

TO
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COPIES TO
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DATE
 October 10, 2024

FROM
 Patrick Curry, Arcadis

SUBJECT
 2023 LNAPL Monitoring Well Abandonment Summary and Proposed Scope of Work
 Plant 2, RACER Trust, Lansing, MI

This memorandum is provided at the request of the Michigan Department of Environment, Great Lakes and Energy (EGLE) and includes a summary of the monitoring well abandonment activities completed in the Plant 2 light non-aqueous phase liquid (LNAPL) area at the RACER Trust site located in Lansing, Michigan (Site). As discussed with Joe Rogers during a phone discussion on October 2, 2024, a miscommunication within Arcadis led to the abandonment of several monitoring wells that were not approved by EGLE for abandonment.

On December 5, 2022, the original 2023 well abandonment proposal was submitted to EGLE. This included the proposed abandonment of nine Plant 2 LNAPL monitoring wells (LMWs). This list included LMWs that have only seen sporadic traces of LNAPL since installation as shown in Exhibit 1.

Exhibit 1. December 2022 proposed well abandonment, Plant 2 LNAPL area.

Well	Primary Function	Abandonment Rationale
Plant 2		
<i>Perched</i>		
LMW-12-01	LNAPL Monitoring	No LNAPL observed since 2013 (0.02 ft).
LMW-12-02	LNAPL Monitoring	LNAPL observed once in 2018 (0.04 ft), no LNAPL observed since 2018.
LMW-12-04	LNAPL Monitoring	Trace LNAPL with max in 2012 (0.04 ft), no LNAPL observed since 2018.
LMW-12-06	LNAPL Monitoring	LNAPL observed once in 2013 (0.02 ft) and once in 2020 (0.01 ft), no LNAPL observed since 2020.
LMW-12-07	LNAPL Monitoring	Trace LNAPL with max in 2018 (0.02 ft), no LNAPL observed since 2020.
LMW-14-14D	LNAPL Monitoring	LNAPL observed once in 2018 (0.07 ft), no LNAPL observed since 2018.
LMW-15-17D	LNAPL Monitoring	LNAPL observed once in 2018 (0.01 ft) and once in 2020 (0.01 ft), no LNAPL observed since 2020.
PMW-02	LNAPL Monitoring	Variable LNAPL observed 2012 to 2019 with max thickness of 1.96 ft (2019). No LNAPL observed since 2019.
PMW-03	LNAPL Monitoring	Variable LNAPL observed 2012 to 2014 with max thickness of 0.48 ft (2014). No LNAPL observed since 2014.

In January 2023, EGLE provided comments to the well abandonment workplan indicating additional information must be provided to show the LNAPL monitoring program was sufficient if all the proposed wells were to be abandoned. On June 26, 2023, Arcadis provided a response to comment that summarized additional background information provided in the LNAPL Conceptual Site Model (Arcadis 2020) that illustrates the LNAPL at Plant 2 is stable, not migrating, presents little to no risk to the underlying bedrock aquifer and is undergoing reduction through natural source zone depletion (NSZD). As an alternative, Arcadis proposed (in the June 26, 2023, response) the abandonment of eight monitoring wells containing significant thicknesses of LNAPL (i.e., LMW-12-03D, LMW-12-05, LMW-12-08, LMW-14-12D, LMW-14-15D, LMW-15-16D, P2-SB-37 and PMW-01) and the retention of eleven monitoring wells without LNAPL that could be used for ongoing monitoring, as necessary.

On September 13, 2023, Arcadis received an email from EGLE stating that the proposed abandonment of monitoring wells containing LNAPL was acceptable. However, a revised abandonment plan was not submitted by

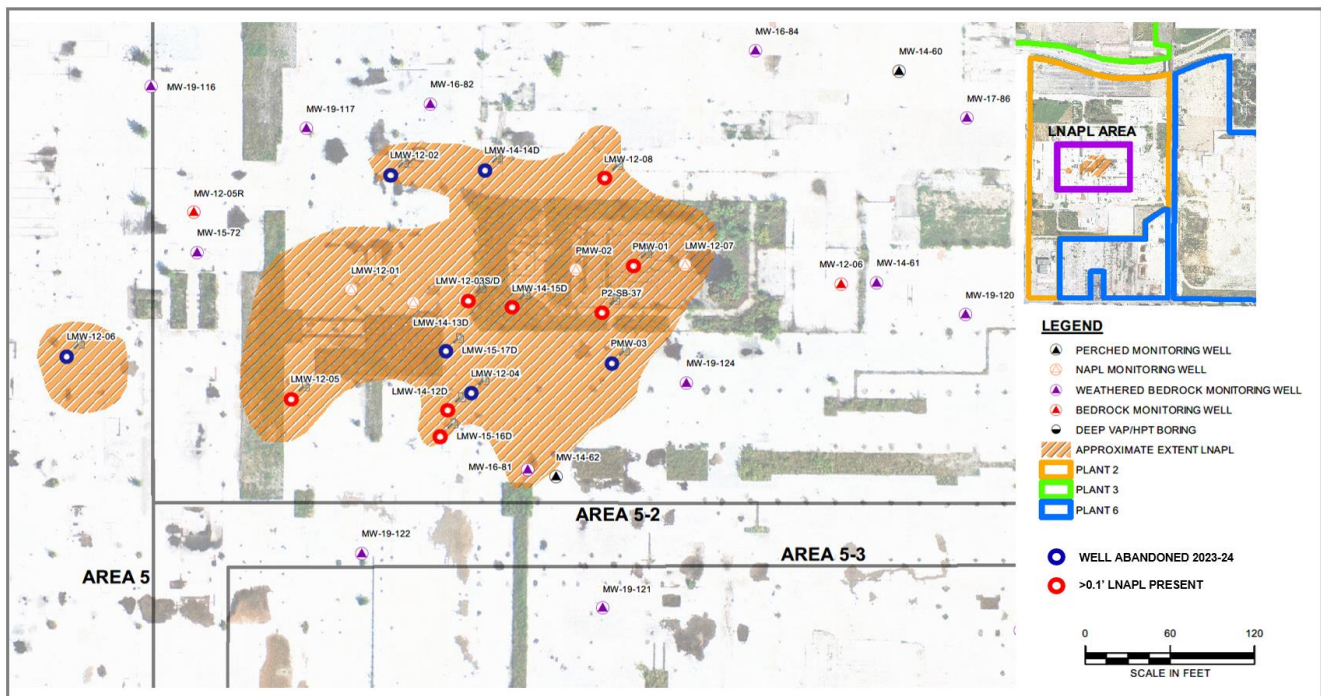
Arcadis. In December 2023, Arcadis completed abandonment of LMW wells; however, the well list provided to the field team was the original list included in the December 2022 well abandonment plan. The list did not include LMW-12-01. As a result, wells without significant LNAPL were abandoned, as opposed to the LNAPL containing wells approved by EGLE. The final list of abandoned wells is shown below as Exhibit 2.

