	0.044	<0.0011	0.0062	0.1196	
08/10/06	0.019	0.026	<0.0011	0.018	0.0050	0.018	0.0075	0.063	0.0014	0.043	0.2009	
09/14/06	0.036	0.022	<0.0011	0.016	0.0057	0.1	0.0079	0.07	0.0015	0.046	0.3051	
10/05/06	0.010	0.0031	<0.0011	0.0078	0.0013	0.023	0.0014	0.036	0.0063	0.0095	0.0984	
11/15/06	0.0082	<0.0029	<0.0011	0.013	<0.00087	0.096	<0.0011	0.045	<0.0011	<0.0022	0.1622	
12/19/06	0.0044	0.0031	<0.0011	0.013	<0.00087	0.0094	0.0014	0.044	0.0011	0.0055	0.0819	
01/29/07	0.0060	<0.0029	<0.0011	0.0037	0.00089	0.014	0.0024	0.023	<0.0011	0.0065	0.0565	
02/19/07	0.010	<0.0029	<0.0011	0.012	<0.00087	0.066	<0.0011	0.057	0.0027	0.0046	0.1523	
03/28/07	0.015	0.0045	<0.0011	0.0091	0.034	0.022	0.087	0.034	<0.0011	0.18	0.3856	
04/30/07	0.010	0.0069	<0.0011	0.0033	0.010	0.0084	0.022	0.016	0.0018	0.054	0.1324	
05/23/07	0.0080	<0.0029	<0.0011	0.013	<0.00087	0.032	<0.0011	0.033	0.0030	<0.0022	0.0890	
06/18/07	0.010	0.010	0.0021	0.018	0.11	0.033	0.13	0.056	<0.0011	0.57	0.9391	
07/18/07	0.0082	0.12	<0.0011	0.014	0.015	0.038	0.0079	0.053	<0.0022	0.11	0.3661	
08/10/07	0.024	0.0050	<0.0011	0.018	0.057	0.036	0.042	0.059	<0.0022	0.035	0.2760	
09/26/07	0.0065	0.0029	<0.0011	0.011	0.0064	0.047	0.015	0.047	<0.0022	0.043	0.1788	
10/30/07	0.013	<0.0029	<0.0011	0.015	0.0018	0.037	0.0014	0.069	<0.0022	0.016	0.1532	
11/27/07	0.010	<0.0029	<0.0011	0.012	0.0014	0.017	0.0015	0.053	<0.0022	0.013	0.1079	
12/19/07	0.0083	<0.0029	<0.0011	0.011	<0.0013	0.011	0.0013	0.039	<0.0022	0.0061	0.0767	
01/15/08	0.0054	<0.0029	<0.0011	0.0049	<0.0013	0.030	0.0012	0.045	<0.0022	<0.0026	0.0865	
02/13/08	0.0095	<0.0029	<0.0011	0.013	<0.0013	0.025	0.0054	0.055	<0.0022	<0.0026	0.1079	
03/10/08	0.0075	0.0035	<0.0011	0.0099	<0.0013	0.034	<0.0011	0.040	<0.0022	<0.0026	0.0949	
04/29/08	0.0059	0.0038	<0.0011	0.0029	<0.0013	0.0037	0.0025	0.013	<0.0022	0.0041	0.0359	
05/20/08	0.0036	<0.0030	<0.0011	0.0020	<0.0013	0.0076	<0.0011	0.017	<0.0022	<0.0026	0.0302	
06/03/08	0.0092	<0.0029	<0.0011	0.010	<0.0013	0.024	0.0014	0.050	<0.0021	0.0071	0.1017	

TABLE 1

SUMMARY OF MRDS SVE SYSTEM EXHAUST GAS ANALYTICAL RESULTS (JANUARY 2004 - AUGUST 2019)

