Glenn Springs Holdings, Inc.
A subsidiary of Occidental Petroleum

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Site Manager
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7601 Old Channel Trail
Montague, MI 49437

April 28, 2017 Reference No. 007406

Mr. Brian Sadowski
New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, NY 14203-2915

Dear Mr. Sadowski:

Re: 2017 Semiannual Groundwater Monitoring Report
Twenty-Sixth Year Interceptor Trench Operation
Occidental Chemical Corporation Durez, North Tonawanda, New York

This submittal has been prepared by Glenn Springs Holdings, Inc. (GSH) for distribution to the parties listed in the Third Stipulation and Partial Consent Judgment (PCJ).

GSH is submitting the enclosed semiannual groundwater monitoring report for water level measurements recorded in March 2017.

Introduction

Pursuant to Appendix B of the Durez PCJ "Monitoring, Operations, and Maintenance Plan" (1989) and subsequent Minor Modification #10, Rev. 2 "Minor Change to Appendix B "Monitoring, Operations, and Maintenance Plan" (September 1999) (Minor Change No. 10), groundwater monitoring at the former Occidental Chemical Corporation (OxyChem) Durez Division North Tonawanda Plant site (Site) is being conducted as part of the plant-wide groundwater remediation program. The post-interceptor trench (IT) groundwater monitoring program is conducted to collect the hydraulic and groundwater chemical data necessary to evaluate the effectiveness of the IT and the long-term trends in groundwater chemistry in selected monitoring wells. This monitoring began on October 2, 1989, prior to installation of a groundwater remediation system, the principle component of which is a perimeter groundwater IT.

The IT was fully operational beginning November 1990. Since that time, as part of the hydraulic monitoring program, groundwater level measurements were to be performed monthly through November 1991 and quarterly thereafter.

The post-IT hydraulic monitoring program was conducted quarterly from April 1991 through January 2000. In January 1992, the PCJ, which requires quarterly reporting of the monitoring results to the New York State Department of Environmental Conservation (NYSDEC), was amended by Minor Change No. 5 to allow for semiannual reporting of quarterly hydraulic groundwater data.

Effective January 2000, the following changes were approved as per Minor Change No. 10:

- Groundwater level monitoring went from 83 wells/36 IT piezometers to 48 wells/36 piezometers.
- The frequency of groundwater level monitoring of the trench piezometers went from quarterly to semiannual.
- The frequency of groundwater level monitoring of the monitoring wells went from quarterly to annually.
- The seven groundwater network sampling wells and parameters analyzed have not changed; however, the sampling frequency went from quarterly to annually.
- Reporting of groundwater went from semiannual to annual with submittal of a letter report summary of the monitoring data.

As per Minor Change No. 10, this letter report summarizes the hydraulic monitoring of the IT performed on March 20, 2017. Twelve sets of piezometer arrays (T2 through T13) were measured. The piezometer arrays consist of three wells (A, B, and C): the first well (A) located on the outside perimeter of IT; the second well (B) located in the center or in IT backfill; and the third well (C) located in the plant side of the IT for a total of 36 piezometers. The location and associated groundwater elevation for the March 2017 event are shown on attached Figure 1. Additionally, the 48 monitoring well locations and their water levels for the monitoring event are also noted on Figure 1.

Groundwater Monitoring

The contour map (Figure 1) shows an inward hydraulic containment along the IT system and that the IT continues to provide an effective barrier to groundwater migration at the plant Site boundary. At two piezometer locations (T-5 and T-6), the outside piezometers (T-5A and T-6A) were dry. The T-6 piezometer cluster still shows an inward hydraulic gradient since the water level elevation (570.38 feet above mean sea level [ft AMSL]) in monitoring well SP-3, which is located farther outside of the IT than T-6A, is higher than the water level elevation in the piezometer located in the center of the IT (T-6B, 565.95 ft AMSL). The trench piezometer of the T-5 cluster (T-5B) was also dry. When the depth of piezometer T-5B (564.14 ft AMSL) is compared to the water level elevation in monitoring well NP-22A located farther from the IT than T-5A (572.45 ft AMSL), it is clear that an inward hydraulic gradient at the T-5 cluster was present since the water level elevation is higher than the depth of piezometer T-5B.