Exhibit 2. Final list of Plant 2 LNAPL area wells as provided in March 2024 abandonment summary report.

Well ID	Abandoned?	Comments
Plant 2		
LMW-12-02	Yes	Abandonment complete.
LMW-12-04	Yes	Abandonment complete.
LMW-12-06	Yes	Abandonment complete.
LMW-12-07	No	Could not access well - covered by ice. Will be abandoned during future mobilization.
LMW-14-14D	Yes	Abandonment complete.
LMW-15-17D	Yes	Abandonment complete.
PMW-02	No	Could not access well - covered by ice. Will be abandoned during future mobilization.
PMW-03	Yes	Abandonment complete.

As shown on Exhibit 2, six of the wells without significant LNAPL were abandoned. As a result, there are currently eight monitoring wells that show measurable LNAPL and four monitoring wells with negligible or no LNAPL that remain within the Plant 2 LNAPL area, as shown on Exhibit 3.

Exhibit 3. Summary of abandoned and remaining wells in Plant 2 LNAPL area.



We apologize for the miscommunication that led to the wrong wells being abandoned. As noted in the Arcadis June 26, 2023, response to comment, the Plant 2 LNAPL is stable, not migrating, presents little to no risk to the underlying bedrock aquifer, and is undergoing reduction through NSZD. Currently, RACER recommends retaining a representative transect of wells through the axis of the Plant 2 LNAPL area for future gauging and

potential sampling purposes. These wells would include LMW-12-01, LMW-14-13D, LMW-12-03S, PMW-02 and LMW-12-07. The remaining wells would be abandoned. Well MW-14-62 is located south of the LNAPL impacted area and can be used for continued monitoring. No other perimeter monitoring wells have historically been located around the Plant 2 LNAPL area. A summary of the May 2024 gauging data and proposed abandonment is provided as Exhibit 4.

Exhibit 4. Summary of LMW gauging in May 2024 and proposed abandonment.

Well ID	Date Collected	Depth to Water (feet below TOC)	Depth to LNAPL (feet below TOC)	Calculated Thickness LNAPL (feet)	Corrected Groundwater Elevation (feet amsl)	Proposed Abandon/Retain
Plant 2						
LMW-12-01	5/21/2024	4.54	NP	NP	860.37	Retain
LMW-12-03D	5/21/2024	19.73	3.59	16.14	859.78*	Abandon
LMW-12-03S	5/21/2024	3.76	3.71	0.05	861.21*	Retain
LMW-12-05	5/21/2024	6.80	5.86	0.94	859.08*	Abandon
LMW-12-07	5/21/2024	2.83	NP	NP	861.30	Retain
LMW-12-08	5/21/2024	4.40	2.93	1.47	861.32*	Abandon
LMW-14-12D	5/21/2024	24.95	3.54	21.41	858.90*	Abandon
LMW-14-13D	5/21/2024	4.81	NP	NP	860.22	Retain
LMW-14-15D	5/21/2024	22.65	4.35	18.30	858.92*	Abandon
LMW-15-16D	5/21/2024	23.25	4.88	18.37	858.47*	Abandon
P2-SB-37	5/21/2024	5.42	4.24	1.18	861.54*	Abandon
PMW-01	5/21/2024	0.47	0.35	0.12	860.49*	Abandon
PMW-02	5/13/2024	NM	NM	NM	NM	Retain

Monitoring Well Abandonment

Like previous well abandonment activities, the full well casing will not be over-drilled due to the potential risk of exacerbating shallow groundwater impacts by allowing vertical migration to deeper portions of the perched aquifer. The wells will be abandoned in-place; the PVC well casing will be cut 1-foot below grade and the casing filled with Portland cement to the ground surface. Selected wells are a mixture of stick-up and flush mount construction:

- For wells installed in gravel or degraded asphalt: the manhole casing, or stick-up casing, and cement collar will be removed, and the void space will be backfilled to grade with Type 1 Portland cement (with approximately 5%-10% bentonite added).
- For wells installed in concrete: the stick-up casing will be removed, or the manhole cover will be removed, and the void space will be backfilled to grade with Type 1 Portland cement (with approximately 5%-10% bentonite added).