

To: Operating Record

From: Bethany Swanberg *BLS*
Risk Management

Date: July 21, 2023

Subject: JH Campbell Ponds 1-2 North and 1-2 South Coal Combustion Residual (CCR) Unit
40 CFR 257.97(a) Selection of Remedy Letter Report

CC: Heather Prentice, Risk Management
Harold D. Register, Jr., Risk Management

Consumers Energy (CE) has prepared this Final Selection of Remedy Report (Report) for the JH Campbell Ponds 1-2 North and 1-2 South CCR Unit (Ponds 1-2) as a requirement of §257.97(a) of 40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities, under subtitle D of the Resource Conservation and Recovery Act (RCRA), also known as the Coal Combustion Residuals (CCR) Rule. Ponds 1-2 are former bottom ash ponds that were part of a wet ash handling system used at the JH Campbell solid waste disposal facility until 2018. CCR has been removed from Ponds 1-2 and all wet ash processes at the facility have been replaced with concrete bottom ash treatment tanks. The location of the former Ponds 1-2 is shown on Figure 1.

Per §257.97(a), this Report describes the remedy selected along with how the remedy meets the standards set forth in §257.97(b) for Ponds 1-2, which had triggered an Assessment of Corrective Measures (ACM) under the CCR Rule. The ACM is required pursuant to §257.96 whenever an Appendix IV constituent has been detected at a statistically significant level exceeding the established federal groundwater protection standard (GWPS). CE reported statistically significant exceedances above the GWPS within the certified compliance well network for a single Appendix IV constituent, arsenic, in the "Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)" (Consumers Energy Company, January 2019).

Unit with GWPS Exceedance	Constituent	# of Downgradient Wells Observed
Ponds 1-2	Arsenic	2 of 5

Subsequently, the "Assessment of Corrective Measures Report" (ACM) (TRC, September 2019) was completed on September 11, 2019, for Ponds 1-2. Five remedial approaches were

evaluated and presented based on source control by removing CCRs in Ponds 1-2. Semi-annual progress reports have been prepared in accordance with §257.97(a) to describe progress toward selecting and designing remedies and are available on the CE CCR Rule Compliance Data and Information public-facing website.

Source removal was completed in 2018. The extent of the Ponds 1-2 excavation area and former wet ash boundary are shown on Figure 1 along with the monitoring well network. Groundwater monitoring and nature and extent evaluation performed subsequent to source removal demonstrates successful attainment of the GWPS using ACM Alternative 2a: Source Removal with Post Remedy Monitoring. There are no adverse effects on human health or the environment from either surface water or groundwater due to the CCR management at former Ponds 1-2.

Pond Closure and Source Removal

CE worked with qualified professional engineers and the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to achieve closure objectives under both the Federal CCR Rule and the Michigan Part 115-Solid Waste Management of the Natural Resources and Environmental Protection Act, 1194 PA 451, as amended (Part 115). CE completed CCR removal at Ponds 1-2 as documented in the *"JH Campbell Generating Facility Bottom Ash Ponds 1-2 Closure Plan"* (Golder, January 2018) pursuant to §257.102. The December 2017 *"Bottom Ash Ponds 1-2 Closure Work Plan"* was submitted to the EGLE on December 5, 2017, and approved by the EGLE on February 26, 2018. Dewatering and removal of ash from Ponds 1-2 for beneficial reuse began in June 2018 and continued through September 2018. CCR removal activities were completed in October 2018 and Consumers Energy submitted final documentation of CCR removal, including certification from a qualified professional engineer (QPE), to EGLE in the *"JH Campbell Generating Facility Bottom Ash Ponds 1-2 N/S CCR Removal Documentation Report"* (CCR Removal Documentation Report) (Golder, August 2019). On October 22, 2019, EGLE provided written concurrence that all bottom ash had been removed from Ponds 1-2 in accordance with Part 115 based on observations by EGLE staff during the removal process and the multiple lines of evidence described in the CCR Removal Documentation Report. Following CCR removal, the Ponds 1-2 excavation was backfilled with clean fill to promote stormwater drainage and minimize the potential for ponding of surface water. The surface was vegetated to minimize erosion and any future maintenance of the restored area. An overview of the excavation boundary, former pond boundary, and associated monitoring well layout is included in Figure 1.

As detailed in the CCR Removal Documentation Report, Ponds 1-2 were dewatered during CCR excavation in late August and early September 2018. Approximately 800,000 gallons of water were removed per day during the dewatering period, for a total removal of nearly 11.5 million gallons. CCR from Ponds 1-2 was excavated to at least the elevation of the base of CCR established by plant drawings and verified through soil borings. Following initial excavation, CCR removal was verified visually at nodes established according to EGLE guidance “*Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria (S3TM)*”. If any CCR were visible, additional material was removed. When no CCR or only trace amounts of CCR remained, a colorimetric analysis using a digital colorimeter to precisely measure the color of a soil sample was developed to confirm CCR removal. Sampled grid nodes passed colorimetric confirmation testing if the remaining surface contained no more than 5 percent CCR material. Grid nodes which did not pass colorimetric testing were further examined by microscopy. Microscopic analysis confirmed that these grid nodes contained no more than 5 percent CCR material. If the remaining surface at a grid node was confirmed to contain more than 5 percent CCR material, additional excavation was performed. These multiple lines of evidence confirmed that all CCR material was removed from Ponds 1-2.

Remedy Selection Assessment Activities

Since the initiation of the assessment monitoring program in May 2018, Consumers Energy continues to monitor Ponds 1-2 semiannually for Appendix III and IV constituents in conformance with §257.90 - §257.98, which includes semiannual assessment monitoring in accordance with §257.95 to monitor post-source removal groundwater conditions and inform the remedy selection. The annual groundwater monitoring reports are available on the CE public-facing website.