T-2A Non-Aqueous Phase Liquid (NAPL)

During the October 2008 routine semiannual water level measurement event at the Site, the presence of NAPL was discovered in the T-2A piezometer.

In December 2008, GSH subsequently sent the NYSDEC a letter detailing the discovery of NAPL presence in T-2A and the investigation activities that were conducted to identify the cause of the NAPL presence. It was agreed between GSH and the NYSDEC that GSH would continue to pump the NAPL from the T-2A location and monitor hydraulic conditions weekly at T-2A and surrounding wells to demonstrate a continued inward gradient towards the IT in this area.

Based on the 2011 results demonstrating consistent hydraulic containment and extended periods without NAPL presence, it was recommended in the 2011 Periodic Review Report that biweekly pumping of T-2A and weekly water level monitoring be reduced in frequency to quarterly pumping of T-2A and quarterly water level monitoring of the selected wells. GSH continued to monitor the NAPL presence at piezometer T-2A through biweekly pumping of T-2A and weekly water level rounds at the select wells until approval for modification of the program was received on May 11, 2012. Following approval, the frequency of monitoring was reduced to quarterly.

NAPL extracted from the T-2A piezometer has declined following its discovery in 2008 (2008-82 ounces [oz.], 2009-53 oz., 2010-8 oz., 2011-1.2 oz., 2012-14 oz., 2013-0 oz., and 2014-0 oz.); however, after 2 years with no NAPL extracted in 2013 and 2014, 3 oz. were extracted in 2015, and 10 oz. were extracted in 2016. No NAPL was extracted in 2017 to date. Figure 2 presents the NAPL extracted from T-2A since October 2008. The quarterly water level monitoring (weekly through May 18, 2012) at T-2A and surrounding monitoring wells from 2012 to present are shown in Table 1. Water level elevations from the March 20, 2017 water level event shown on Figure 3 demonstrate an inward gradient in this area as indicated by a lower groundwater elevation in T-2A than monitoring well NP-27, which is farther outside of the IT than T-2A.

If you have any questions, please feel free to contact me at 231-670-6809 or by email at joseph_branch@oxy.com.

Very truly yours,

GLENN SPRINGS HOLDINGS, INC.

JBranch

Joseph Branch
Site Manager
231-670-6809 Cell

JB/adh/5
Encl.

cc: M. Forcucci, NYSDOH (email only)
G. May, NYSDEC (email only)
J. Pentilchuk, GHD (email only)
S. Sasnow, GHD (email only)

WATER LEVELS AT INTERCEPTOR TRENCH (IT)

MEASURED

TRENCH PIEZOMETER	A	B	C
T-2	571.25	DRY	571.99
T-3	569.37	567.05	569.36
T-4	570.07	567.55	570.85
T-5	DRY	DRY	573.24
T-6	DRY	565.95	573.04
T-7	569.59	DRY	568.33
T-8	573.56	568.74	572.23
T-9	574.20	569.52	574.79
T-10	571.72	567.90	570.38
T-11	570.32	DRY	571.04
T-12	568.56	564.53	570.60
T-13	568.52	562.31	571.64

KEY

A OFFSITE SIDE OF IT
B IN IT BACKFILL
C PLANT SIDE OF IT

LEGEND

- INTERCEPTOR TRENCH INWARD GRADIENT (SEE NOTE 1)
- INTERCEPTOR TRENCH OUTWARD GRADIENT (SEE NOTE 2)
- 572 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- MONITORING WELL
- (574.35) GROUNDWATER ELEVATION (ft NGVD)
- PIEZOMETER
- PIEZOMETER T-2A (SEE NOTES)
- MONITORING WELL PART OF GROUNDWATER CHEMISTRY MONITORING PROGRAM
- MANHOLE

NOTES:
1. INWARD GRADIENT INDICATES WATER LEVELS AT TRENCH PIEZOMETER B (IN IT BACKFILL) IS LOWER THAN THE CORRESPONDING TRENCH PIEZOMETER A (OFFSITE SIDE OF IT).
2. OUTWARD GRADIENT INDICATES WATER LEVELS AT TRENCH PIEZOMETER B IS EQUAL TO OR HIGHER THAN THE CORRESPONDING TRENCH PIEZOMETER A.
3. PIEZOMETER T-2A IS MONITORED QUARTERLY FOR NAPL PRESENCE. 15.2 OUNCES OF NAPL HAS BEEN EXTRACTED SINCE JULY 2010.