Date	Detected Target Compound List Volatile Organic Compound Concentrations ⁽¹⁾										TCL VOCs
	Acetone RQ	2-Butanone RQ	Chloroethane	1,1-DCA	Ethylbenzene	PCE	Toluene RQ	TCA	TCE RQ	Xylenes RQ	
07/08/08	0.016	0.0068	<0.0011	0.013	<0.0013	0.019	0.0013	0.038	<0.0021	0.0059	0.1000
08/21/08	0.029	0.0058	<0.0011	0.011	<0.0013	0.0055	0.0017	0.035	<0.0021	0.0064	0.0944
09/10/08	0.032	0.023	<0.0011	0.012	<0.0013	0.057	<0.0011	0.046	<0.0021	0.0036	0.1736
10/16/08	0.015	<0.0029	<0.0011	0.016	<0.0013	0.042	<0.0011	0.072	<0.0021	0.0063	0.1513
11/05/08	0.018	0.0042	<0.0011	0.016	<0.0013	0.027	0.0020	0.055	<0.0021	0.0076	0.1298
12/15/08	0.0035	<0.0029	<0.0011	0.013	<0.0013	0.013	0.0020	0.056	<0.0021	0.0028	0.0903
01/27/09	0.0097	0.0032	<0.0011	0.0049	<0.0013	0.016	<0.0011	0.039	<0.0021	<0.0013	0.0728
02/18/09	0.0056	<0.0029	<0.0011	0.018	0.0021	0.058	0.0075	0.093	<0.0021	0.012	0.1962
03/26/09	0.0043	<0.0029	<0.0011	0.0098	0.0030	0.037	0.011	0.047	<0.0021	0.015	0.1271
04/29/09	0.016	0.0035	<0.0011	0.0034	<0.0013	0.0084	0.0011	0.038	<0.0021	<0.0013	0.0704
05/26/09	0.036	0.0047	<0.0011	0.013	<0.0013	0.040	<0.0011	0.040	<0.0021	<0.0013	0.1337
06/24/09	0.010	<0.0029	<0.0011	0.011	0.0043	0.014	0.018	0.033	<0.0021	0.019	0.1093
07/07/09	0.012	<0.0029	<0.0011	0.015	<0.0013	0.029	<0.0011	0.055	<0.0021	<0.0013	0.1110
08/12/09	0.027	0.0076	<0.0011	0.022	0.0028	0.021	0.022	0.11	0.12	0.018	0.3504
09/22/09	0.026	0.0079	<0.0011	0.012	0.013	0.038	0.028	0.048	<0.0021	0.070	0.2429
10/07/09	0.0048	<0.0029	<0.0011	0.0089	0.016	0.016	0.015	0.039	<0.0021	0.10	0.1997
11/24/09	0.012	0.0036	<0.0011	0.012	<0.0013	0.016	0.0023	0.037	<0.0021	0.0077	0.0906
12/22/09	0.016	0.0033	<0.0011	0.010	0.0016	0.008	0.0039	0.043	<0.0021	0.0084	0.0946
01/27/10	0.022	<0.0029	<0.0011	0.0059	<0.0013	0.016	0.0039	0.035	<0.0021	0.0056	0.0884
02/11/10	0.0064	<0.0029	<0.0011	0.012	<0.0013	0.029	0.0014	0.057	<0.0021	<0.0013	0.1058
03/16/10	0.013	0.0060	<0.0011	0.0078	0.0081	0.019	0.015	0.057	<0.0021	0.063	0.1889
04/22/10	0.0035	<0.0029	<0.0011	0.0037	<0.0013	0.0085	0.0012	0.044	<0.0021	<0.0013	0.0609
05/17/10	0.011	<0.0029	<0.0011	0.0061	<0.0013	0.0062	<0.0011	0.018	<0.0021	<0.0013	0.0413
06/10/10	0.011	0.0030	<0.0011	0.016	<0.0013	0.027	<0.0011	0.054	<0.0021	<0.0013	0.1110
07/22/10	0.014	0.0097	<0.0011	0.013	<0.0013	0.014	0.0012	0.034	<0.0021	0.0029	0.0888
08/10/10	0.023	0.0041	<0.0011	0.0090	0.0013	0.0054	0.0015	0.032	0.0032	0.0040	0.0835
09/09/10	0.0035	<0.0029	<0.0011	0.011	0.016	0.020	0.044	0.036	<0.0021	0.080	0.2105
10/20/10	0.0048	<0.0029	<0.0011	0.015	<0.0013	0.023	<0.0011	0.068	<0.0021	<0.0013	0.1108