As documented in the “2020 Annual Groundwater Monitoring and Corrective Action Report for the JH Campbell Power Plant Units 1-2 North and 1-2 South CCR Unit” (2020 Annual Report) (TRC, January 2021), due to the cessation of hydraulic loading and decommissioning of Ponds 1-2, the groundwater flow direction changed significantly from the previous baseline and assessment monitoring events such that groundwater flow is generally toward the south at Ponds 1-2. The change in the groundwater flow regime that occurred post-removal is shown by comparing attached Figure 2 that depicts the 2017 pre-removal conditions and Figure 3 that shows the current 2022 post-removal condition. As a result, the sufficiency of the groundwater monitoring well network to meet the performance objectives under the CCR rule was evaluated and the revised monitoring well network was recertified and included in the 2020 Annual Report. The new groundwater monitoring system consisted of three downgradient wells (JHC-MW-15005, JHC-MW-18004, and JHC-MW-18005) and two side gradient wells (JHC-MW-15002 and JH-MW-15003).

JHC-MW-15001 was removed from the monitoring network post-pond decommissioning given the well is located upgradient relative to Ponds 1-2, dry conditions had been observed, and no Appendix IV constituents had been observed at statistically significant levels (SSLs) above GWPSs at that location since monitoring began in 2015. Monitoring wells JHC-MW-15002 and JHC-MW-15003, although located side gradient of Ponds 1-2, continued to be used to monitor post-CCR removal changes in groundwater quality since groundwater concentrations at those wells had contributed to the initiation of assessment monitoring.

As discussed in the “2021 Annual Groundwater Monitoring and Corrective Action Report for the JH Campbell Power Plant Units 1-2 North and 1-2 South CCR Unit” (2021 Annual Report) (TRC, January 2022), the results of the April 2021 assessment monitoring event indicated a new SSL above the GWPS for selenium at JHC-MW-15005. The SSL for selenium at JHC-MW-15005 resulted from increases in concentrations observed after the cessation of hydraulic loading at Ponds 1-2 in 2018 and an associated change in local groundwater flow. An Alternate Source Demonstration (ASD) for the selenium SSL was completed in accordance with §257.95(g)(3)(ii) (TRC, October 2021) is included in the 2021 Annual Report. The multiple lines of evidence presented in the ASD show that the SSL is attributed to a system of closed, pre-existing units licensed under Michigan solid waste rules that are adjacent to Ponds 1-2 and support the determination that wells JHC-MW-15002, JHC-MW-15003, and JHC-MW-15005 are not appropriate for use in assessment monitoring at Ponds 1-2. The closed, pre-existing units are not currently regulated under the CCR Rule; however, remedial action is being taken under Consent Agreement WMRPD No. 115-01-2018 with EGLE.

As detailed in the “2022 Annual Groundwater Monitoring and Corrective Action Report for the JH Campbell Power Plant Units 1-2 North and 1-2 South CCR Unit” (2022 Annual Report) (TRC, January 2023), JHC-MW-15002, JHC-MW-15003, and JHC-MW-15005 were removed from the certified compliance monitoring network for the Ponds 1-2 CCR Unit and have continued to be monitored as nature and extent wells for the purpose of informing the remedy selection and ongoing risk mitigation evaluation under the state program. JHC-MW-22001 was added to the downgradient monitoring network and the groundwater monitoring network was recertified in January 2023 and included in the 2022 Annual Report. Additional monitoring wells MW-22-14 and MW-22-15 were installed within the footprint of Ponds 1-2 in late 2022 to further assess the effectiveness of source removal at Ponds 1-2. The data from monitoring wells MW-22-14 and MW-22-15 show that groundwater quality directly beneath the former Ponds 1-2 footprint is well below the GWPSs for all Appendix IV constituents.

Arsenic concentrations in groundwater during the 2022 monitoring period are below the GWPS at each well within the current monitoring network (certified January 2023) in addition to the

nature and extent wells installed in the interior of the Ponds 1-2 footprint and downgradient/east at monitoring well JHC-MW-15005, as detailed in the 2022 Annual Report. The ACM and the 2022 Annual Report also shows that nature and extent analysis of groundwater monitoring downgradient from Ponds 1-2 further demonstrates that there are no adverse effects on human health or the environment from either surface water or groundwater due to the CCR management at Ponds 1-2.

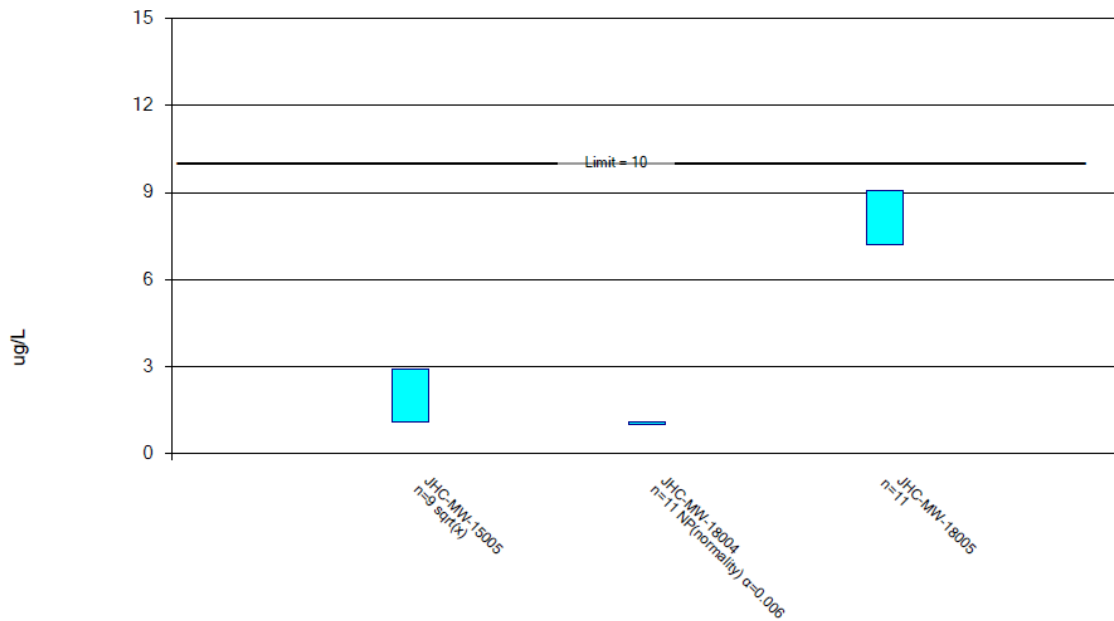
Statistically Significant Evidence that Clean-Up Criterion is Met