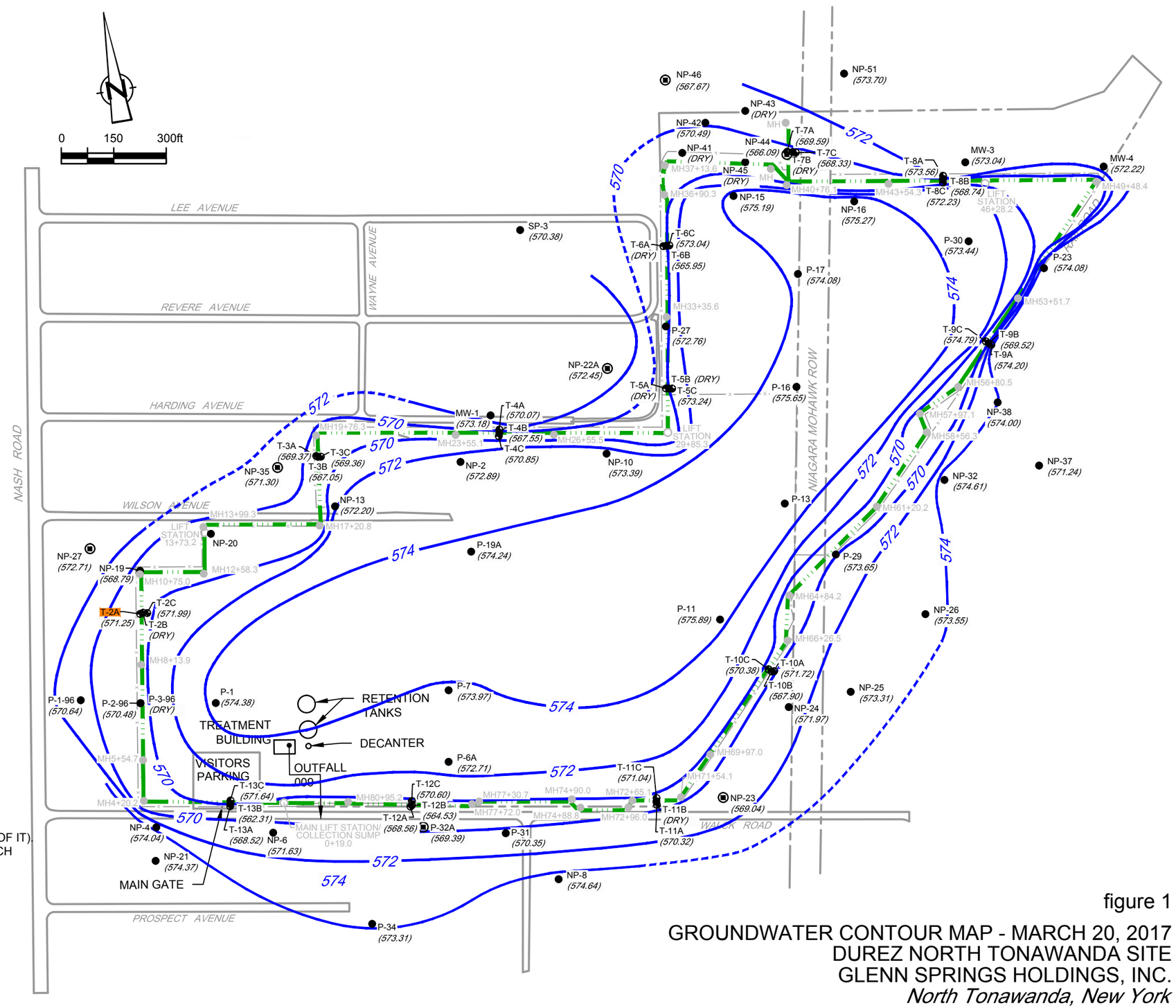


figure 1

GROUNDWATER CONTOUR MAP - MARCH 20, 2017
DUREZ NORTH TONAWANDA SITE
GLENN SPRINGS HOLDINGS, INC.
North Tonawanda, New York

