BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

INEOS JOLIET, LLC, Petitioner, v. ILLINOIS ENVIRONMENTAL PROTECTION AGENCY Respondent.	)))))))	PCB No., _____

NOTICE OF FILING

TO: Don Brown
Clerk of the Board
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601
(VIA ELECTRONIC MAIL)

Brad Halloran
Hearing Officer
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601
(VIA ELECTRONIC MAIL)

(SEE PERSONS ON ATTACHED SERVICE LIST)

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Illinois Pollution Control Board a **PETITION TO APPROVE ALTERNATIVE THERMAL EFLUENT LIMITATIONS FOR INEOS JOLIET, LLC**, a copy of which is herewith served upon you.

June 29, 2023

Respectfully Submitted,
INEOS JOLIET, LLC

By: /s/ Michael P. Murphy
One of its Attorneys

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter Of:	)	
	)	
INEOS JOLIET, LLC,	)	
Petitioner,	)	
v.	)	PCB No. _____
	)	
ILLINOIS ENVIRONMENTAL	)	
PROTECTION AGENCY	)	
Respondent.	)	

PETITION TO APPROVE ALTERNATIVE THERMAL EFFLUENT LIMITATIONS FOR INEOS JOLIET, LLC

Pursuant to 35 Ill. Admin. Code Part 106, Subpart K, INEOS Joliet, LLC ("INEOS") requests that the Illinois Pollution Control Board ("Board") approve and apply the alternative thermal effluent limitations set forth in this petition to discharges from INEOS' facility in Channahon, Illinois instead of effluent limits derived from 35 Ill. Admin. Code § 302.408(c) through (e), and (i).

I. INTRODUCTION

INEOS owns and operates a manufacturing facility located on a 270-acre tract of land in Channahon, Illinois. The site is approximately 41 miles Southwest of Chicago and approximately one-mile Southeast of the Route 6 and I-55 intersection ("Facility"). To the immediate East and Southeast of the Facility is the Lower Des Plaines River ("LDPR"), which is in the Upper Dresden Island Pool ("UDIP") at River Mile 280.3. The Facility is downriver from Midwest Generation, LLC's ("MG") Joliet 9 Generation

Station and Joliet 29 Generation Station ("MG Stations"), which directly discharge into the UDIP.

The Facility has three process units which manufacture isopthalic acid, maleic anhydride, and trimetallitic anhydride. The Facility is configured with separate and distinct production units. The Facility also has one utilities unit and one wastewater treatment unit which supply process air and steam to the process units as well as treat any wastewater from the process units. Water for Facility processes is withdrawn from on-site groundwater extraction wells.

The Facility discharges into the LDPR an average of 1.22 million gallons per day ("MGD") of: treated process wastewater, analytical lab waste, fire field waste, impacted groundwater and stormwater, utilities waste, and alternate sanitary waste through Outfall 001; intermittent discharge of stormwater, non-process wastewater, and hydrostatic test wastewater from Outfalls 002, 003, and 005; and 0.25 MGD of treated sanitary waste from Outfall 004, pursuant to its National Pollutant Discharge Elimination System ("NPDES") Permit. See NPDES Permit No. IL 0001643 (expiration date Sept. 30, 2025) ("NPDES Permit"), Exhibit 1 (Demonstration), Appendix 3 (INEOS 80).

The thermal component of the discharge goes through Outfall 001. The Design Maximum Flow ("DMF") through this outfall is 2.8 MGD (4.3 cfs), with a Design

Average Flow ("DAF") of 2.318 MGD (3.6 cfs) and a Long-Term Average Flow of 1.22 MGD (1.9 cfs).

The applicable water quality standards, including water temperature limits for the UDIP, were modified by the Board in PCB R08-9(D). These thermal standards, which were adopted by the Board on June 16, 2015 and codified on July 10, 2015, became effective on July 1, 2018. The Board, in 2015, delayed for three years the applicability of the thermal standards to allow adversely affected thermal dischargers, like INEOS and MG's Joliet Stations, time to conduct the necessary demonstration studies pursuant to 35 Ill. Admin. Code Part 106, Subpart K ("Subpart K regulations") and Clean Water Act ("CWA") Section 316(a) to support a request for alternative thermal effluent limitations ("ATEL").

As demonstrated in this Petition, however, the existing thermal standards, based on existing Illinois General Use thermal water quality standards used to protect waters that meet or have the capability of meeting CWA aquatic life goals, are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife in and on the LDPR in the UDIP. The UDIP, per the Board, is compromised by non-thermal impairments to the point that it "may not fully attain the CWA aquatic use goal …" which is why the Board designated it as the "Upper Dresden Island Pool Aquatic Life Use Waters" rather than a General Use water. *See* 35 Ill. Admin. Code 303.240. Thus, pursuant to 35 Ill. Admin. Code 304.141(c),

CWA Section 316(a), and 35 Ill. Admin. Code Part 106, Subpart K, INEOS' ATEL requested in this Petition are reasonable and appropriate.

II. LEGAL STANDARDS APPLICABLE TO SECTION 316(a) RELIEF

Section 316(a) of the CWA grants a discharger of heated effluent the right to obtain specific effluent limits for its discharge that differ from generally applicable limits that would otherwise govern. Specifically, Section 316(a) provides:

> With respect to any point source otherwise subject to the provisions of Section 301 or Section 306 of the [Clean Water] Act, whenever the owner or operator of any such source, after opportunity for public hearing, can demonstrate to the satisfaction of the Administrator (or, if appropriate, the State) that any effluent limitation proposed for the control of the thermal component of any discharge from any such source will require effluent limitations more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made, the Administrator (or, if appropriate, the State) may impose an effluent limitation under such section on such plant, with respect to the thermal component of such discharge (taking into account the interaction with other pollutants), that will assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on that body of water.

33 U.S.C. § 1326(a).

In Illinois, Section 316(a) is implemented through Part 106, Subpart K and Section 304.141(c) of the Board's regulations. Section 304.141(c) authorizes the Board to determine that specific thermal standards should apply to a particular discharger instead of those imposed by the Board's generally applicable rules. Specifically, Section 304.141(c) provides:

> The standards of this Chapter shall apply to thermal discharges unless, after public notice and opportunity for public hearing, in accordance with section 316 of the CWA, applicable federal regulations, and procedures in 35 Ill. Adm. Code 106, Subpart K, the Board has determined that different standards shall apply to a particular thermal discharge.