Statistical comparison of the groundwater data collected in the downgradient monitoring wells to the GWPS demonstrates that the clean-up criterion (i.e. GWPS) has been met. Per the USEPA's Unified Guidance (USEPA, 2009), in compliance/assessment, the statistical comparison is made to determine whether groundwater concentrations have increased above the established compliance standard. In corrective action, the statistical test is used to determine whether concentrations have decreased below a clean-up criterion or compliance level. In compliance/assessment monitoring, the lower confidence limit [LCL] is of primary interest, where an increase of the LCL above the GWPS is what triggers corrective action. Whereas the upper confidence limit [UCL] is most important in corrective action, where a UCL below the GWPS demonstrates that the compliance criterion has been met.

As discussed above, arsenic had exceeded the LCL at two of the compliance monitoring wells which had triggered corrective action at Ponds 1-2. As shown in the chart below, arsenic concentrations in groundwater collected between November 2018 and October 2022 have remained statistically below the GWPS, with the UCL below the GWPS, in all monitoring wells located downgradient of the former Ponds 1-2 footprint under the post-removal groundwater flow regime, including JHC-MW-15005, for four consecutive years post-CCR removal. This provides statistically significant evidence demonstrating that the CCR removal activities were effective in addressing arsenic concentrations associated with former Ponds 1-2 activities.

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Final Remedy Selection

The ACM Report identified source removal as the primary corrective action for Ponds 1-2 and retained five technically feasible groundwater management alternatives for further evaluation to address the potential for residual arsenic:

- Source Removal with Post Remedy Monitoring
- Source Removal with Groundwater Capture/Control
- Source Removal with Impermeable Barrier
- Source Removal with Active Geochemical Sequestration
- Source Removal with Passive Geochemical Sequestration

The remedial action alternatives evaluation presented in the ACM shows that the first three alternatives have the most favorable relative effectiveness ratings compared to the last two alternatives that rely upon geochemical sequestration. CE used an adaptive management strategy for selecting the final groundwater remedy for Ponds 1-2 in coordination with the specified CCR source material management strategies discussed in the ACM. Under this remedy selection strategy, measures that remove source material, reduce infiltration, and/or minimize the potential for future migration during the closure process may be implemented to address existing conditions followed by monitoring and evaluation of the performance after closure, while adjusting the corrective measure remedy, as needed, to achieve the remedial goals. Data collected post-CCR removal have demonstrated the relative effectiveness of the Source Removal with Post Remedy Monitoring remedy, leading to final remedy selection.

Per the CCR Rule, the final selected remedy needs to meet the standards of §257.97(b), which specifies that remedies must:

1. Be protective of human health and the environment;
2. Attain the groundwater protection standard as specified pursuant to §257.95(h);
3. Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV to this part into the environment;
4. Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
5. Comply with standards for management of wastes as specified in §257.98(d).

Based on the CCR removal and data collected as part of the assessment activities performed to date at Ponds 1-2, CE has selected "Source Removal with Post Remedy Monitoring" as the final remedy. This remedy is demonstrated to meet the standards of §257.97(b) as follows:

1. Be protective of human health and the environment: As detailed above, Ponds 1-2 has been dewatered and CCR has been removed. Post-remedy monitoring demonstrates the effectiveness of the CCR removal in protecting human health and the environment with all downgradient groundwater compliance and nature and extent well concentrations below the GWPS.
2. Attain the groundwater protection standard as specified pursuant to §257.95(h): Semiannual groundwater monitoring data demonstrate that attainment of arsenic

concentrations below the GWPS of 10 ug/L has been met. Concentrations of arsenic in all downgradient compliance monitoring wells are below 10 ug/L and have been for four consecutive years. Statistical evaluation of the results using confidence interval analysis, in accordance with the procedures and performance standards set forth in § 257.93(f) and (g), demonstrates that the upper confidence limits of arsenic are below the GWPS for four consecutive years post-remedy.

3. Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV to this part into the environment: As described above and in the CCR Removal Documentation Report, with certification from a QPE and written concurrence from the EGLE, all bottom ash has been removed from Ponds 1-2 based on multiple lines of evidence. Additionally, there were no new SSIs determined to be released from Ponds 1-2 during the four years since the CCR has been removed.
4. Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems: Approximately 800,000 gallons of water were removed per day during the dewatering period, for a total removal of nearly 11.5 million gallons. CCR from Ponds 1-2 was excavated to at least the elevation of the base of CCR and additional lines of evidence were used as detailed above and in the CCR Removal Documentation Report to ensure removal of CCR material.
5. Comply with standards for management of wastes as specified in §257.98(d): Bottom ash has been removed from Ponds 1-2 and utilized to construct grades and improve the subgrade bearing capacity for the final cover system of Pond A. Consumers Energy closed Pond A in place in accordance with 40 CFR 257.102(d); the Pond A Construction Quality Assurance (CQA) Plan dated March 22, 2019; the Part 115 Administrative Rules; and the updated Pond A Closure Plan (Golder, January 2019) approved by the EGLE on March 27, 2019. The closure was documented and certified by a QPE in the Pond A Construction Documentation and Certification Report (Golder, October 2019) and the closure certification was approved by the EGLE on November 25, 2019.

