



December 20, 2021

Daniel Hamel
Michigan Department of EGLE
Remediation and Redevelopment Division
Jackson District Office Building
301 E. Louis Glick Highway
Jackson, Michigan 49210

Re: **Gelman Quarterly Progress Report**
4th Quarter, 2021
October 1, 2021 to December 31, 2021

Dear Mr. Hamel:

Please find enclosed the Quarterly Progress Report for the period of October 1, 2021 to December 31, 2021.

Should you have any questions regarding this document, please contact me at 269-993-7585.

Sincerely,

FLEIS & VANDENBRINK

A handwritten signature in blue ink, appearing to read "Jim Brode", is written over a faint, light blue circular watermark.

Jim Brode, CPG
Senior Project Manager

GelmanSciences

4th Quarter, 2021

(October, November, December)

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Summary of Activity

CEB = Central Environmental Building
C3 = C3 aquifer
D2 = D2 aquifer
E = E aquifer
SW = Southwest Property Area
Maple = Maple Road

Treatment Activities

- 10/1/21 - TW-22 (SW) was shut down for rehabilitation.
- 10/1/21-10/3/21 - TW-23 (E) was shut down due to flow fluctuations during TW-29 initial startup.
- 10/1/21-10/4/21 - TW-24 (C3) was shut down to control Red Pond level.
- 10/1/21-10/12/21 - TW-2 (Dolph) (C3) was shut down for rehabilitation.
- 10/4/21 - Treatment System 2A was shut down briefly for injector installation.
- 10/12/21-10/15/21 - TW-20 (C3) was shut down to control Red Pond level.
- 10/13/21 - TW-22 (SW) flow was briefly reduced below detectable rates during sampling.
- 10/15/21 - Treatment System 2A was shut down briefly for system maintenance.
- 10/18/21-10/25/21 - PW-1 (Marshy) was shut down for rehabilitation.
- 10/21/21-10/25/21 - TW-20 (C3) was shut down to control Red Pond level.
- 10/21/21-10/31/21 - TW-24 (C3) was shut down to control Red Pond level.
- 10/26/21-10/27/21 - TW-29 (E) and TW-23 (E) were shut down during LB-4 cleaning.
- 10/26/21-11/10/21 - LB-4 (D2) was shut down for rehabilitation.
- 11/1/21-11/30/21 - TW-24 (C3) was shut down.
- 11/3/21 - TW-2 (Dolph) (C3) and TW-20 (C3) were shut down briefly to control Red Pond level.
- 11/3/21 - Treatment System 1A was automatically shut down briefly by low water sensor.
- 11/18/21 - Treatment System 1A was shut down briefly for maintenance.
- 12/1/21-12/10/21 - TW-24 (C3) was shut down.
- 12/7/21-12/10/21 - TW-21 (D2) was shut down for rehabilitation.
- 12/11/21-12/13/21 - TW-22 (SW) and TW-28 (SW) were shut down due to a power outage.
- 12/13/21-12/17/21 - TW-23 (E) was shut down for rehabilitation.
- 12/20/21 - TW-24 (C3) was shut down briefly during electrical work.
- 12/20/21-12/22/21 - TW-20 (C3) and PW-1 (Marshy) were shut down during electrical work.
- 12/21/21-12/28/21 - TW-18 (E) was shut down for rehabilitation.
- 12/22/21-12/31/21 - TW-24 (C3) was shut down.
- 12/27/21 - TW-2 (Dolph) (C3) was shut down briefly due to communication loss.
- 12/29/21 - Treatment System 2A was shut down briefly to repair a faulty valve.

Field Activities

- 10/2021 – TW-22, TW-2 (Dolph), PW-1, and LB-4 were rehabilitated.
- 10/2021 – Delineation of wetland on east side of Third Sister Lake.
- 11/2021 – Drilled test borings TB-21-01, TB-21-02, and TB-21-03 along Valley Drive (Rose Extraction Area).
- 11/2021 – Drilled test borings for onsite extraction wells.
- 12/2021 – TW-21, TW-23, and TW-18 were rehabilitated.
- Drilled test borings and installed Western Area monitoring wells:
 - MW-142s/d at 50 W. Delhi (10/2021)
 - MW-143s/i/d at Park Rd between Burton and Myrtle (10/2021-11/2021)
 - MW-144s/i/d at 3340 W. Liberty Rd (11/2021-12/2021)
 - MW-145s/i/d at 4517 Dexter Ann Arbor Rd (12/2021)