11/30/10	0.019	0.0036	<0.0011	0.010	<0.0013	0.016	<0.0011	0.035	<0.0021	<0.0013	0.0836
12/16/10	0.0048	<0.0029	<0.0011	0.0086	<0.0013	0.0063	0.0024	0.036	<0.0021	<0.0013	0.0581
01/18/11	0.0073	<0.0029	<0.0011	0.0076	<0.0013	0.037	0.0011	0.049	<0.0021	<0.0013	0.1020
02/09/11	0.0036	<0.0029	<0.0011	0.0073	<0.0013	0.011	0.0013	0.039	<0.0021	<0.0013	0.0622
04/12/11	0.012	<0.0029	<0.0011	0.0031	<0.0013	0.0032	<0.0011	0.026	<0.0021	<0.0013	0.0443
05/24/11	0.0052	<0.0024	<0.0021	0.015	<0.0017	0.018	<0.0015	0.032	<0.0021	<0.0017	0.070
06/09/11	0.011	0.0032	<0.0021	0.012	<0.0017	0.019	0.0044	0.046	<0.0021	<0.0017	0.0956
07/13/11	0.0094	0.0027	<0.0021	0.0083	<0.0017	0.011	<0.0015	0.026	<0.0021	<0.0017	0.0574
08/10/11	0.0088	0.0029	<0.0021	0.011	<0.0017	0.0054	0.0015	0.045	<0.0021	<0.0017	0.0746
10/17/11	0.0095	0.0031	<0.0021	0.0021	<0.0017	0.0050	<0.0015	0.013	<0.0021	<0.0017	0.0327
11/30/11	0.0051	<0.0024	<0.0021	0.010	<0.0017	0.012	<0.0015	0.046	<0.0021	<0.0017	0.0731
12/21/11	0.011	0.0028	<0.0021	0.011	<0.0017	0.0047	<0.0015	0.031	<0.0021	<0.0017	0.0605
01/24/12	0.015	0.0043	<0.0021	0.0053	<0.0017	0.0061	<0.0015	0.047	<0.0021	<0.0017	0.0777
02/21/12	0.0081	<0.0024	<0.0021	0.0048	<0.0017	0.0081	0.0020	0.028	<0.0021	<0.0017	0.0510
03/14/12	0.0078	0.0024	<0.0021	0.010	<0.0017	0.016	0.0020	0.054	<0.0021	<0.0017	0.0922
04/19/12	0.0079	<0.0024	<0.0021	0.012	<0.0017	0.012	0.0023	0.038	<0.0021	<0.0017	0.0722
05/30/12	0.0084	0.0025	<0.0021	0.0096	<0.0017	0.0053	<0.0015	0.042	<0.0021	<0.0017	0.0678
06/28/12	0.017	0.0034	<0.0021	0.0035	<0.0017	0.0064	<0.0015	0.020	<0.0021	<0.0017	0.0503
07/23/12	0.018	0.0055	<0.0021	0.0070	<0.0017	0.013	<0.0015	0.031	<0.0021	0.0030	0.0775
08/08/12	0.035	0.0039	<0.0021	0.012	<0.0017	0.011	<0.0015	0.033	<0.0021	<0.0017	0.0949
09/12/12	0.0095	<0.0024	<0.0026	0.010	<0.0017	0.0063	<0.0015	0.048	<0.0021	<0.0017	0.0738
10/17/12	0.011	<0.0024	<0.0040	0.0024	<0.0017	0.0063	<0.0015	0.016	<0.0021	<0.0017	0.0357
11/20/12	0.0068	<0.0024	<0.0040	0.011	<0.0017	0.030	<0.0015	0.048	<0.0021	0.0094	0.1052
12/26/12	0.0071	<0.0024	<0.0040	0.0090	<0.0017	0.0078	<0.0015	0.032	<0.0021	<0.0017	0.0559
01/10/13	0.0080	0.0033	<0.0040	0.0079	<0.0017	0.0059	<0.0015	0.037	<0.0021	<0.0017	0.0621
02/25/13	0.782	0.776	<0.00097	0.0143	0.0032	0.0478	0.0097	0.0376	0.0088	0.0124	1.6918
04/04/13	0.0096	0.0027	<0.00091	0.0072	<0.0015	0.0079	0.0018	0.0306	<0.00092	<0.0045	0.0598
05/09/13	0.0134	0.0053	<0.00056	0.0061	0.0024	0.0076	0.0052	0.0193	<0.00073	0.0102	0.0695
06/13/13	0.011	0.0025	<0.001	<0.0015	<0.0016	0.0038	0.0018	0.0155	<0.001	<0.0049	0.0346