GHD

07406-00(SADO005)GN-WA001 APR 24, 2017

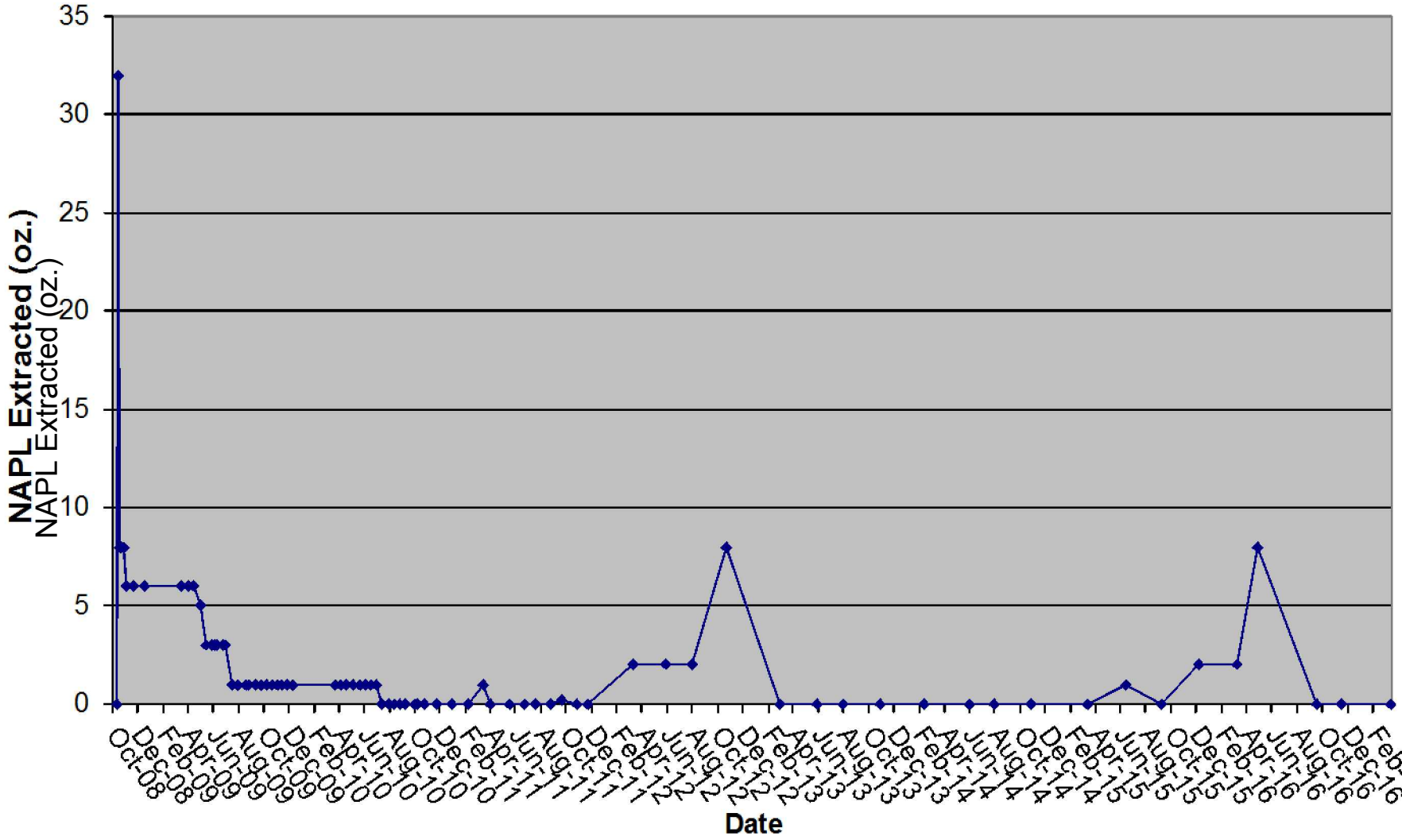
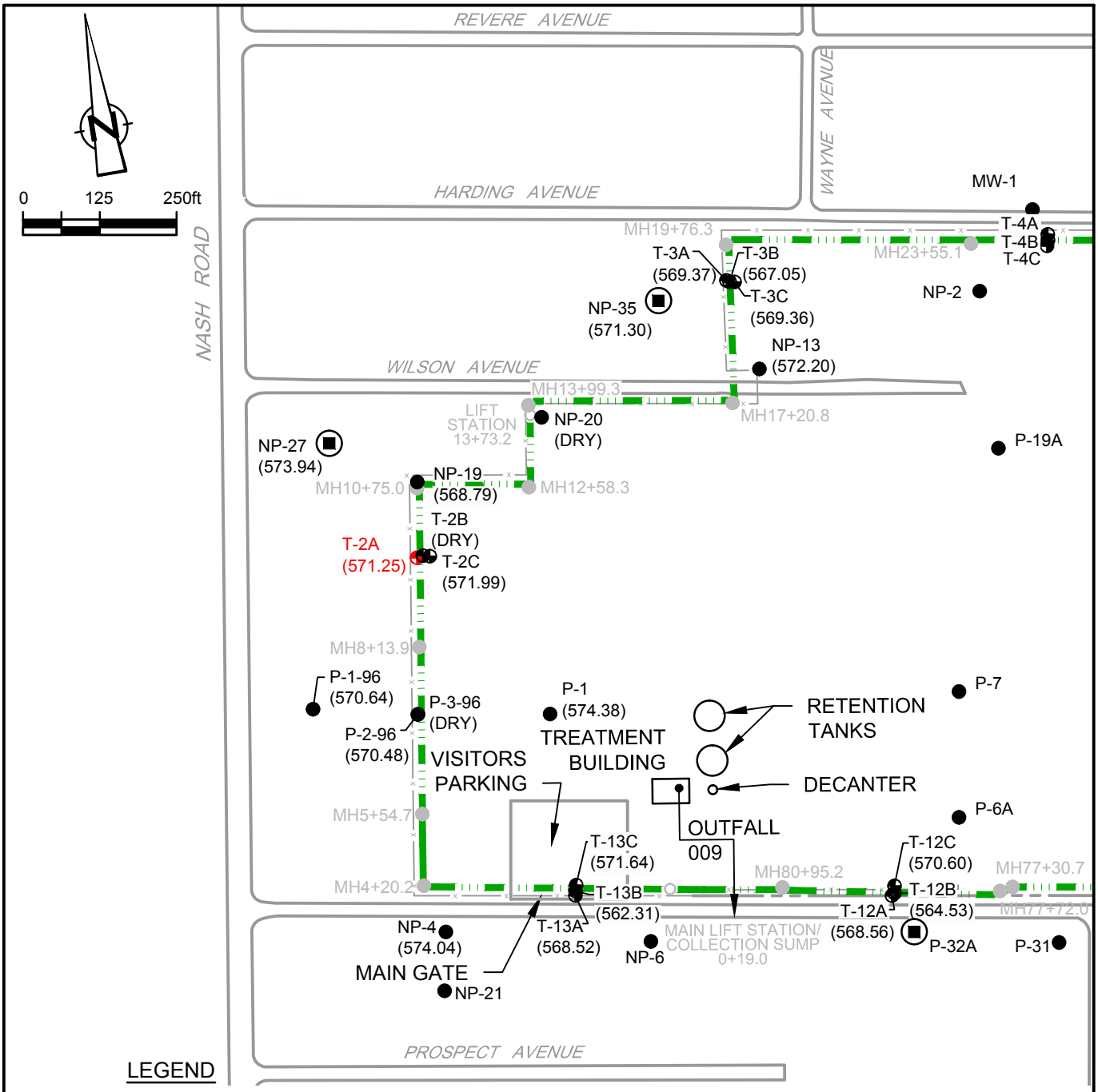