35 Ill. Admin. Code 304.141(c).

Part 106, Subpart K sets forth the procedural rules for the Board's review and issuance of ATELs under CWA Section 316(a). Prior to filing a petition seeking alternative limitations, the petitioner must submit early screening information and a detailed plan of study to the Illinois Environmental Protection Agency ("Illinois EPA"), describing the proposed alternative limits, how the petitioner will make the required demonstration, and types of data the petitioner intends to submit. 35 Ill. Admin. Code 106.1115, 106.1120. The petitioner must consult with Illinois EPA to discuss the early screening information and seek Illinois EPA's recommendations regarding the detailed plan of study. *Id*. The petitioner must then complete the plan of study prior to filing a petition with the Board. 35 Ill. Admin. Code 106.1120(g).

The burden of proof is on the petitioner to demonstrate "that the otherwise applicable effluent limitations . . . are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water into which the discharge is made." 35 Ill. Admin. Code 106.1160(a), (b). The petitioner must also "show that the alternative thermal effluent limitation desired by the petitioner, considering the cumulative impact of its

thermal discharge, together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made." 35 Ill. Admin. Code 106.1160(c).[1] Existing dischargers may base their demonstration for an ATEL either upon predictive studies or upon the absence of prior appreciable harm. 35 Ill. Admin. Code 106.1160(d).

In 1977, the United States Environmental Protection Agency ("USEPA") issued draft guidance on Section 316(a) demonstrations titled "Interagency 316(a) Technical Guidance Manual and Guide for Thermal Effects Sections of Nuclear Facilities Environmental Impact Statements (DRAFT)" dated May 1, 1977 ("316(a) Manual"). The 316(a) Manual provides that it "is intended to be used as a general guidance and as a starting point for discussions," and that delegated state agencies "are not rigidly bound by the contents of this document." 316(a) Manual, at 8-9. In recent decisions by the Board on petitions for ATELs under Section 316(a), the Board has used the 316(a) Manual decision criteria in its analysis of whether the petitioner has met the requirements for obtaining relief under Section 316(a). *See* Board Opinion and Order, *Midwest Generation, LLC v. IEPA*, PCB 20-38, 20-39 (July 8, 2021); *see* Board Opinion and Order, *Marathon Petroleum Company, LP v. IEPA*, PCB 18-49 (Apr. 7, 2022).

[1] The term "balanced, indigenous community" in 35 Ill. Admin. Code Part 106 Subpart K is defined to be synonymous with the term "balanced, indigenous population" in the CWA. 35 Ill. Admin. Code 106.1110.

As discussed below, INEOS' Section 316(a) demonstration ("Section 316(a) Demonstration") provides sufficient evidence that the existing thermal standards, based on existing Illinois General Use thermal water quality standards used to protect waters that meet or have the capability of meeting CWA aquatic life goals, are more stringent than necessary to protect the balanced indigenous community in the LDPR in the UDIP and should be replaced by the ATEL requested in this Petition.

III. PETITION

Section 106.1130(a) requires a petition to contain a general plant description, including certain specific information as applicable. INEOS submits the following general plant description for the Facility and the Section 316(a) Demonstration, including information listed in Section 106.1130(a), where applicable.

A. General Plant Description (35 IAC 106.1130(a))

Prior to ownership by INEOS, Flint Hills Resources Joliet, LLC acquired the Facility in 2004. The owner prior to Flint Hills Resources began operating the Facility in 1957. The Facility is located on a 270-acre tract of land located in Channahon, Illinois. The site is approximately 41 miles Southwest of Chicago and approximately one-mile Southeast of the Route 6 and I-55 intersection. To the immediate East and Southeast of the facility is the LDPR (River Mile 280.3). The Facility employs approximately 220 employees who operate, maintain, and manage the facility, which operates 24 hours a day, 7 days a week.

The Facility has three process units which manufacture isophtalic acid, maleic anhydride, and trimellitic anhydride. These products are manufactured using various chemical processes onsite, including some exothermic chemical reactions. The Facility is configured with separate and distinct production areas for each of the primary products produced. The production areas are a combination of outdoor and indoor equipment dedicated to that production area. The Facility also has one utilities unit and one wastewater treatment unit. These units supply process air and steam to the process units as well as treat any wastewater from the process units. The Facility also has several maintenance shops, office buildings, and warehouses. Water for facility processes is withdrawn from on-site groundwater extraction wells. No water is withdrawn from the LDPR.

The permitted average flows from Outfalls 001 and 004 are 2.318 MGD and 0.025 MGD respectively. Flows from Outfalls 002, 003, and 005 are intermittent. The Facility's primary waste treatment process for treating process sewer water consists of an anaerobic, aerobic, clarification, and air floatation process. The anaerobic reactor must be operated at temperatures greater than 98° F. After the anaerobic reactor, natural heat loss to the atmosphere results in ambient cooling as the water passes in parallel through four aerobic treatment basins, and then in parallel through three clarifiers, and finally one air floatation channel before heading to Outfall 001. This process typically contributes 60% to 80% of the discharge annually to Outfall 001. The second contributor

to Outfall 001 is a process for treating the clean water utility streams from the process. Clean water utility streams include cooling tower blow down, boiler blowdown, water filter backwash, and reject water from the Facility's reverse osmosis and filtration systems. This process consists of a storage tank and anthracite filters. The Facility's Outfall 004 is the effluent from the sanitary sewer system, which includes an aerobic and clarification process. This process contributes approximately 6 gpm of flow to the river.

The Facility does not operate pollution control equipment designated to remove heat. However, the aeration basins cool the water by virtue of their operation; however, cooling is not their intended function. Their function is to add oxygen to enhance the biological degradation of the material prior to the air flotation unit.