TABLE 1

SUMMARY OF MRDS SVE SYSTEM EXHAUST GAS ANALYTICAL RESULTS (JANUARY 2004 - AUGUST 2019)

Date	Detected Target Compound List Volatile Organic Compound Concentrations ⁽¹⁾										TCL VOCs
	Acetone RQ	2-Butanone RQ	Chloroethane	1,1-DCA	Ethylbenzene	PCE	Toluene RQ	TCA	TCE RQ	Xylenes RQ	
07/11/13	0.0032	0.0020	<0.00075	0.0070	<0.0012	0.0089	0.0020	0.0194	<0.00076	<0.0036	0.0425
08/06/13	0.0056	0.011	<0.00075	0.0067	0.0047	0.0106	0.0188	0.0222	<0.00076	0.0251	0.1047
09/26/13	0.0170	0.0057	<0.00091	0.0085	0.0335	0.0090	0.0635	0.0227	<0.00092	0.1562	0.3161
10/17/13	0.0038	0.0018	<0.00072	0.0112	<0.0012	0.0079	0.0034	0.0381	<0.00074	0.0052	0.0714
11/21/13	0.0163	0.0056	<0.00094	0.0044	0.0026	0.0096	0.0032	0.0189	<0.00096	0.0064	0.0670
12/23/13	0.0558	0.0183	<0.00094	0.0063	0.002	0.0089	0.0116	0.0235	0.0014	0.0069	0.1347
01/28/14	0.0142	0.0026	<0.00072	0.0072	<0.0012	0.0072	0.0026	0.0204	<0.00074	<0.0036	0.0542
02/25/14	0.0095	0.0103	<0.00078	0.0072	<0.0013	0.0104	0.0017	0.0341	<0.00079	<0.0038	0.0732
03/27/14	0.0093	0.0021	<0.00080	0.0064	<0.0013	0.0114	0.0057	0.0227	<0.00082	0.0056	0.0632
04/18/14	0.0176	0.0078	<0.00091	0.0087	0.0508	0.0096	0.0014	0.0293	<0.00092	0.423	0.5482
05/22/14	0.0282	0.0056	<0.00091	0.0064	<0.0015	0.0066	<0.0013	0.0200	<0.00092	<0.0045	0.0668
06/18/14	<0.0035	<0.00086	<0.00078	0.0012	<0.0013	<0.00099	0.0015	0.0046	<0.00079	<0.0038	0.0073
07/25/14	0.0051	0.0022	<0.00075	0.0043	<0.0012	0.0114	<0.0011	0.0174	<0.00076	<0.0055	0.0404
08/20/14	0.0140	0.0022	<0.00072	0.0089	<0.0012	0.0096	0.0026	0.0325	<0.00074	0.0036 U	0.0734
09/17/14	<0.0032	0.00083	<0.00072	0.0110	<0.0012	0.0070	<0.0010	0.0274	<0.00074	<0.0036	0.0462
10/30/14	<0.0034	<0.00083	<0.00075	0.0160	<0.0012	0.0172	<0.0011	0.0754	<0.00076	<0.0036	0.1086