figure 2

NAPL REMOVED FROM T-2A
DUREZ NORTH TONAWANDA SITE
GLENN SPRINGS HOLDINGS, INC.
North Tonawanda, New York



LEGEND

- INTERCEPTOR TRENCH INWARD GRADIENT (SEE NOTE 1)
- MONITORING WELL USED IN QUARTERLY HYDRAULIC MONITORING OF T-2A
- MONITORING WELL PART OF GROUNDWATER CHEMISTRY MONITORING PROGRAM
- PIEZOMETER T-2A WHERE NAPL IS PRESENT
- MANHOLE
- PIEZOMETER

NOTE:
1. WATER LEVELS AT TRENCH PIEZOMETERS B (IN IT BACKFILL) ARE LOWER THAN THE CORRESPONDING TRENCH PIEZOMETER A (OFFSITE SIDE OF IT). INDICATING AN INWARD GRADIENT.
2. (*) - TOP OF WATER TABLE FROZEN AT TIME OF MEASUREMENT.

figure 3

GROUNDWATER ELEVATIONS NEAR T-2A - MARCH 20, 2017
DUREZ NORTH TONAWANDA SITE
GLENN SPRINGS HOLDINGS, INC.
North Tonawanda, New York

Table 1

2012-2017 T-2A NAPL Presence - Hydraulic Monitoring
Durez North Tonawanda
Glenn Springs Holdings, Inc.
North Tonawanda, New York

	Monitoring Date							
Well ID	**1/6/2012**	**1/13/2012**	**1/20/2012**	**1/27/2012**	**2/3/2012**	**2/10/2012**	**2/16/2012**	**3/1/2012**
NP-4	574.16	574.67	574.27	575.15	574.76	573.82	573.57	574.48
NP-13	572.24	572.71	572.67	573.54	573.74	572.81	572.75	572.68
NP-20	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
NP-27	571.45	574.30	NM[1]	575.00	575.14	574.63	573.74	574.71
NP-35	574.82	571.63	571.75	571.94	572.07	572.20	572.07	572.16
P-1	575.04	574.96	NM[1]	575.17	575.19	575.11	575.10	575.06
P-3-96	568.88	569.05	569.97	571.10	569.89	568.97	568.79	569.00
T2-A	570.97	572.34	571.97	573.37	572.46	571.06	571.16	571.47
T2-B	563.86	563.88	569.76	570.67	569.42	563.93	563.85	564.79
T2-C	570.85	571.61	571.40	573.03	571.64	570.68	570.42	570.87
P-1-96	571.79	571.78	572.95	572.97	572.74	571.36	571.31	572.04
P-2-96	571.53	572.32	573.91	NM[2]	NM[2]	572.43	571.41	572.24
T-3C	569.55	569.88	569.75	NM[2]	570.98	569.83	569.73	569.74
T-3B	567.48	567.46	567.43	NM[2]	567.73	567.72	567.63	566.67
T-3A	569.29	569.41	569.55	NM[2]	570.29	569.33	569.16	569.35
NP-19	572.07	572.56	572.70	574.27	573.22	572.52	572.26	573.02
T-12C	571.14	571.18	571.55	572.37	571.67	570.97	570.76	571.06
T-12B	564.33	564.32	569.04	569.95	568.63	564.30	564.33	564.66
T-12A	568.44	568.42	569.13	569.95	568.75	568.45	568.44	568.49
T-13C	569.85	572.97	570.48	573.31	573.01	569.55	573.54	572.80
T-13B	562.29	562.31	569.15	570.15	568.61	562.57	562.28	564.51
T-13A	568.47	569.07	569.46	569.36	569.46	568.44	568.35	569.38

Table 1

2012-2017 T-2A NAPL Presence - Hydraulic Monitoring
Durez North Tonawanda
Glenn Springs Holdings, Inc.
North Tonawanda, New York