Conclusion

The Source Removal with Post Removal Monitoring remedy for Ponds 1-2 has been formally selected per §257.97 that meets the performance standards set forth in §257.97(b). Further, the remedy evaluation factors set forth in §257.97(c) have been considered in the context of the CCR Removal Documentation Report that demonstrates CCR removal has been completed in 2018 that prevents further releases of Appendix IV constituents into the environment.

Additionally, groundwater monitoring data collected post-removal, presented in the 2019 through 2022 Annual Groundwater Monitoring Reports, demonstrates the effectiveness of the source removal in attaining the GWPS and being protective of human health and the environment. Therefore, the schedule for implementing and completing the remedy required by §257.97(d) can be summarized as follows:

Source Removal of CCR	June 2018 – October 2018
Post-Removal Groundwater Monitoring	October 2018 until GWPS achieved for 3 years
Start Post-Removal Performance Review	January 2019
Remedy Completion Certification	Upon meeting GWPS consecutively for 3 years

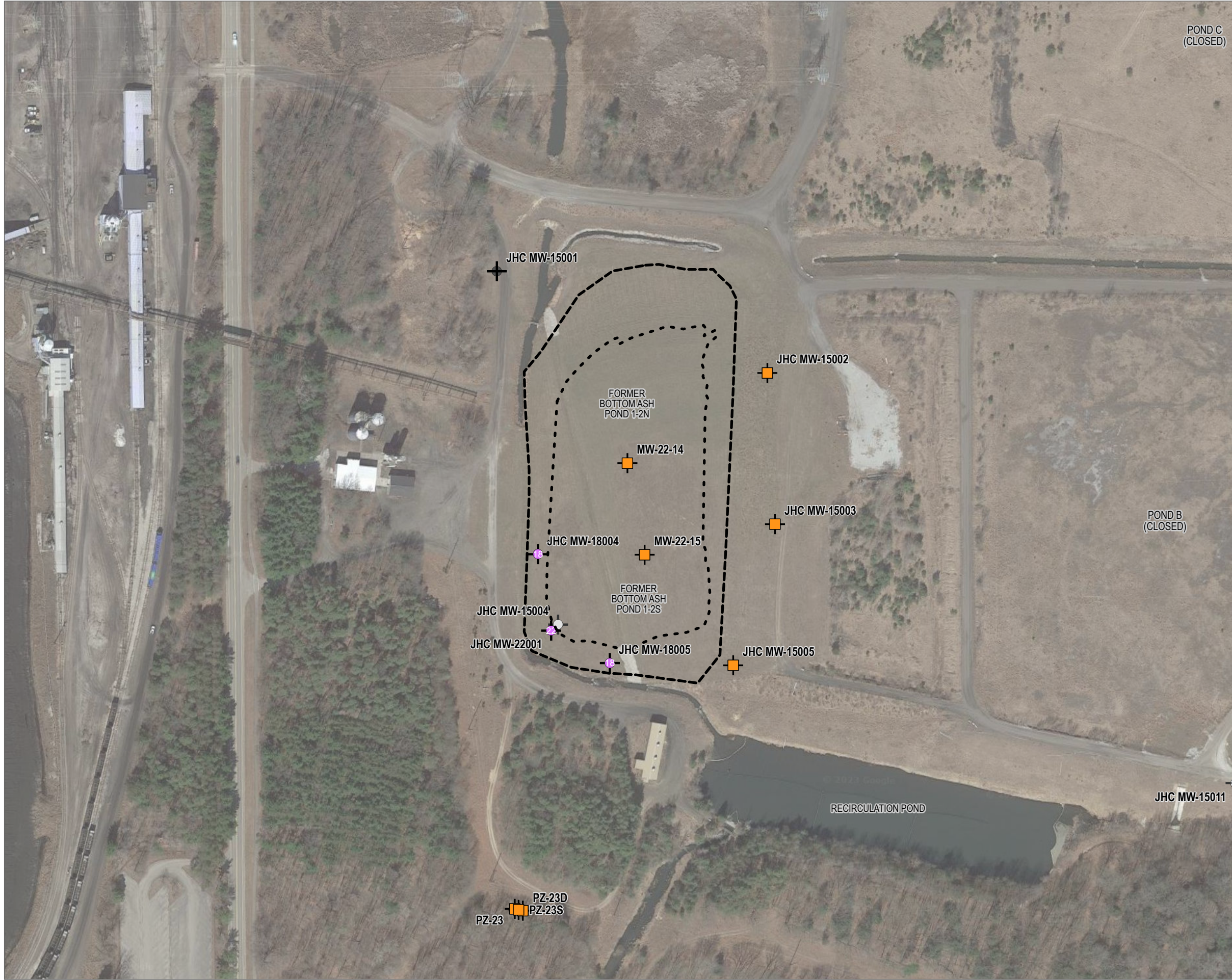
Finally, a public meeting was conducted on June 14, 2023, that provided at least 30 days for comments to be received prior to the final remedy selection, as required under §257.96(e). Enclosed is the public notice that was published in the Sunday Edition of the Holland Sentinel on May 28, 2023 publicizing the public meeting for interested and affected parties and an affidavit from the publisher authenticating its publication.