11/21/14	0.0101	0.0023	<0.00072	0.0085	0.0068	0.0082	0.0030	0.0257	<0.00074	0.0542	0.1188
12/03/14	0.0086	0.0018 J	<0.00024	0.0068	<0.00027	0.0204	0.0020 J	0.0380	<0.00027	<0.00087	0.0776
03/23/15	<0.0016	0.00057 J	<0.00022	0.0049	<0.00024	0.0075	0.00061 J	0.0167	<0.00024	0.00195 J	0.0322
06/15/15	0.0022 J	0.0050	<0.00029	0.0119	<0.00063	0.0123	<0.00023	0.0334	<0.00041	<0.00172	0.0648
09/22/15	0.0032 J	0.0020 J	<0.00027	0.0123	<0.00059	0.0105	0.0065	0.0282	0.0013	0.00219 J,U	0.0662
12/07/15	0.0065 J	0.0021 J	<0.00026	0.0114	<0.00057	0.0170	0.0022	0.0603	0.00088	0.00187 J,U	0.1023
01/04/16	0.0042 J	<0.0020	<0.00042	0.0148	<0.00059	0.0214	<0.00051	0.0738	<0.00037	0.00395 J	0.1182
02/02/16	0.0036	<0.00031	<0.00026	0.0147	<0.00057	0.0066	0.001 J	0.0455	<0.00037	0.00197 J,U	0.0734
03/22/16	0.005	0.0019 J	<0.00027	0.0126	<0.00059	0.0175	<0.00021	0.0698	0.00067 J	0.00269 J	0.1102
06/14/16	--	--	--	0.0051	--	0.0159	--	0.0245	0.00089	--	0.0464
08/29/16	--	--	--	0.0168	--	0.0238	--	0.0437	0.0013	--	0.0856
12/06/16	--	--	--	0.0081	--	0.0144	--	0.0301	0.00120	--	0.0538
03/21/17	--	--	--	0.0146	--	0.0175	--	0.107	0.00090	--	0.1400
06/12/17	--	--	--	0.0188	--	0.0135	--	0.114	0.00074 J	--	0.1470
08/29/17	--	--	--	0.0116	--	0.0056	--	0.0264	0.00036 U	--	0.0440
12/14/17	--	--	--	0.00033	--	0.0057	--	0.0350	0.0011 J	--	0.0421
03/27/18	--	--	--	0.0133	--	0.0142	--	0.0797	0.00066 J	--	0.1079
06/18/18	--	--	--	0.0192	--	0.0188	--	0.1220	0.0048 J	--	0.1648
08/13/18	--	--	--	0.0145	--	0.0109	--	0.0384	0.0016	--	0.0654
12/11/18	--	--	--	0.0100	--	0.0109	--	0.0342	0.00034 U	--	0.0554
03/26/19	--	--	--	0.0141	--	0.0159	--	0.0839	0.00064 J	--	0.1145
06/10/19	--	--	--	0.0189	--	0.0167	--	0.1050	0.00084	--	0.1414
08/20/19	--	--	--	0.0152	--	0.0055	--	0.0313	0.00059 J	--	0.0526