Submittals/Responses

| | |
|----------|--|
| 10/20/21 | Gelman submitted Discharge Monitoring Report (DMR) to EGLE Gelman submitted Monthly Monitoring Report (NPDES) to EGLE Gelman submitted 3rd Quarter 2021 Report to EGLE |
| 11/20/21 | Gelman submitted Discharge Monitoring Report (DMR) to EGLE Gelman submitted Monthly Monitoring Report (NPDES) to EGLE |
| 12/20/21 | Gelman submitted Discharge Monitoring Report (DMR) to EGLE Gelman submitted Monthly Monitoring Report (NPDES) to EGLE |

Anticipated Major Activities for the Next Quarter

- Drilling/installation of monitoring wells in Western and Eastern Areas
- Installation of onsite extraction well
- Continuation of property access arrangements
- Submittal of permit for portion of Rose Extraction System
- Submittal of NPDES permit application for First Sister Lake discharge
- Implementation of Western Area GSI Work Plan

Quarterly Performance Analysis

For the months of October, November, and December 2021, over 205 pounds of 1,4-dioxane were removed and 84,071,303 gallons of water were extracted from the contaminated aquifers, treated, and discharged. The total mass of 1,4-dioxane removed since May 1997 is over 97,035 pounds and the total volume of water discharged since May 1997 is over 9.1 billion gallons.

In general, the performance of the operation was as expected, purging, and treating contaminated groundwater to the existing allowable capacities.

| QUARTERLY H₂O₂ INFLUENT | |
|--|-------------------------------|
| 12/16/2021 | H ₂ O ₂ |
| Well Name | µg/l |
| TW-20 | <50 |
| TW-18 | <50 |
| TW-23 | <50 |
| TW-2 (Dolph) | <50 |
| LB-4 | <50 |
| TW-19 | Not Sampled (well plugged) |
| TW-22 | <50 |
| TW-28 | <50 |
| TW-21 | <50 |
| PW-1 | <50 |

Mass Reduction

MASS REDUCTION DETAIL BY AQUIFIER

October 1 - October 31, 2021

| | Extraction Well | Month To Date Gallons Extracted | Month To Date Average Daily Flow Rate GPM | Month To Date Average Daily Pounds Removed | Month To Date Pounds Removed | Month To Date Average Concentration ppb |
|-----------------------|-------------------|---------------------------------|---|--|------------------------------|---|
| C3 | | | | | | |
| | TW-2 (Dolph) | 738,058 | 17 | 0.024 | 0.74 | 120 |
| | TW-10 | 73,638 | 1.6 | 0.014 | 0.44 | 710 |
| | TW-14 | 1,131,043 | 25 | 0.031 | 1.0 | 101 |
| | TW-20 | 891,832 | 20 | 0.18 | 5.6 | 765 |
| | TW-24 | 365,591 | 8.2 | 0.18 | 5.7 | 1,906 |
| | Sub-Totals | 3,200,162 | 72 | 0.33 | 10 | |
| Marshy | | | | | | |
| | PW-1 | 73,201 | 1.6 | 0.015 | 0.46 | 741 |
| | Sub-Totals | 73,201 | 1.6 | 0.015 | 0.46 | |
| E | | | | | | |
| | TW-17 | 1,411,719 | 32 | 0.032 | 1.0 | 85 |
| | TW-18 | 4,608,687 | 103 | 0.31 | 9.7 | 252 |
| | TW-29 | 2,163,064 | 48 | 0.21 | 6.4 | 352 |
| | TW-23 | 2,046,610 | 46 | 0.20 | 6.3 | 368 |
| | Sub-Totals | 10,230,080 | 229 | 0.75 | 23 | |
| Southwest | | | | | | |
| | TW-28 | 1,113,584 | 25 | 0.18 | 5.6 | 598 |
| | TW-22 | 87,328 | 2.0 | 0.010 | 0.31 | 425 |
| | Sub-Totals | 1,200,912 | 27 | 0.19 | 5.9 | |
| D2 | | | | | | |
| | LB-1 | 459,840 | 10 | 0.036 | 1.1 | 443 |
| | LB-4 | 3,650,312 | 82 | 0.44 | 14 | 445 |
| | TW-5 | 1,074,772 | 24 | 0.18 | 5.6 | 655 |
| | TW-9 | 102,691 | 2.3 | 0.012 | 0.37 | 430 |
| | TW-21 | 4,474,197 | 100 | 0.29 | 9.1 | 244 |
| | Sub-Totals | 9,761,812 | 219 | 0.96 | 30 | |
| Overall Totals | | 24,466,167 | 548 | 2.2 | 70 | |