1. Generating Capacity (35 IAC 106.1130(a)(1))

This information is not applicable to the Facility because the Facility is not a power generating facility. The Facility is classified under Standard Industrial Code (SIC) 2865 as a manufacturer of cyclic organic crudes and intermediates and organic dyes and pigments.

2. Type of Fuel Used (35 IAC 106.1130(a)(2))

Site steam is produced from multiple sources – the CB706 boiler produces steam and the isophtalic acid (IPA) unit and maleic anhydride (MAN) unit also export steam when the reactors are running. CB706 steam uses natural gas (supplied by Nicor) as

well as biogas produced in the wastewater treatment unit. The IPA and MAN units do not use a natural gas fuel source – the steam is produced as a byproduct of the exothermic reactions.

3. Operating Characteristics of the Condenser Cooling System (35 IAC 106.1130(a)(3))

This information is not applicable to the Facility because the Facility does not include a condenser cooling system. However, see the discussion in Section III.B.1 below regarding the types of cooling systems used at the Facility.

4. History of the Load Factor for the Last Five Years (35 IAC 106.1130(a)(4))

This information is not applicable to the Facility because the Facility is not a power generating facility.

5. Projected Load Factors for the Next Five Years (35 IAC 106.1130(a)(5))

This information is not applicable to the Facility because the Facility is not a power generating facility.

6. Estimated Dates of Unit Retirement and Plans for Additional Units (35 IAC 106.1130(a)(6))

The Facility does not plan to retire any process units at this time nor does it plan to add any additional process units. The Facility continually improves the facility by replacing or repairing major and minor equipment, as necessary.

7. History of Plant Shutdowns for the Last Five Years ((35 IAC 106.1130(a)(7))

The Facility is typically never entirely shut down. However, the Facility has had the strategy of shutting down units for maintenance and repair approximately once per year, with the shut downs lasting two to three weeks.

8. Planned and Emergency Shutdowns with Frequency and Duration for the Last Five Years (35 IAC 106.1130(a)(8))

The Facility is typically never entirely shut down. However, the Facility has had the strategy of shutting down units for maintenance and repair approximately once per year, with the shut downs lasting two to three weeks.

9. Planned and Projected Shutdowns with Frequency and Duration for the Next Five Years (35 IAC 106.1130(a)(9))

The Facility is typically never entirely shut down. However, the Facility will continue its strategy of proactively shutting down units for maintenance and repair approximately once per year. As noted above, shut downs generally last two to three weeks.

B. Description of Method for Heat Dissipation (35 IAC 106.1130(b))

1. Type of System Used (35 IAC 106.1130(b)(1))

The Facility's primary treatment methods for treating process wastewater consist of an anaerobic, aerobic, clarification, and air floatation process. The anaerobic reactor must be operated at temperatures greater than 98° F, year-round. The anerobic reactor feed is controlled to temperatures greater than 98° F using a steam heat exchanger

during the winter months and a cooling water exchanger during the summer months. After the anaerobic reactor, natural heat loss to the atmosphere results in ambient cooling as the water passes in parallel through four aerobic treatment basins, and then in parallel through three clarifiers, and finally one air floatation channel before heading to Outfall 001. This process typically contributes 60% to 80% of the annual discharge flow volume to Outfall 001.

The second contributor to Outfall 001 is the discharge from the treatment of clean water utility streams from various facility processes. Clean water utility streams include cooling tower blow down, boiler blowdown, water filter backwash, and reject water from the reverse osmosis and filtration system. This process consists of a storage tank and anthracite filters. The long-term average flow for the combined utilities water is 0.3 MGD (0.46 cfs).

The Facility also operates three cooling towers (CU401, CU402, and CU403). CU401 has a 12,000 gpm capacity and supplies cooling water to the utilities unit and IPA oxidation. CU402 has a 16,800 gpm design capacity and supplies cooling water to the utilities unit, IPA purification, MAN unit, and Air Products. CU403 has an 8,400 gpm capacity and supplies cooling water to the trimellitic anhydride (TMA) unit. The cooling water is used to remove heat from process streams in heat exchangers. The cooling water from the basin of each tower is circulated by pumps to the distribution system that supplies the users at the plant. The warm cooling water is returned to the

top of the cooling towers, where it is distributed evenly across each cell by spray nozzles and cascades down through the tower's packing. Blowdown occurs on an as-needed basis to maintain tower performance.

Warm process water from the INEOS wastewater treatment unit discharges through Outfall 001. The Design Maximum Flow (DMF) through this outfall is 2.8 MGD (4.3 cfs), with a Design Average Flow (DAF) of 2.318 MGD (3.6 cfs) and a Long-Term Average (LTA) Flow of 1.22 MGD (1.9 cfs). The discharge flows underground in a 275 foot linear 24" high-density polyethylene (HDPE) pipe to a concrete revetment-lined channel (i.e., discharge structure), which is located on the right descending bank of the LDPR at approximately River Mile 280. The temperature monitor for this discharge is located at the head of the pipe, prior to combining with the Outfall 004 flow.

INEOS' Outfall 004 is the effluent from the sanitary sewer system, which includes an aerobic and clarification process. This process contributes approximately 6 gpm of flow to the river.

2. Summary Information on Temperature of Discharge to Receiving Waters (35 IAC 106.1130(b)(2))

INEOS had not been required to monitor for temperature in its prior NPDES permits, as it had no reasonable potential to exceed the former Secondary Contact thermal limits applicable to the LDPR prior to the implementation of the UDIP standards. INEOS has submitted Discharge Monitoring Report (DMR) temperature data since October 2020 for Outfall 001. Since the UDIP standards have been stayed for

INEOS due to the variance and Time-Limited Water Quality Standard (TLWQS) filings, there have been no instances of non-compliance with the thermal standards.

Temperature monitoring data collected by INEOS has been reviewed for the Facility for the past six years (2016-2021) and is provided in Appendix 2, Table 1A (INEOS 73) of the INEOS Demonstration document, which is attached as Exhibit 1 to this Petition. The maximum daily average temperature for Outfall 001 during the past six years was 94.5° F, which occurred in May 2020, and July 2021. The corresponding hourly maximum temperature was 97.8° F, which occurred in August 2021. Exhibit 1, Table 1B (INEOS 74). The minimum daily average temperature during the same time period was 71.9° F in November 2017. The minimum hourly measured temperature was 34.0° F in December 2018. The long-term annual average discharge temperature for the six-year period for Outfall 001 was 79.1° F. The average temperature during the winter months (December through March) was 75.3° F. The non-winter month (April through October) average temperature for the six-year period reviewed was 81° F.