NOTES:

Concentrations are in micrograms per liter ($\mu\text{g}/\ell$).

Continuous, full-time operation of the SVE began on 10/28/98.

1,1-DCA = 1,1-Dichloroethane.

J = Estimated concentration below laboratory quantitation level.

PCE = Tetrachloroethylene.

RQ = Results qualifier.

TCA = 1,1,1-Trichloroethane.

TCE = Trichloroethylene.

TCL VOC = Target compound list volatile organic compound.

TCL VOCs = Summation of detected TCL VOC concentrations. Includes xylenes, prior to 06/14/16, if one xylene isomer-type was detected and the other was not.

U = Indicates either VOC analyzed for, but not detected, or one of the two xylene isomer-types (i.e., m&p-Xylene or o-Xylene) was analyzed for, but not detected.

-- = Not analyzed.

FOOTNOTE:

(1) Includes only those TCL VOCs detected at concentrations at or above $0.1 \mu\text{g}/\ell$ in one or more samples. In addition, starting on 06/14/16, the analytes include 1,1-DCA; PCE; TCA; TCE only, as approved by both agencies.

NATIONAL PRESTO INDUSTRIES, INC.
EAU CLAIRE, WISCONSIN

TABLE 2

EVALUATION OF MRDS SVE SYSTEM EXHAUST GAS ANALYTICAL DATA (JUNE 2016 - JUNE 2019)

Date	NPI VOC Concentration ($\mu\text{g}/\ell$) and Results Qualifier (RQ)				NPI VOCs	Comments
	1,1-DCA RQ	PCE RQ	TCA RQ	TCE RQ		
06/14/16	0.0051	0.0159	0.0245	0.00089	0.0464	
08/29/16	0.0168	0.0238	0.0437	0.0013	0.0856	
12/06/16	0.0081	0.0144	0.0301	0.00120	0.0538	Start of first trial seasonal shutdown
03/21/17	0.0146	0.0175	0.107	0.00090	0.1400	
06/12/17	0.0188	0.0135	0.114	0.00074 J	0.1470	End of first trial seasonal shutdown
08/29/17	0.0116	0.0056	0.0264	0.00036 U	0.0440	
12/14/17	0.00033 U	0.0057	0.0350	0.0011 J	0.0421	Start of second trial seasonal shutdown
03/27/18	0.0133	0.0142	0.0797	0.00066 J	0.1079	
06/18/18	0.0192	0.0188	0.122	0.0048 J	0.1648	End of second trial seasonal shutdown
08/13/18	0.0145	0.0109	0.0384	0.0016	0.0654	
12/11/18	0.0100	0.0109	0.0342	0.00034 U	0.0554	Third trial shutdown started 12/14/18
03/26/19	0.0141	0.0159	0.0839	0.00064 J	0.1145	
06/10/19	0.0189	0.0167	0.105	0.00084	0.1414	End of third trial seasonal shutdown
Fractional Change Compared to 12/06/16 Concentration for 03/21/17 and 06/12/17 Concentrations						
03/21/17	1.80	1.22	3.6	0.75	2.6	
06/12/17	2.32	0.94	3.8	0.62	2.7	
Fractional Change Compared to 12/14/17 Concentration for 03/27/18 and 06/18/18 Concentrations						
03/27/18	40.3	2.5	2.3	0.60	2.6	
06/18/18	58.2	3.3	3.5	4.4	3.9	
Fractional Change Compared to 12/11/18 Concentration for 03/26/19 and 06/10/19 Concentrations						
03/26/19	1.41	1.46	2.5	1.88	2.1	
06/10/19	1.89	1.53	3.1	2.5	2.6	
Ratio of One-Tenth Threshold Concentration for TCA (threshold = 60 $\mu\text{g}/\ell$) and TCE (threshold = 1.0 $\mu\text{g}/\ell$)						
03/21/17	na	na	56	111	na	
06/12/17	na	na	53	135	na	
03/27/18	na	na	75	152	na	
06/18/18	na	na	49	21	na	
03/26/19	na	na	72	156	na	
06/10/19	na	na	57	119	na	

NOTES:

NPI VOC concentrations are in micrograms per liter ($\mu\text{g}/\ell$).

See Page 2 for example calculations.

1,1-DCA = 1,1-Dichloroethane.

J = Estimated concentration below laboratory quantitation level.

NPI VOCs = Summation of the detected NPI VOC concentrations.

PCE = Tetrachloroethylene.

RQ = Results qualifier.

TCA = 1,1,1-Trichloroethane.

TCE = Trichloroethylene.

na = Not applicable for ratio comparisons.

U = Indicates compound was analyzed for, but not detected.

TABLE 2

EVALUATION OF MRDS SVE SYSTEM EXHAUST GAS ANALYTICAL DATA (JUNE 2016 - JUNE 2019)EXAMPLE CALCULATIONS:

Fractional change in TCA concentrations, 03/21/17 compared to 12/06/16:

$$\frac{\text{TCA on 03/21/17}}{\text{TCA on 12/06/16}} = \frac{0.107}{0.0301} = 3.6$$

Ratio of one-tenth threshold concentration (60 µg/ℓ) to measured concentration for TCA on 03/21/17:

$$\frac{0.1 \times \text{TCA threshold}}{\text{TCA on 03/21/17}} = \frac{6.0}{0.107} = 56$$

Ratio of one-tenth threshold concentration (1.0 µg/ℓ) to measured concentration for TCE on 03/21/17:

$$\frac{0.1 \times \text{TCE threshold}}{\text{TCE on 03/21/17}} = \frac{0.10}{0.00090} = 111$$