	Monitoring Date							
Well ID	**3/9/2012**	**3/16/2012**	**3/23/2012**	**3/30/2012**	**4/5/2012**	**4/13/2012**	**4/20/2012**	**4/27/2012**
NP-4	574.58	573.17	571.85	572.04	572.54	571.16	570.74	574.32
NP-13	572.85	572.06	571.68	571.44	571.47	571.00	570.75	572.17
NP-20	DRY	DRY	DRY	DRY	Dry	Dry	Dry	Dry
NP-27	574.24	573.94	573.57	573.03	573.07	572.56	568.61	573.83
NP-35	572.21	572.18	572.09	572.01	571.97	571.90	567.38	567.84
P-1	575.00	575.00	574.83	574.84	574.92	574.83	574.69	574.88
P-3-96	568.90	568.80	568.66	568.60	568.54	568.50	568.38	569.04
T2-A	571.98	570.87	570.46	570.37	570.48	570.08	570.02	571.17
T2-B	563.88	DRY	DRY	DRY	563.84	Dry	Dry	568.52
T2-C	571.00	570.29	DRY	DRY	Dry	Dry	Dry	570.39
P-1-96	571.27	571.40	570.78	570.69	570.92	570.42	570.32	571.81
P-2-96	571.70	570.85	570.42	570.12	570.16	569.77	569.72	572.07
T-3C	569.83	569.48	569.31	569.21	569.29	569.00	568.97	569.58
T-3B	566.57	566.54	566.54	566.52	566.60	566.54	566.53	566.53
T-3A	569.25	569.12	569.03	DRY	569.04	Dry	Dry	569.32
NP-19	572.79	571.94	571.12	571.01	571.27	570.51	570.18	572.59
T-12C	571.01	570.84	570.66	570.59	570.65	570.43	570.30	571.12
T-12B	564.37	564.38	564.33	564.30	564.32	564.30	564.32	568.44
T-12A	568.44	568.44	568.44	568.45	568.46	568.45	568.39	568.44
T-13C	573.46	569.86	569.51	569.69	569.83	569.42	569.38	571.06
T-13B	562.35	562.25	562.27	562.28	562.28	562.26	562.19	568.04
T-13A	569.80	568.56	568.34	568.54	568.57	568.36	568.27	569.30

Table 1

2012-2017 T-2A NAPL Presence - Hydraulic Monitoring
Durez North Tonawanda
Glenn Springs Holdings, Inc.
North Tonawanda, New York

	Monitoring Date							
Well ID	**5/3/2012**	**5/11/2012**	**5/18/2012**	**9/12/2012**	**11/1/2012**	**2/6/2013**	**3/4/2013**	**5/3/2013**
NP-4	574.38	574.58	573.27	570.56	573.71	573.76	574.76	572.98
NP-13	572.15	572.32	571.63	Dry	Dry	572.12	572.58	567.77
NP-20	Dry	Dry	Dry	Dry	Dry	Dry	Dry	570.88
NP-27	574.32	574.47	573.82	Dry	Dry	NM[1]	575.00	570.68
NP-35	568.00	568.29	568.41	567.63	567.85	570.88	571.68	572.44
P-1	574.91	574.71	574.62	573.22	574.39	574.39	574.44	570.70
P-3-96	568.90	569.44	568.63	Dry	569.24	568.91	569.39	564.33
T2-A	571.14	571.49	570.31	566.65	566.60	570.15	571.85	568.47
T2-B	563.92	569.15	Dry	Dry	569.59	563.88	563.91	569.77
T2-C	570.28	570.63	Dry	Dry	571.13	570.54	571.23	562.30
P-1-96	571.54	571.85	570.84	568.43	572.63	571.93	571.90	568.39
P-2-96	571.23	572.97	570.35	568.63	568.50	571.90	574.07	574.39
T-3C	569.65	569.71	569.29	565.88	Dry	569.47	569.81	568.79
T-3B	566.61	566.88	566.55	565.82	567.71	566.66	566.78	DRY
T-3A	569.32	569.43	569.11	Dry	Dry	569.23	569.39	DRY
NP-19	572.74	572.67	570.76	Dry	Dry	570.27	572.54	570.45
T-12C	570.92	571.39	570.86	569.83	571.72	571.05	571.45	571.11
T-12B	564.41	568.62	564.38	564.12	569.31	564.33	564.35	DRY
T-12A	568.45	569.46	568.45	568.66	569.21	568.45	568.53	571.81
T-13C	569.66	569.61	569.43	569.42	571.19	569.77	Dry	569.39
T-13B	562.34	568.59	562.30	562.14	569.11	562.28	562.32	566.50
T-13A	569.01	569.07	568.39	568.50	570.60	568.59	568.78	569.01

Table 1

2012-2017 T-2A NAPL Presence - Hydraulic Monitoring
Durez North Tonawanda
Glenn Springs Holdings, Inc.
North Tonawanda, New York