Over this same six-year period (2016-2021), the average annual flow from Outfall 001 was 2.4 cfs, and remained relatively consistent on both a monthly and inter-annual basis. Exhibit 1, Appendix 2, Table 2 (INEOS 75). The monthly maximum flow average for the same time period was 3.1 cfs. Exhibit 1, Appendix 2, Table 3 (INEOS 76). Outfall 001 average flow for 2016-2021 was only 56% of the DMF of 2.8 MGD (4.3 cfs) and contributed only 0.07% of the corresponding long-term monthly average flow of the

LDPR, as measured at the Brandon Road Lock and Dam. Exhibit 1, Appendix 2, Tables 4 and 5 (INEOS 77-78). The DMF flow is also less than 0.3% of the published 7-day, 10-year low flow for this portion of the LDPR (1,493 cfs). Therefore, the overall thermal contribution from the INEOS discharge remains insignificant, as originally discussed in the Midwest Generation Demonstration report ("MG Demonstration") in Appendix D (MG Exhibits D-2a and D-2b).

C. Summary of Compliance or Non-Compliance with Thermal Requirements at the Facility in the Past Five Years (35 IAC 106.1130(c))

On July 21, 2015, INEOS filed a Petition for Variance, which was automatically converted to a Petition for a Time-Limited Water Quality Standard (TLWQS) on February 24, 2017 by operation of 415 ILCS 5/38.5(c). The Petition for TLWQS was later amended, consolidated with Midwest Generation's TLWQS Petition, found to be in "substantial compliance," and stayed by the Board. PCB 16-24, July 25, 2019 and December 5, 2019 Orders of the Board. The stay of the TLWQS Petition remains in effect until the Board reaches a decision on this ATEL Petition or until the Board orders otherwise. PCB 16-24, December 21, 2021 Hearing Officer Order.

INEOS' timely filing of its variance seeking relief from the thermal water quality standard resulted in a stay of the thermal water quality standard by operation of law. 415 ILCS 5/38.5(h)(1)(A). The stay of the effectiveness of the water quality standard remains in place until the Board issues a ruling on the Petition for TLWQS. 415 ILCS

5/38.5(h)(4). Accordingly, the thermal water quality standard has not been effective as to INEOS since its adoption and consequently INEOS has no history of non-compliance.

D. Detailed Plan of Study Submitted to the Agency Pursuant to Section 106.1120(a) and the Agency's Written Response Pursuant to Section 106.1120(f) (35 IAC 106.1130(d))

INEOS submitted its Early Screening Information, as described in 35 Ill. Admin. Code 106.1115, to Illinois EPA on December 2, 2021. INEOS discussed the elements of the Early Screening Information that had been submitted to Illinois EPA on December 10, 2021. Illinois EPA expressed agreement during the December 10, 2021 discussion and stated that no new or additional field studies would be required to be performed by INEOS to supplement the MG case/Board record to support the request for application of the MG ATELs to the INEOS thermal discharge. Further, Illinois EPA agreed that supporting information from the MG Demonstration could be incorporated by reference in the INEOS Demonstration, rather than having to duplicate or reiterate details that had already been thoroughly reviewed and approved by Illinois EPA and the Board. Pursuant to 35 Ill. Admin. Code 106.1120, INEOS submitted its Detailed Plan of Study to Illinois EPA on January 28, 2022. Illinois EPA approved INEOS' Detailed Plan of Study on March 13, 2022. Copies of the Early Screening Information and Detailed Plan of Study are attached to the INEOS Demonstration as Appendix 1 (INEOS 42); the Demonstration is attached as Exhibit 1 as referenced above.

E. Results of the Studies Conducted Pursuant to the Detailed Plan of Study Submitted Under Section 106.1120 (35 IAC 106.1130(e))

1. Background on the Proposed Alternative Thermal Effluent Limitations (35 IAC 106.1130(e)(1))

The LDPR, into which the Facility discharges, empties into the UDIP. The UDIP was formerly designated as a Secondary Contact and Indigenous Aquatic Life Water ("Secondary Contact Waters") under the Illinois use designation system in 35 Ill. Admin. Code Part 303. Due to the inherent limitations of the Chicago Area Waterway System (CAWS), of which the UDIP (and LDPR) forms a part, these Secondary Contact Waters were regulated by a set of water quality limitations that were less stringent than the General Use water quality standards that applied to most waters of Illinois. The waterway is heavily influenced by hydromodification, channelization, alterations in flow, wastewater discharges, and other factors that limit the kinds of aquatic life that can be maintained there.

Since the adoption of the Secondary Contact waters designation in the 1970s, water quality improved over the years as the result of point source discharge controls, including wastewater control technology advances by publicly owned treatment works. These improvements generated interest in revising the applicable designated uses and standards. In 2007, Illinois EPA presented two use attainability analyses to the Board and submitted that these studies indicated that the UDIP and other portions of the CAWS had attained, or had the potential to attain, higher designated recreational and

aquatic life uses under the Clean Water Act than those provided by the Secondary Contact Waters designation.

Then, on October 26, 2007, the Board initiated a rulemaking that lasted several years. The Board re-designated the UDIP from a Secondary Contact Water to an "Upper Dresden Island Pool Use" or "UDIP Use" water. The designation is defined as the:

> Lower Des Plaines River from the Brandon Road Lock and Dam to the Interstate 55 bridge is designated as the Upper Dresden Island Pool Aquatic Life Use. These waters are capable of maintaining, and shall have quality sufficient to protect, aquatic-life populations consisting of individuals of tolerant, intermediately tolerant, and intolerant types that are adaptive to the unique flow conditions necessary to maintain navigational use and upstream flood control functions of the waterway system. Such aquatic life may include, but is not limited to, largemouth bass, bluntnose minnow, channel catfish, orange spotted sunfish, smallmouth bass, shorthead redhorse, and spottail shiner.