Enclosures

Figure 1 – Site Plan with Monitoring Well Locations
Figure 2 – Groundwater Contour Map, September 2017
Figure 3 – Groundwater Contour Map, October 2022
Public Meeting Notice
Public Meeting Notice Affidavit of Publication
Qualified Professional Engineering Certification
References

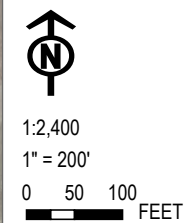
Enclosures

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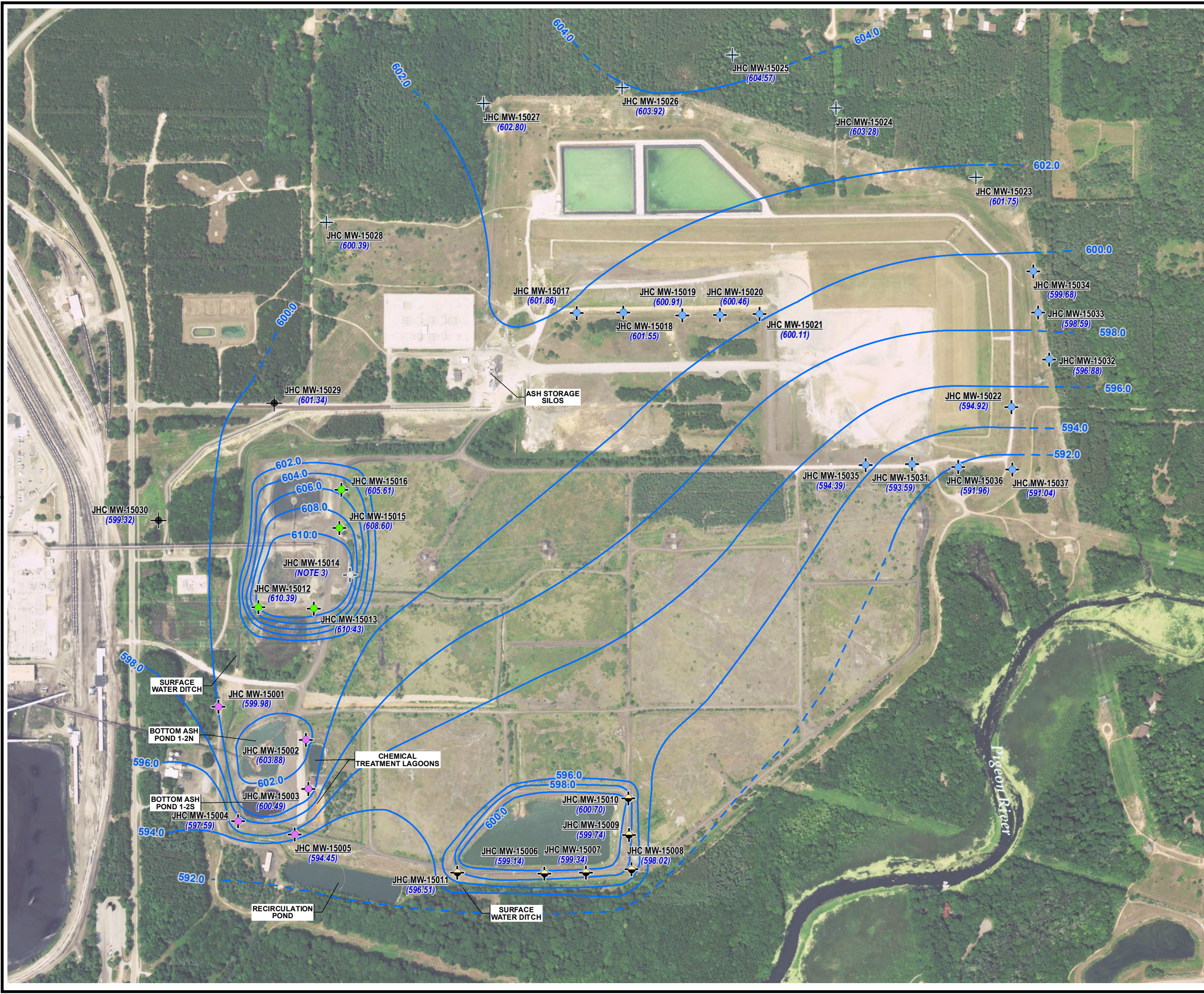


- LEGEND**
- APPROXIMATE WORKPLAN EXCAVATION BOUNDARY
 - APPROXIMATE POND WETTED BOUNDARY
 - DOWNGRADIENT POND A MONITORING WELL
 - MONITORING WELL (STATIC WATER LEVEL ONLY)
 - DECOMMISSIONED
 - DOWNGRADIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2018)
 - DOWNGRADIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2022)
 - NATURE AND EXTENT/DOWNGRADIENT MONITORING WELLS

- NOTES:**
1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2021.
 2. WELL LOCATIONS BASED ON SURVEY DATA THROUGH JUNE 15, 2022.
 3. JHC-MW-1800X MONITORING WELLS INSTALLED IN DECEMBER, 2018.
 4. JHC-MW-15008R AND TW-19-XX MONITORING WELLS INSTALLED IN JUNE 2019.
 5. JHC-MW-22001 MONITORING WELL INSTALLED MAY 12, 2022.