	Monitoring Date							
Well ID	**8/1/2013**	**11/15/2013**	**2/24/2014**	**5/23/2014**	**8/8/2014**	**11/19/2014**	**2/19/2015**	**4/8/2015**
NP-4	570.37	574.14	574.49	574.11	571.36	570.89	569.48	574.57
NP-13	570.39	571.35	573.28	572.19	568.44	DRY	570.27	572.84
NP-20	571.23	571.71	DRY	DRY	DRY	DRY	DRY	DRY
NP-27	569.68	270.53	575.14	573.60	568.38	DRY	569.70	575.10
NP-35	573.87	574.24	572.03	568.42	569.05	569.05	570.25	571.01
P-1	571.98	571.29	574.39	574.30	573.46	572.25	573.21	574.22
P-3-96	564.22	564.22	570.24	568.58	DRY	567.62	DRY	569.30
T2-A	568.50	568.43	572.91	570.86	568.19	565.95	567.59	571.84
T2-B	570.23	569.64	569.89	DRY	DRY	DRY	DRY	568.49
T2-C	562.33	562.32	572.01	DRY	DRY	DRY	DRY	571.12
P-1-96	568.81	568.42	572.13	571.68	569.56	569.69	NM2	570.62
P-2-96	574.68	574.35	NM1	570.96	568.55	DRY	NM2	574.44
T-3C	568.32	568.83	570.05	569.56	567.86	566.00	568.38	570.11
T-3B	DRY	570.70	568.72	566.79	566.56	566.39	566.41	566.41
T-3A	DRY	DRY	569.55	569.16	DRY	568.88	DRY	569.48
NP-19	568.93	570.51	NM1	571.55	DRY	DRY	DRY	572.92
T-12C	DRY	570.75	571.41	571.16	570.24	569.67	570.43	570.67
T-12B	DRY	DRY	568.93	564.28	564.16	564.04	564.14	568.29
T-12A	571.09	572.16	569.16	568.46	568.51	569.25	568.34	568.61
T-13C	569.07	569.68	570.07	569.69	569.71	DRY	DRY	571.56
T-13B	566.54	566.57	569.07	562.33	562.17	562.08	DRY	568.29
T-13A	DRY	569.28	569.54	568.37	568.30	570.03	DRY	571.87

Table 1

2012-2017 T-2A NAPL Presence - Hydraulic Monitoring
Durez North Tonawanda
Glenn Springs Holdings, Inc.
North Tonawanda, New York

	Monitoring Date						
Well ID	**9/2/2015**	**11/9/2015**	**2/4/2016**	**5/4/2016**	**8/12/2016**	**11/30/2016**	**2/10/2017**
NP-4	569.21	572.16	574.22	573.87	569.28	572.58	575.26
NP-13	DRY	570.04	572.24	572.01	DRY	DRY	572.01
NP-20	DRY	DRY	DRY	DRY	DRY	DRY	DRY
NP-27	567.59	570.63	574.56	574.17	DRY	DRY	572.83
NP-35	569.30	569.97	570.82	568.26	568.50	568.44	570.61
P-1	572.25	573.37	573.60	574.37	571.69	571.65	574.33
P-3-96	DRY	DRY	DRY	568.76	DRY	DRY	DRY
T2-A	567.48	566.77	570.92	571.01	567.26	565.94	566.65
T2-B	DRY	DRY	DRY	DRY	DRY	DRY	DRY
T2-C	DRY	DRY	571.43	DRY	DRY	DRY	570.99
P-1-96	568.65	570.73	570.74	571.05	DRY	569.22	570.40
P-2-96	DRY	DRY	571.56	570.72	DRY	DRY	DRY
T-3C	567.27	567.67	569.77	569.68	566.47	DRY	568.39
T-3B	566.31	566.40	566.45	566.88	565.90	565.44	566.94
T-3A	DRY	DRY	569.41	569.21	DRY	568.90	569.29
NP-19	569.60	569.09	570.39	572.36	569.32	DRY	DRY
T-12C	569.90	570.46	571.17	570.63	569.62	569.55	570.62
T-12B	564.07	564.12	564.41	564.50	564.06	564.00	564.40
T-12A	568.47	568.34	568.44	568.41	568.46	568.43	568.46
T-13C	569.65	DRY	562.32	562.30	DRY	DRY	569.77
T-13B	562.16	562.12	570.31	569.89	562.15	562.16	562.29
T-13A	568.51	568.20	568.66	568.72	568.30	568.44	568.80

Notes:

Elevations shown are in feet above mean sea level

NM[1] Water frozen, measurement not possible

NM[2] Well under water/snow, measurement not possible