35 Ill. Adm. Code 303.230.

The Board concluded that the UDIP Use waters should have the same thermal water quality standards as the General Use waters. The Board recognized that some thermal dischargers would needed to seek additional relief from these thermal standards such as through the pursuit of alternate thermal effluent limitations. The Board delayed application of the thermal standards until three years after the effective date to allow these dischargers, like Midwest Generation and INEOS, to pursue alternate relief. *See In the Matter of: Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303, and 304*, PCB R08-9(D), at 77 (Mar. 19, 2015). Thus, the Board

adopted the following temperature standards for the UDIP that are on par with the most stringent thermal standards in the state:

> Water temperature for the Upper Dresden Island Pool Aquatic Life Use waters, as defined in 35 Ill. Admin. Code 303.230, shall not exceed the limits in the following table in accordance with subsection (f):

Months	Daily Maximum (°F)
January	60
February	60
March	60
April	90
May	90
June	90
July	90
August	90
September	90
October	90
November	90
December	60

35 Ill. Admin. Code 302.408(i).

Further, the regulations state that the water temperature shall not exceed these daily maximum amounts during more than "one percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature exceed the maximum limits … by more than 1.7°C (3.0°F)." 35 Ill. Admin. Code 302.408(f).

The Facility has an inability to consistently meet the UDIP standards, in large part because of Illinois EPA's inability to grant a mixing zone to INEOS due to the recently approved MG ATEL for its two Joliet Generating Stations being in place in the receiving stream (per 35 Ill. Admin. Code 302.102(b)(9)). Illinois EPA requested that MG, as part of their overall CWA Section 316(a) Demonstration (PCB 20-38/39), perform analyses which showed that the INEOS thermal discharge would not have any discernable impact on the temperature of the main body of the UDIP. INEOS was found to be eligible for coverage under the proposed MG ATELS, which themselves have been shown to have no adverse impact on the balanced indigenous community ("BIC") of the UDIP in accordance with the CWA Section 316(a) criteria outlined in the USEPA (1977) technical guidance document, as well as the 35 Ill. Admin. Code Part 106, Subpart K rules.

Illinois EPA stated that USEPA considers it "appropriate to include downstream dischargers in the relief requested as long as the dischargers were considered in the Demonstration Report." Illinois EPA Recommendation, PCB 20-38 and PCB 20-39, p. 11 (Apr. 29, 2020). The Board, in the MG case, ultimately found:

> *Board Finding. Based on the record before it, the Board finds that the generally applicable thermal water quality standard is more stringent than necessary to assure the protection and propagation of the BIC in the receiving waters. The Board finds that MG's demonstration shows that the proposed thermal ATELs will protect the BIC in the UDIP/NearField and in the Five-Mile Stretch/Far-Field.*

Board Opinion and Order, PCB 20-38 and PCB 20-39, p. 129 (July 8, 2021). The Board acknowledged MG's suggestion that downstream dischargers, like INEOS, would be able to submit its own petition for coverage under the approved MG ATELS, relying upon the extensive MG case record as justification.

2. Information on Data Collection Program and Methodologies (35 IAC 106.1130(e)(2))

INEOS retained EA Engineering, Science, and Technology, Inc., PBC ("EA") to assist with preparation of Section 316(a) technical support documentation, along with incorporation of the MG ATEL information.

The MG Demonstration is a voluminous report that presents detailed information, data, and finding supporting MG's requested thermal AEL. The report is based on over 40 years of monitoring and analyses of the fauna and ecosystems associated with the UDIP and Five-Mile Stretch. The report presented both prospective and retrospective analyses which showed that the proposed thermal AELs will assure the protection and propagation of a BIC. The report met the requirements of Subpart K regulations and the CWA Section 316(a) criteria, as outlined in the 316(a) Manual.

The MG Demonstration began with a summary of all the information presented. The appendices of the report described the UDIP and Five-Mile Stretch in detail, provided prospective and retrospective assessments, detailed both the historical and current operations at the Joliet Stations and a recent hydrothermal modeling analysis of the two station discharges, reviewing the various Joliet Stations 9 and 29 data collection

programs, presented the most recent annual fisheries monitoring reports covering the UDIP and Five-Mile Stretch from 2016, 2017, and 2018, presented prior thermal plume studies performed at the Joliet Stations in 2002 and 2012, provided a detailed summary of the fisheries data collected in the UDIP near the Joliet Stations in 2017 and 2018, presented the results of the habitat and submerged aquatic vegetation (SAV) surveys, and contained the results of benthic macroinvertebrate surveys that were conducted in the UDIP in 2017 and 2018.

The MG Demonstration shows that there is no evidence that operation of the Joliet Stations in accordance with the former Secondary Contact Waters thermal limits, nor the identical current interim thermal limits, have caused appreciable harm to a BIC in the UDIP/ Five-Mile Stretch. The Board found that the numeric thermal AELs proposed for the Joliet Stations in PCB 20-38 and PCB 20-39 were more stringent than the prior Secondary Contact and Indigenous Aquatic Life limits and logically should also not result in appreciable harm. The MG Demonstration data and analysis demonstrates that the UDIP/Five-Mile Stretch BIC will be protected under MG's proposed thermal AELS. Furthermore, the MG Demonstration shows that the UDIP/Five-Mile Stretch has been adequately protected by water standards using numeric criteria exclusively. According, MG's ATELs did not include narrative criteria.

The MG Demonstration used a retrospective analysis of aquatic community monitoring data collected during MG's Joliet Stations' operations over the past 20-plus

years. This extensive biological database was collected during a period when the less-stringent Secondary Contact Waters standards applied. The data analyzed includes data collected in the vicinity of the Joliet Stations during prior, "base-load" operations and under current, "peaker" operations.

The retrospective evaluation was conducted in two parts. First, the condition of each biotic category as a whole was analyzed by comparing available information on its abundance and species composition to what would be expected based on existing habitat, flow, and chemical characteristics of the UDIP and Five-Mile Stretch. Second, the long-term trends abundance for each of the biotic categories within the UDIP/ Five-Mile Stretch BIC were analyzed to determine whether a change in population abundance has occurred that can be attributed to the operation of the Joliet Stations. (See Ex. A, Appendix C of the MG Demonstration). The biotic category and long-term trend analyses provide a thorough and technically sound assessment of the status of the biological community in the UDIP and Five-Mile Stretch.