MASS REDUCTION DETAIL BY AQUIFIER

November 1 - November 30, 2021

| | Extraction Well | Month To Date Gallons Extracted | Month To Date Average Daily Flow Rate GPM | Month To Date Average Daily Pounds Removed | Month To Date Pounds Removed | Month To Date Average Concentration ppb |
|-----------------------|-------------------|---------------------------------|---|--|------------------------------|---|
| C3 | | | | | | |
| | TW-2 (Dolph) | 1,179,235 | 27 | 0.041 | 1.2 | 131 |
| | TW-20 | 1,299,814 | 30 | 0.27 | 8.2 | 777 |
| | Sub-Totals | 2,479,049 | 57 | 0.31 | 9.4 | |
| Marshy | | | | | | |
| | PW-1 | 82,258 | 1.9 | 0.016 | 0.47 | 708 |
| | Sub-Totals | 82,258 | 1.9 | 0.016 | 0.47 | |
| E | | | | | | |
| | TW-17 | 2,020,322 | 47 | 0.039 | 1.2 | 72 |
| | TW-18 | 4,424,353 | 102 | 0.29 | 8.7 | 242 |
| | TW-29 | 2,155,011 | 50 | 0.17 | 5.1 | 293 |
| | TW-23 | 2,167,348 | 50 | 0.23 | 6.8 | 386 |
| | Sub-Totals | 10,767,034 | 249 | 0.72 | 22 | |
| Southwest | | | | | | |
| | TW-28 | 1,085,546 | 25 | 0.17 | 5.1 | 586 |
| | TW-22 | 97,809 | 2.3 | 0.011 | 0.34 | 433 |
| | Sub-Totals | 1,183,355 | 27 | 0.18 | 5.5 | |
| D2 | | | | | | |
| | LB-1 | 901,918 | 21 | 0.073 | 2.2 | 300 |
| | LB-4 | 2,944,041 | 68 | 0.33 | 10 | 423 |
| | TW-5 | 1,637,641 | 38 | 0.31 | 9.3 | 704 |
| | TW-21 | 4,326,189 | 100 | 0.27 | 8.2 | 235 |
| | Sub-Totals | 9,809,789 | 227 | 0.98 | 29 | |
| Overall Totals | | 24,321,485 | 563 | 2.2 | 67 | |

MASS REDUCTION DETAIL BY AQUIFIER

December 1 - December 31, 2021

| | Extraction Well | Month To Date Gallons Extracted | Month To Date Average Daily Flow Rate GPM | Month To Date Average Daily Pounds Removed | Month To Date Pounds Removed | Month To Date Average Concentration ppb |
|-----------------------|-------------------|---------------------------------|---|--|------------------------------|---|
| C3 | | | | | | |
| | TW-1 | 903 | 0.020 | 0.00 | 0.00 | 52 |
| | TW-2 (Dolph) | 1,199,530 | 27 | 0.042 | 1.3 | 130 |
| | TW-3 | 847 | 0.019 | 0.00 | 0.00 | 40 |
| | TW-10 | 410 | 0.0092 | 0.00 | 0.0016 | 470 |
| | TW-14 | 829,569 | 19 | 0.025 | 0.76 | 110 |
| | TW-20 | 1,213,217 | 27 | 0.25 | 7.8 | 770 |
| | TW-24 | 179,040 | 4.0 | 0.10 | 3.2 | 2,152 |
| | Sub-Totals | 3,423,516 | 77 | 0.42 | 13 | |
| Marshy | | | | | | |
| | PW-1 | 90,681 | 2.0 | 0.019 | 0.60 | 798 |
| | Sub-Totals | 90,681 | 2.0 | 0.019 | 0.60 | |
| E | | | | | | |
| | TW-11 | 1,810,333 | 41 | 0.073 | 2.3 | 150 |
| | TW-17 | 1,761,527 | 39 | 0.029 | 0.90 | 60 |
| | TW-18 | 3,480,536 | 78 | 0.21 | 6.5 | 226 |
| | TW-29 | 2,515,843 | 56 | 0.23 | 7.1 | 342 |
| | TW-23 | 1,971,382 | 44 | 0.20 | 6.3 | 382 |
| | Sub-Totals | 11,539,621 | 259 | 0.75 | 23 | |
| Southwest | | | | | | |
| | TW-28 | 1,037,722 | 23 | 0.18 | 5.5 | 636 |
| | TW-22 | 88,378 | 2.0 | 0.011 | 0.33 | 451 |
| | Sub-Totals | 1,126,100 | 25 | 0.19 | 5.9 | |
| D2 | | | | | | |
| | LB-1 | 1,729 | 0.039 | 0.00 | 0.0048 | 330 |
| | LB-4 | 4,470,610 | 100 | 0.50 | 16 | 415 |
| | TW-9 | 640 | 0.014 | 0.00 | 0.0020 | 380 |
| | TW-21 | 3,996,219 | 90 | 0.24 | 7.6 | 227 |
| | Sub-Totals | 8,469,198 | 190 | 0.75 | 23 | |
| Overall Totals | | | | | | |
| | | 24,649,116 | 552 | 2.1 | 66 | |