PROJECT: CONSUMERS ENERGY COMPANY JH CAMPBELL POWER PLANT WEST OLIVE, MICHIGAN	
TITLE: SITE PLAN WITH CCR MONITORING WELL LOCATIONS	
DRAWN BY: A. FOJTIK	PROJ. NO.: 514398.0000.0000 P1T3
CHECKED BY: H. SCHNAIDT	FIGURE 1
APPROVED BY: S. HOLMSTROM	
DATE: JULY 2023	
999 FOURIER DRIVE SUITE 101 MADISON, WI 53717 PHONE: 608.826.3663	
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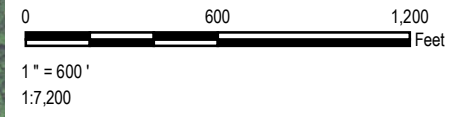


LEGEND

- BACKGROUND MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- DOWNGRADEMENT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRADEMENT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRADEMENT LANDFILL MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- POND A MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (600.97)** GROUNDWATER ELEVATION (FEET)

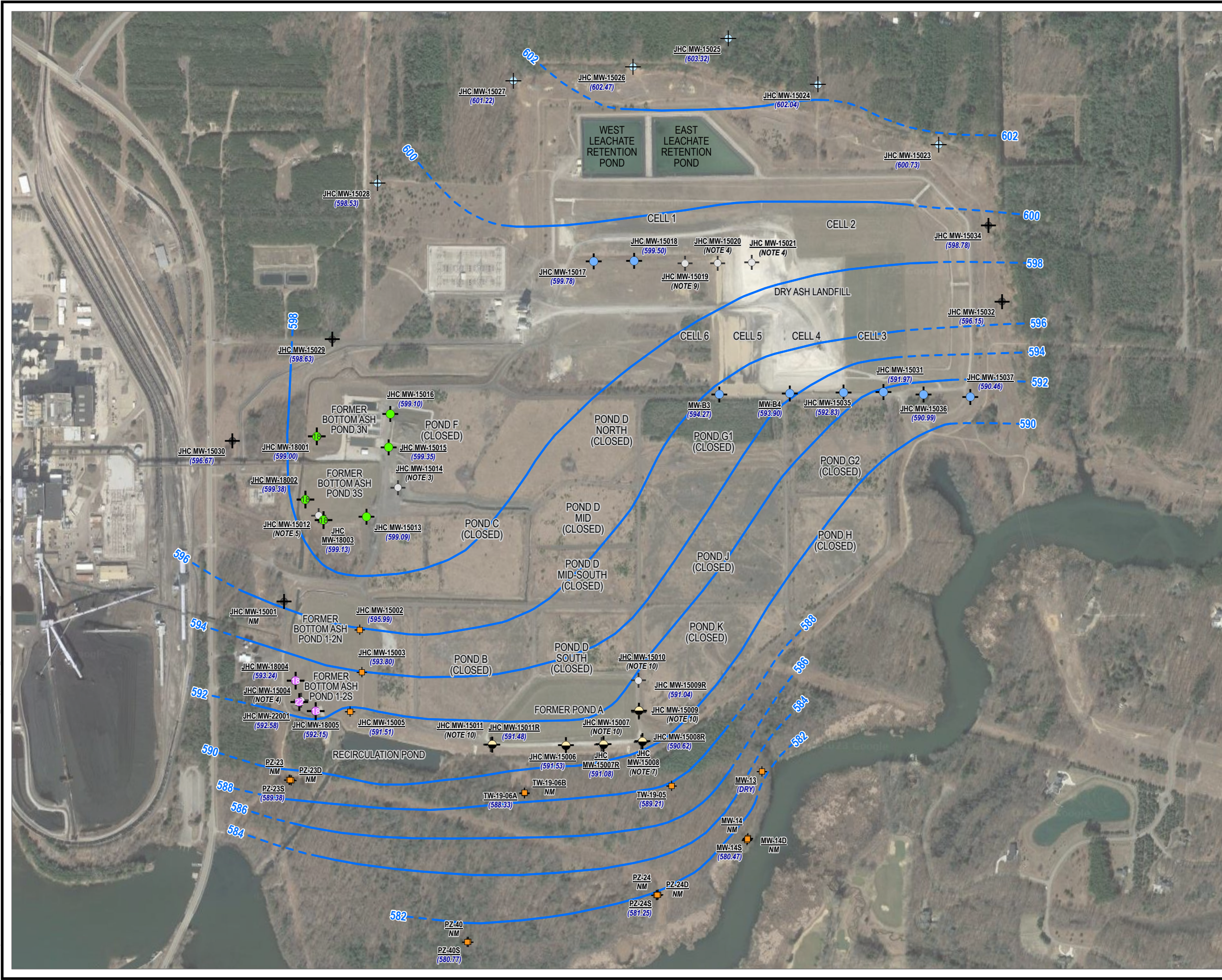
NOTES

1. BASE MAP IMAGERY FROM USDAL-NATIONAL AGRICULTURE IMAGERY PROGRAM, 7/20/2016.
2. WELL LOCATIONS SURVEYED BY NEDERVELD ON 11/25/2015.
3. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



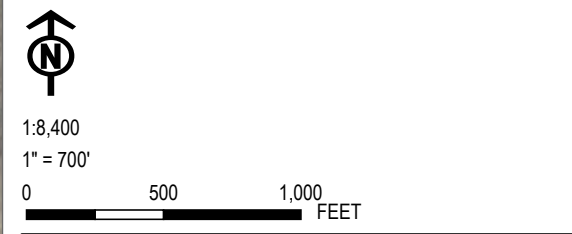
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TITLE:		GROUNDWATER CONTOUR MAP SEPTEMBER 25, 2017	
DRAWN BY:	S. MAJOR	PROJ NO.:	269767-001
CHECKED BY:	C. SCIESZKA	FIGURE 2	
APPROVED BY:	S. HOLMSTROM		
DATE:	JANUARY 2018		
		1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trcsolutions.com	
FILE NO.:		269767-005-012.mxd	