The predictive assessment used the MIKE3 model outputs to characterize and predict resultant hydrothermal conditions in the UDIP downstream of the Joliet Stations' thermal discharges on both typical and worst-case scenarios based on real-world data. The MIKE3-predicted thermal plume dimensions and distribution in the UDIP were compared to available biothermal metric data related to survival, avoidance, spawning, and growth of fish. This assessment evaluated the predicted effects of the

Joliet Stations' thermal plume temperatures on the aquatic community represented by ten selected representative species under three summer period scenarios, including worst-case, typical, and typical low flow, paired with corresponding projected station operational data.

3. Summaries of Physical, Chemical, Biological and Technical Data Supporting the Demonstration, Along with a Discussion of the Data (35 IAC 106.1130(e)(3))

INEOS hereby incorporates by reference the MG Demonstration, as it includes all of the required studies and detailed information that allowed the MG ATELs to be approved by the Board.

The retrospective study in the MG Demonstration, based on years of studies, data, and other information evaluated for the different biotic categories of the UDIP/Five-Mile Stretch aquatic community, reached several conclusions:

(1) There have been no substantial increases in abundance or distribution of any nuisance species or heat-tolerant community;

(2) There have been no substantial decreases of formerly abundant indigenous species other than nuisance species;

(3) There had been no elimination of an established potential economic or recreational use of the waters;

(4) There have been no reductions in the successful completion of life cycles of indigenous species, including those of migratory species;

(5) There have been no substantial reductions of community heterogeneity or trophic structure;

(6) There have been no adverse impacts on threatened or endangered species;

(7) There has been no destruction of a unique or rare habitat; and

(8) There have been no detrimental interactions with other pollutants, dischargers, or water-use activities.

Petition to Approve Alternative Thermal Effluent Limitations for the Joliet 9 Generating Station, PCB 20-38, p. 26 (December 30, 2020).

The MG Demonstration studies took longer than originally anticipated in order for MG to collect biological monitoring data for the UDIP during "peaker" operations at the Joliet Stations. The segment-based UDIP electrofishing results from May through September 2017 and 2018 are consistent with findings from the pre-peaker historical studies which substantiates the conclusion that mean summertime water temperatures have not influenced catch results within the UDIP on a consistent basis among the past 24 years. Also, the results of electrofishing conducted during winter months during this period, demonstrate that water temperature is not the primary limiting factor to the UDIP fish community.

The MG Demonstration predictive study found that the maximum surface temperature near the theoretical edge of the allowable mixing zones of the Joliet Stations under the "worst-case" scenario was approximately 96° F, which was the maximum compliance temperature requested by MG as part of the proposed near-field summer thermal AEL. Based on continuous temperatures from 2012-2017 recorded at the Joliet Stations' thermal discharge and historical operating data, temperatures of the

magnitude approaching those modeled for the "worst-case" scenario are expected in July and August no more than 10% of the time over a 6-year period. Discharge temperatures exceeding 93° F can be expected up to a maximum of 20% of the time from June through September, based upon actual data from 2012-2017.

The summary worst-case scenario results demonstrate that neither Joliet Station could consistently meet the numerical and narrative criteria required by the 2018 Thermal Standards for the UDIP. The narrative criteria include the "5° F above natural" requirement, which is difficult to apply in a regulated and anthropogenically influenced waterway such as the LDPR. However, in the MG Demonstration, the model results indicate that both Joliet Stations would be able to meet the less stringent thermal limitations which were proposed in their demonstration. The Joliet Stations would not be able to consistently meet the narrative portions, but they would be able to meet the UDIP numeric limits.

The MG Demonstration showed that modeling results indicate that a major portion of the UDIP cross-sections between the Joliet Stations' thermal discharges and the downstream model extent (I-55 Bridge) maintain temperatures fully adequate to support biological communities under both typical and more adverse flow and summer weather conditions while continuing to provide an adequate zone of passage for aquatic life. Further, the MG Demonstration stated that support of the biological communities is

maintained with edge of mixing zone temperatures that are above the existing thermal standards imposed by 35 Ill. Admin. Code 302.408.

Further, the MG demonstration stated that modeling of winter conditions showed a similar pattern: thermal discharges that comply with UDIP and General Use numerical thermal limits most of the time, but that fail to comply under worst-case scenarios.

4. Criteria or Methodology Used to Assess Whether a Balanced Indigenous Community of Shellfish, Fish and Wildlife Will Be Maintained in the Receiving Waters and the Protection of Threatened and Endangered Species (35 IAC 106.1130(e)(4))

The MG Demonstration also utilizes predictive studies to assess whether the proposed ATELs will "assure the protection and propagation of a balanced, indigenous, community of shellfish, fish, and wildlife." MG's approach used quantitative hydrothermal modeling to predict thermal conditions under various operating and ambient flow conditions, integrated with metrics of thermal requirements and tolerance limits identified in scientific literature for selected aquatic species representative of the BIC. Their prospective analysis is used to predict the response of the aquatic community and receiving water body to the Joliet Stations' thermal discharge plumes.

The MG demonstration identified that the hydrothermal model and predictive analysis were integrated with representative import species ("RIS") life history requirements to develop proposed monthly ATELS that are protective of the UDIP/Five-Mile Stretch BIC. The RIS, selected using criteria found in the 316(a) Manual,

were River Redhorse (*Moxostoma carinatum*), White Sucker (*Catostomus commersonii*), Gizzard Shad (*Dorosoma cepedianum*), Bluntnose Minnow (*Pimephales notatus*), Banded Killifish (*Fundulus diaphanus*), Common Carp (*Cyprinus carpio*), Channel Catfish (*Ictalurus punctatus*), Largemouth Bass (*Micropterus salmoides*); Bluegill (*Lepomis macrochirus*); Freshwater Drum (*Aplodinotus grunniens*).