MASS REDUCTION SUMMARY
Mass Removed Per Month (lb)

| A | B | C | D | E | F | G |
|----------|-------------------------------|----------------------------------|-------------------------------|--|---------------------------|---|
| Month | Mass Removed from Unit E Only | Mass Removed from Southwest Only | Mass Removed from Marshy Only | Mass Removed from Units C3 and D2 Only | Mass Removed from Unit D0 | Total Mass Removed from Units E, D2, C3, D0, Southwest and Marshy |
| Aug-00 | 0 | 0 | 8 | 366 | | 374 |
| Sep-00 | 0 | 0 | 9 | 332 | | 341 |
| Oct-00 | 0 | 5 | 9 | 583 | | 597 |
| Nov-00 | 0 | 3 | 12 | 1160 | | 1175 |
| Dec-00 | 0 | 0 | 10 | 1040 | | 1050 |
| Jan-01 | 0 | 0 | 7 | 816 | | 823 |
| Feb-01 | 0 | 0 | 7 | 1056 | | 1063 |
| Mar-01 | 0 | 0 | 11 | 1379 | | 1390 |
| Apr-01 | 0 | 0 | 9 | 1140 | | 1149 |
| May-01 | 0 | 1 | 8 | 990 | | 999 |
| Jun-01 | 0 | 2 | 8 | 933 | | 943 |
| Jul-01 | 0 | 2 | 10 | 1121 | | 1133 |
| Aug-01 | 0 | 2 | 13 | 1018 | | 1033 |
| Sep-01 | 0 | 1 | 9 | 909 | | 919 |
| Oct-01 | 0 | 5 | 8 | 896 | | 909 |
| Nov-01 | 0 | 4 | 5 | 827 | | 836 |
| Dec-01 | 0 | 6 | 4 | 768 | | 778 |
| Jan-02 | 0 | 6 | 5 | 753 | | 764 |
| Feb-02 | 0 | 4 | 6 | 691 | | 701 |
| Mar-02 | 0 | 7 | 7 | 663 | | 677 |
| Apr-02 | 0 | 6 | 7 | 682 | | 695 |
| May-02 | 100 | 9 | 7 | 898 | | 1014 |
| Jun-02 | 94 | 9 | 6 | 889 | | 998 |
| Jul-02 | 56 | 10 | 7 | 640 | | 713 |
| Aug-02 | 53 | 8 | 6 | 745 | | 812 |
| Sep-02 | 51 | 8 | 6 | 860 | | 925 |
| Oct-02 | 33 | 6 | 4 | 603 | | 646 |
| Nov-02 | 57 | 8 | 5 | 880 | | 950 |
| Dec-02 | 48 | 9 | 5 | 842 | | 904 |
| Jan-03 | 45 | 8 | 6 | 839 | | 898 |
| Feb-03 | 37 | 6 | 6 | 767 | | 816 |
| Mar-03 | 44 | 8 | 7 | 763 | | 822 |
| Apr-03 | 39 | 8 | 3 | 716 | | 766 |
| May-03 | 36 | 13 | 5 | 725 | | 779 |
| Jun-03 | 34 | 15 | 5 | 683 | | 737 |
| Jul-03 | 29 | 15 | 5 | 678 | | 727 |
| Aug-03 | 31 | 15 | 6 | 676 | | 728 |
| Sep-03 | 27 | 16 | 5 | 644 | | 692 |
| Oct-03 | 34 | 17 | 5 | 701 | | 757 |
| Nov-03 | 26 | 12 | 5 | 663 | | 706 |
| Dec-03 | 29 | 14 | 6 | 635 | | 684 |
| Jan-04 | 28 | 15 | 6 | 667 | | 716 |
| Feb-04 | 8 | 11 | 5 | 485 | | 509 |
| Mar-04 | 23 | 14 | 7 | 573 | | 617 |
| Apr-04 | 27 | 15 | 6 | 537 | | 585 |
| May-04 | 16 | 10 | 5 | 439 | | 470 |
| Jun-04 | 21 | 11 | 5 | 499 | | 536 |
| Jul-04 | 36 | 12 | 5 | 506 | | 559 |