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- LEGEND**
- BACKGROUND MONITORING WELL
 - DOWNGRAIDENT BOTTOM ASH POND 3 N/S MONITORING WELL
 - DOWNGRAIDENT LANDFILL MONITORING WELL
 - DOWNGRAIDENT POND A MONITORING WELL
 - MONITORING WELL (STATIC WATER LEVEL ONLY)
 - DECOMMISSIONED
 - DOWNGRAIDENT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2018)
 - DOWNGRAIDENT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2022)
 - DOWNGRAIDENT BOTTOM ASH POND 3 N/S MONITORING WELL (2018)
 - NATURE AND EXTENT/DOWNGRAIDENT MONITORING WELLS
 - GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)

- NOTES:**
1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2021.
 2. WELL LOCATIONS BASED ON SURVEY DATA THROUGH JUNE 15, 2022.
 3. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
 4. MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
 5. MONITORING WELL DECOMMISSIONED OCTOBER 10, 2018.
 6. JHC-MW-1800X MONITORING WELLS INSTALLED IN DECEMBER 2018.
 7. MONITORING WELL DECOMMISSIONED JUNE 24, 2019.
 8. JHC-MW-15008R AND TW-19-XX MONITORING WELLS INSTALLED IN JUNE 2019.
 9. MONITORING WELLS DECOMMISSIONED MAY 25, 2021.
 10. MONITORING WELLS DECOMMISSIONED AND REPLACED JULY 20-22, 2021.
 11. JHC-MW-22001 MONITORING WELL INSTALLED MAY 12, 2022.



PROJECT: CONSUMERS ENERGY COMPANY JH CAMPBELL POWER PLANT WEST OLIVE, MICHIGAN	
TITLE: GROUNDWATER CONTOUR MAP OCTOBER 2022	
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CHECKED BY: H. SCHNAIDT	FIGURE 3
APPROVED BY: S. HOLMSTROM	
DATE: JANUARY 2023	
999 FOURIER DRIVE SUITE 101 MADISON, WI 53717 PHONE: 608.826.3663	
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Study names long COVID symptoms

Findings a critical step for effective treatment

Karen Weintraub
USA TODAY

A clearer picture of what's become known as long COVID-19 is starting to emerge, which should eventually allow researchers to treat symptoms that can devastate people's lives for months or years after a COVID-19 infection.

In a new study funded by the National Institutes of Health, researchers identified symptoms that are the most distinctive to long COVID, including: fatigue, especially after exercise; brain fog; dizziness; gastrointestinal symptoms; heart palpitations; issues with sexual desire or capacity; loss of smell or taste; thirst; chronic cough; chest pain; and abnormal movements.

Each self-reported symptom is given a score and someone with a score of 12 or more "is a person who very likely has long COVID," said Dr. Leora Horwitz, who helped lead the research from the New York University Grossman School of Medicine. "It doesn't mean these symptoms are the most common, or the most severe, or the most burdensome, or the most important to people. It just means that these are the ones that help us identify people who have long-term consequences."

More than 20% of people who've had COVID score high enough six months after their infection to meet this working definition of long COVID, although one-third of them no longer meet the criteria at nine months. But just because someone no longer meets this standard doesn't mean they are free from suffering or fully recovered, Horwitz noted.

It's not yet clear from this study whether people with long COVID can be classified into different groups according to their symptoms, Horwitz said, though other research has tried to do that. It's possible that long COVID has



Fatigue, brain fog, dizziness, thirst and heart palpitations are a few of the symptoms of long COVID. RICK CRUZ/PACIFIC DAILY NEWS VIA IMAGN CONTENT SERVICES

different causes in different people, or that some people are affected by a combination of factors.

The survey of nearly 10,000 Americans found long COVID is more common among people infected before the omicron variant emerged in late 2021 and among those who were not vaccinated. Reinfection and severity of infection were also linked to a higher incidence of long COVID, according to the study, published Thursday in the *Journal of the American Medical Association*.

Researchers now plan to connect the survey responses with biological data, such as blood samples and scans, to delve into the causes of these symptoms.

Although the process seems slow – this study was started more than a year ago – it is essential to precisely define long COVID before researchers can pursue treatments, said Andrea Foulkes, the study's other lead author. If they don't have a way to distinguish people with long COVID from those without,

they won't be able to tell if a treatment is making a difference.

"By coming up with a way of classifying people as having long COVID, we can now take the next step of really unraveling the mechanisms of disease," said Foulkes, director of biostatistics at Massachusetts General Hospital and a Harvard Medical School professor. "Knowing who has long COVID, we can start to look at what are the factors that contribute to these different manifestations. And that's of course important because ultimately it's going to inform treatments."

Long COVID has a long potential list of causes, including tiny blood clots affecting organ function, lingering virus or viral particles, and dysautonomia, where activities that happen without thought, like maintaining heart rate and blood pressure, are out of whack.

A number of the symptoms – such as gastrointestinal problems, brain fog, fatigue and thirst – are indicative of dysautonomia, said Tanayott Thaweethai,

a co-author on the study and a biostatistician at Massachusetts General Hospital and Harvard Medical School. Others, such as feeling worse after exercise, are known to occur after other post-viral illnesses like chronic fatigue syndrome.

Foulkes said she wants to continue to follow study participants to learn more about the characteristics of those who no longer meet the definition of having long COVID. It's too soon to know if the recovery seen at nine months is real or if symptoms simply ebb and flow over time, said Foulkes, who wants "to really understand what recovery means."

The RECOVER trial includes adults who were infected with the SARS-CoV-2 virus that causes COVID, along with people who were not knowingly infected and do not have COVID antibodies. Many of these people were enrolled right after getting COVID, so it was too soon to know whether they would develop long-lasting symptoms.