The model was calibrated and validated for the seasonal conditions using a recent bathymetric survey and field surveys of water temperature under various canal flow and weather conditions conducted during 2011, 2016, and early 2017. The calibrated model was used to estimate water temperature within each model cell under various ambient flow and station operating scenarios by simulating dilution and dispersion of elevated thermal plume temperatures. Model-estimated cross-section and bottom water temperatures are compared to biothermal metrics to estimate the extent of otherwise available aquatic habitat that would be excluded or would be at less than optimum conditions for selected life history functions (e.g., spawning, growth, and survival) of RIS due to water temperature, while still allowing for an adequate zone of passage.

The MG Demonstration states that the data reviewed for the predictive assessment demonstrate that the Joliet Station 9 and 29 thermal discharges would not have an adverse effect on spawning and early development of the RIS that could potentially utilize habitat in the UDIP and the Five Mile Stretch; water temperatures

acceptable for these activities would be available outside of the Joliet Station 9 and 29 allowable mixing zones under typical temperature scenarios throughout most of the spawning period of these species. Further, the report identified that no unique or critical habitat for spawning and early development of RIS or threatened/endangered species exists in the UDIP or Five-Mile Stretch.

F. Any Additional Information or Studies, Including Information or Guidance Published by USEPA, That the Petitioner Judges to Be Appropriate to Support the Alternative Thermal Effluent Limitation Demonstration (35 IAC 106.1130(f))

The MG Demonstration stated that the retrospective assessment shows that there have been no substantial changes in abundance of nuisance species or in the physical and biological components of the ecology of the UDIP/Five-Mile Stretch during the past 24 years of biological monitoring data collected in these waterways. During most of those 24 years, the UDIP was subject to thermal standards that were significantly less stringent than the existing thermal standards and the standards contained in the proposed ATEL. Also, the MG demonstration stated that both the UDIP and the Five-Mile Stretch were subject to significantly more thermal loading from other upstream sources. Additionally, the MG demonstration stated that the Joliet Stations have converted from "base load" operations to "peaker" operations, creating a dramatic drop in annual thermal loading as the Stations now spend long stretches of time offline during suboptimal market conditions.

Even with these large, sustained reductions in thermal loading, the waterway continues to be dominated by tolerant and highly tolerant species suited to the subpar ecological conditions found in the UDIP and Five-Mile Stretch. The temperatures found are not limiting or harming the UDIP/Five-Mile Stretch BIC even though they can be warmer than "natural" waterways.

G. Statement of Requested Relief (35 IAC 106.1130(g))

In lieu of the General Use thermal water quality standards contained in 35 Ill. Admin. Code 302.211 and the Upper Dresden Island Pool Use thermal water quality standards provisions contained in 35 Ill. Admin. Code 302.408 (c)-(f), and (i), INEOS is requesting coverage under the MG ATELS for its thermal discharge to the UDIP. Inclusion of the INEOS thermal discharge under the MG ATELs for the UDIP will result in no changes to the above conclusions. This section provides the requested ATEL, requested mixing zone relief, and any other requested relief per Section 106.1130(g)(1)-(3).

Historically, a 5° F "above natural temperature" limit has not been applied to the UDIP as is required under 35 Ill. Admin. Code 302.408(e). The MG demonstration clearly shows that the UDIP/Five-Mile Stretch BIC can be adequately maintained without these narratives in place, as long as the seasonal numeric standards remain protective of the resident aquatic community. The Board found that the MG ATEL numeric limits meet the criteria for on-going protection of the BIC. The MG

Demonstration's hydrothermal modeling effort showed that the Joliet Stations discharges do not create any type of thermal block that cannot be traversed by the indigenous aquatic community during either summer or winter operations. Considering its small volume of flow in relation to the flow of the LDPR, this conclusion also applies to the INEOS thermal discharge. Thus, the BIC protections afforded by the approved MG ATELs, which do not contain narrative standards, remain fully adequate for application to the INEOS thermal discharge.

A 75% or greater zone of passage ("ZOP") under the proposed maximum thermal AELs would continue to be available in the UDIP near the MG Joliet Stations 9 and 29, even under the worst-case modeled conditions, based on review of historical operating and river flow data. This equates to the allowed use of up to 25% of the available flow in the river for mixing for each facility. However, due to the frequency of erratic flow fluctuations, as well as low flow conditions where the dilution ratio may be less than 3:1, Illinois EPA allows for a 50% ZOP. Therefore, based on the hydrothermal modeling results, both Joliet Stations 9 and 29 thermal discharges were found to be able to meet the existing zone of passage criteria in place under the proposed near-field thermal AELs.

INEOS is requesting that a mixing zone be granted which allows the use of 25% of the 7Q10 flow of the UDIP to maintain compliance with the MG ATELs. Use of a percentage of the 7Q10, instead of real-time flow, is extremely conservative, but still

provides sufficient mixing to bring the INEOS discharge temperature down to near-ambient levels. By granting this mixing zone provision to INEOS, there is no reasonable potential for its thermal discharge to exceed the MG ATELs.

As demonstrated by analysis of the MG thermal discharges in the MG demonstration, INEOS similarly meets all of the criteria for compliance with the best degree of treatment provisions discussed in 35 Ill. Admin. Code 304.102.

Also, based on available information in both the MG Demonstration and discussed herein, the INEOS thermal discharge meets all of the other criteria listed in 35 Ill. Admin. Code 302.102 to allow a mixing zone to be granted. This includes the fact that there are no known mussel beds in the vicinity of the INEOS discharge structure that would be impacted by the thermal discharge.

Based on the entirety of the MG case record in PCB 20-38 and 20-39, as well as the site-specific information contained in the INEOS Demonstration document, the following thermal AELs are proposed for application to the INEOS thermal discharge, in lieu of the following provisions contained in Title 35, Subtitle C, Chapter 1:

- Proposed MG Near-Field Thermal AELs to replace the UDIP thermal standards in Section 302.408(c), (d), (e), and (i).

- Acknowledgement that the Zone of Passage requirements in Section 302.102(b) are applicable to the INEOS thermal discharge, and that mixing is allowed to meet the applicable numeric MG Near-Field ATELs.

