



PFAS Treatment and Investigation at a Former Chromium Plating Facility – A Case Study

Brad Hoare AECOM Project Manager Nathan Whitmyer EGLE-RRD David Harn EGLE-RRD

History

- ∖ Former plastics plating company (~1966 bankruptcy in 1991)
 - Production Plated Plastics (PPP)
- 1977 Heavy metal contamination discovered in residential wells
 - Company replaced affected wells
- 1985 Chlorinated Volatile Organic Compounds discovered at the site
- ∖ PPP conducted investigations and operated a groundwater cleanup system
- ∖ 1988 Municipal water extended to area
- 1991 PPP bankrupt, State took over response activities

History



3

History

Shallow Ni Plume Deep Ni Plume FORMER LAGOONS LEGEND A -----PROPERTY LINE W-7. SINLOW STRADUNTE 201 FORMER LAGOONS TH-1 BI DETEXTING SHULLON OPDIMINATER 2016 -PROPERTY UNE FENCE 0 APPECEMANT LOCATES OF SOL SOURCE AND (AS DETHED BY HORSEN) FENCE ECONCENTRATION IN 1954 DA CHER A = 100 cg/L S3 = 500 DETECTE ANDRE LANDRATORY EFFORMS LIMITS 5000 D x x y OROUNDWATER CONCENTRATION ISOCONTOLR (Ag/A) DI 0 -1 B 160 PRESENCE OF DESIGNATES CONCENTRATION ECCONTIONS (ag/C) 0 cc D ----57.98 -----MR-1 5 \square 5, A (0+1) ß D IJ r. B-; 0 FORMER DRY CLEANER LAGO INS 34th Stree FORMER DRY CLEANER LAGOONS N orth 01-5 10 idate for me Copyright (C) 2010 URS Corporation. All Rights Reserved

Shallow Cr VI Plume





LEGEND

8000

p

UN-30 A DEEP ORDARIANTER 2016

EN-210 CHERY, BIC LIEF CHOMEM, BH SOIL

(IN DEFINED BY HORIZON)

ECONCERTRATIONS IN og A. DM CRITERA - 100 og A.

CASE CONTRACTOR CONCERNENCE (SECONTOR) (SECONTOR)

Adolet from many prodied by Borley, Delivariantal

Congright C 2010 URS Corporation, Al Mighta Head

NO - NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

> PRESLIKE OF DECKARER LESSENTIATES BOOMOUR (15)

> > IN

The Turning Point

- Michigan PFAS Action Response Team (MPART)
 - Surface Water Investigation
 \POTW
 - Industrial Pretreatment Program (IPP)

- Extraction system discharges to the City of Kalamazoo's Water Reclamation Plant under an ICD
- 9,640 ppt PFOS in discharge sample (April 2018)



Pre-Treatment System

- ∖ Installation and startup of a pre-treatment system
 - <2 month TAT with a July 31th deadline
- \ Incorporate into existing extraction well infrastructure



Pre-Treatment System

- \ Equalization Tank (500 gal.)
- \ Bag filters
- (6) 2,000 lbs. vessels (1) Reactivated Carbon, (1) Resin, (4) Virgin Carbon
- \ Flow: 60 GPM; Adjust up to 75 GPM
- \ Telemetry for remote operation and alarms





Pre-Treatment System







Pre-Treatment System – Reactivated Carbon



Pre-Treatment System – Ion Exchange

PFAS Remediation System Ion Exchange Vessel 25.0 6000.0 Carbon Change out 3/28/19 20.0 4800.0 Other PFAS Concentration (ppt) 00 ppt -PFBA 3600.0 -PFPeA PFHxA PFHpA ŝ - PFOA 2400.0 00 System Shut Down 9/27/18 PFHxS PFHpS PFOS 5.0 1200.0 0.0 0.0 0/1 0/2 00 00 00 19999499999 000 IN IN IN NNN ને ની ની

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Pre-Treatment System – Lead/Lag



Pre-Treatment System – Ion Exchange: Metals

Sample Leastion					F\\\/ 1						
		EVV-/	EVV-O	EVV-9	EVV-I	REACT CARDON					TRAIN A LAG
Date Collected		10/1/2018	10/1/2018	10/1/2018	3/25/2019	1/23/2010	1/23/2010	1/23/2010	1/23/2010	1/23/2010	1/23/2010
		10/ 1/ 2010	10/1/2010	10/1/2010	5/25/2017	1/23/2017	1/23/2017	1/23/2017	1/23/2017	1/23/2017	1/23/2017
Date Received		10/3/2018	10/3/2018	10/3/2018	3/26/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019
Analyte	Units										
Hexavalent Chromium	ug/L	170	420	32	1,200	610	610	600	630	630	630
Nickel	ug/L	320	430	100	810	460	36	48	42	50	37

Remedial Investigation – Residential Sampling



Remedial Investigation

∖ Residential Wells

- 4 Phases of sampling
- Later phases guided by well results

 121 samples collected



Residential Sampling
August 2018
September 2018
December 2018
February 2019
Buffer



Remedial Investigation – Existing Monitoring Wells



Remedial Investigation – New Monitoring Wells



Remedial Investigation – Stratigraphy



Index Map

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Remedial Investigation



Surface Water Samples PFOS Concentration (ppt) Non-Detect $\ge 0 - <12$ ≥ 12 PFOA + PFOS (ppt) Non - Detect > 0 - 10 > 10 - 70 > 70 - 1,000> 1,000



Next Steps

- ∖ Additional investigation for lateral and vertical extent
- ∖ Potential local ordinance to limit residential wells
- \ Investigate GSI pathway
- ∖ Crop and feed samples at farm to the north
- ∖ Soil sampling of agricultural fields east and north of the site
- \ Municipal water is planned to be extended east of the site



Thank You!

Brad Hoare AECOM Project Manager

- Grand Rapids, MI
- o (616) 574-8464
- Brad.hoare@aecom.com