Of those – who began enrolling in December 2021, just as the omicron wave was sweeping the country – 10% meet the criteria for long COVID, a smaller percentage than in the group overall.

Vaccination clearly reduces the risk of long COVID, she said.

Horwitz said she's very sympathetic to the fact that people who are suffering today don't want to wait for a deeper understanding of the disease before they feel better. Science moves deliberately but, unfortunately, not quickly.

"From my perspective as a scientist, this is actually moving at warp speed," she said. "We have enrolled over 10,000 people in under a year. We have a phenomenal amount of data here, looking at all parts of the body in a way that no one has put together in a study like this before."

Health and patient safety coverage at USA TODAY is made possible in part by a grant from the Masimo Foundation for Ethics, Innovation and Competition in Healthcare. The Masimo Foundation does not provide editorial input.

First lady to promote women, youth on trip

Darlene Superville
ASSOCIATED PRESS

WASHINGTON – Jill Biden will promote empowerment for women and young people, and attend Jordan's royal wedding, during an upcoming trip to the Middle East, North Africa and Europe.

The first lady is scheduled to depart Wednesday on a six-day trip that will also take her to Egypt, Morocco and Portugal. Her office shared some details first with The Associated Press.

It will be Biden's first Middle East visit as first lady. She traveled to Namibia and Kenya in February.

"The first lady believes that supporting youth across the world is critical to our common future, with education, health, and empowerment at the heart of it," said spokesperson Vanessa Valdivia.

"With her visit to the Middle East and North Africa, the first lady will continue to build on her work to empower young people, and reaffirm our commitment to strengthen our partnerships and advance our shared priorities in the region," Valdivia said in an email.

In Amman, the capital of Jordan, Biden will attend Thursday's wedding of His Royal Highness Crown Prince Al Hussein bin Abdullah II, heir to the throne, and Rajwa Khalid Alseif, an architect.

President Joe Biden and the first lady have a deep



First lady Jill Biden is scheduled to depart Wednesday on a six-day trip that will include the wedding of Jordan's crown prince. MANUEL BALCE CENETA/AP FILE

and longstanding friendship with the crown prince's parents, King Abdullah II and Queen Rania.

When Joe Biden was vice president, he and King Abdullah often met over breakfast when the king traveled to Washington to visit his son, then a student at Georgetown University. Abdullah also visited Biden at his home in Delaware after Biden returned to private

life.

The two have met at least three times since Biden became president, twice at the White House and once in Jeddah, Saudi Arabia.

In Egypt and Morocco, Jill Biden will connect with women and young people while focusing on U.S. investments that help support education programs and efforts to increase economic opportunity.

In Portugal, the first lady will help the U.S. State Department celebrate the 60th anniversary of its Art in Embassies program, highlighting the role the arts can play in diplomacy.

CONSUMERS ENERGY PUBLIC MEETING

Port Sheldon Township Hall
June 14, 2023 • 4:30 p.m.

Consumers Energy will host a public meeting concerning the JH Campbell Bottom Ash Ponds 1-2 North and South Coal Combustion Residuals Unit and Consumers Energy's assessment of corrective measures for the surface impoundment under the Coal Combustion Residuals rules. During the meeting, Consumers Energy will discuss the surface impoundment, work completed to date to remove all coal ash and close the surface impoundment, data compiled about the surface impoundment, and our assessment of corrective measures.

The public meeting will be held at 4:30 p.m. on Wednesday, June 14 at the Port Sheldon Township Hall, 16201 Port Sheldon Street in West Olive.

6-14-23

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May 28, 2023 - Lords Day 22

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Rev. Scott VanOostendoorp

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Advertiser: Consumers Energy

Date of order: May 23, 2023

Contact: Melissa K. Harris

This is to certify that the Public Notice scheduled to run in the newspaper listed ran as the placement details below and proof of publication is attached.

Newspaper Name: **Holland Sentinel**

Run Date	Ad Size	Caption/Position/Special Instructions
5/28/2023	2 col. x 3"	CONSUMERS ENERGY PUBLIC MEETING- Port Sheldon Township Hall

Signed by *Diana Davis* (MP1/MANSI Representative)
Date: May 28, 2023

Notary Public:
Signed by *James R. Tarrant* (Notary Public)
Date: May 28, 2023

JAMES R. TARRANT
NOTARY PUBLIC – STATE OF MICHIGAN
COUNTY OF VAN BUREN
My commission expires April 12, 2029
Acting in the County of Ingham

A CMS Energy Company

Date: July 21, 2023

To: Operating Record

From: Harold D. Register, Jr., P.E.

ADP

RE: JH Campbell Ponds 1-2 North and 1-2 South CCR Unit
40 CFR 257.97(a) Selection of Remedy Engineering Certification

Professional Engineer Certification Statement [40 CFR 257.97(a)]

I, Harold D. Register, Jr., being a registered Professional Engineer in the State of Michigan do hereby certify to the best of my knowledge, information, and belief that the information contained in the "Final Selection of Remedy for the JH Campbell Ponds 1-2 North and 1-2 South CCR Unit" dated July 21, 2023 was developed pursuant to §257.97 and has been prepared with recognized and generally accepted good engineering practices.

Harold D. Register, Jr.

Signature

July 21, 2023

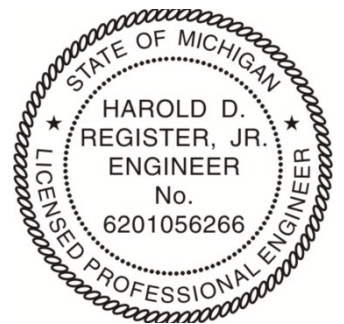
Date of Certification

Harold D. Register, Jr., P.E.

Name

6201056266

Professional Engineer Certification Number



07/21/2023

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