Because there is no reasonable potential for the INEOS thermal discharge to raise the temperature of the main body of the LDPR more than 0.5ºF over ambient upstream

temperature conditions (assuming that the requested mixing zone using 25% of the 7Q10 flow of the LPDR is allowed) and as long as the INEOS Outfall 001 maximum discharge temperature remains at or below 100° F, compliance with the MG ATELs will be maintained for all months of the year.

The proposed numeric near-field ATELs for the INEOS facility is as follows:

Month	**UDIP Thermal Standards (Effective July 1, 2018) Daily Maximum (°F)**	**Approved MG Near-Field ATELs Daily Maximum (°F) Requested to be applied to INEOS Thermal Discharge**
January	60	65
February	60	65
March	60	70
April	90	80
May	90	85
June	90	93
July	90	93
August	90	93
September	90	93
October	90	90
November	90	85
December	60	70
Excursion Hours	Shall not exceed maximum limits during more than 1% of the hours in the 12-month period ending with any month; at no time shall water temperature exceed the maximum limits by more than 3.0ºF	Daily maximum not to be exceeded by more than 5% of the time in a calendar year; at no time shall water temperature exceed the maximum limits by more than 3ºF

These proposed near-field ATELs are higher than the corresponding UDIP numeric thermal standards for eight months out of the year (January-March, June-September, and December), equal to the UDIP standards for one month (October), and lower (i.e., more stringent) than the corresponding UDIP standards for three months

(April, May, and November). Water temperature at representative locations in the UDIP shall not exceed the maximum limits listed above for more than 5% of the time in a calendar year. Moreover, at no time shall water temperature exceed the maximum limit by more than 3ºF (1.7ºC). Based on the applicable Numeric near-field ATELs, the INEOS thermal discharge shall maintain a ZOP pursuant to Section 302.102(b)(6) and shall comply with the required area and volume of a ZOP in Section 301.102(b)(8).

The approved MG near-field ATEL limits, as applied to the INEOS thermal discharge, would be effective at the edge of the allowed mixing zone. As long as INEOS is provided with an allowed mixing zone using 25% of the 7Q10 flow of the LDPR and the end-of-pipe temperature does not exceed 100° F, the analysis provided in Appendix 4 of the INEOS Demonstration proves that there is no reasonable potential for the INEOS thermal discharge to exceed the MG ATELs at any time of the year. Therefore, INEOS requests that a 100° F maximum effluent limitation be placed in its new NPDES permit as the means for determining compliance with the MG ATELs in the main body of the LDPR. Adherence to this maximum effluent limit will assure continuing compliance and would not require the on-going use of a thermal model for compliance determination. The reported compliance temperature would be the maximum instantaneous temperature measured at INEOS Outfall 001 during any given month (based on hourly data).

WHEREFORE, for the foregoing reasons, INEOS respectfully requests that its Petition to Approve Alternative Thermal Effluent Limitations be granted and that the Board provide INEOS the relief requested herein.

Respectfully submitted,

INEOS JOLIET, LLC

By: */s/ Michael P. Murphy*
One of Its Attorneys

Dated: June 29, 2023

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Exhibit 1

INEOS Joliet Facility
§316(a) Demonstration

Prepared for

INEOS Joliet LLC
23425 Amoco Road
Channahon, IL 60410

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
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June 2023
Version: FINAL
EA Project No. 16213.01

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APPENDIX 5: Review of LDPR Mussel Information to Support Mixing Zone Requirements

Entire Case Record in PCB 20-38/39 Incorporated by Reference

Specific MG references made in this INEOS Demonstration document:

- Joliet Stations 9 and 29 316(a) Summary Document

- APPENDIX A: Description of the Lower Des Plaines River
- APPENDIX B: Biothermal Prospective Assessment
- APPENDIX C: Retrospective Assessment
- APPENDIX D: Station Operations and Hydrothermal Analysis
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- APPENDIX F: 2016 Upper Illinois Waterway Fisheries Investigation
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- APPENDIX I: Previously Conducted Joliet Stations 9 and 29 Thermal Plume Surveys and Associated Documentation
- APPENDIX J: Summary of Upper Dresden Island Pool Fisheries Data Collected Following Operational Changes at Joliet Stations 9 and 29, 2017-2018
- APPENDIX K: Habitat and Submerged Aquatic Vegetation (SAV) Survey of the Des Plaines River
- APPENDIX L: 2017-2018 Benthic Macroinvertebrate Assessment of the Des Plaines River

- Illinois Environmental Protection Agency Recommendation dated 29 April 2020

- Board Order and Opinion in PCB 20-38/39 dated 8 July 2021

LIST OF ACRONYMS AND ABBREVIATIONS

ATEL or AEL	Alternative Thermal Effluent Limitation
BIC	Balanced Indigenous Community
CAWS	Chicago Area Waterway System
CSO	Combined Sewer Overflow
CSSC	Chicago Sanitary and Ship Canal
DAF	Design Average Flow
DMF	Design Maximum Flow
DMR	Discharge Monitoring Report
Deg	Degree
DSP	Detailed Study Plan
EA	EA Engineering, Science, and Technology, Inc., PBC (12 December 2014 and thereafter)
Five-Mile Stretch	Portion of the Lower Des Plaines River between the I-55 Bridge and Kankakee River Confluence
HDPE	High-Density Polyethylene
IAC	Illinois Administrative Code
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
IL/Ill.	Illinois
INEOS	INEOS Joliet LLC
IPA	Isophthalic Acid
IPCB	Illinois Pollution Control Board
ISWS	Illinois State Water Survey
LDPR	Lower Des Plaines River
LTA	Long-Term Average
MAN	Maleic Anhydride
msl	Mean Sea Level
MG or MWG	Midwest Generation, LLC
MWRDGC	Metropolitan Water Reclamation District of Greater Chicago (1989-present)
NPDES	National Pollutant Discharge Elimination System

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

PBC	Public Benefit Corporation
PCB	Polychlorinated biphenyls
POTW	Publicly-Owned Treatment Works
RIS	Representative Important Species
SAV	Submerged Aquatic Vegetation
SIC	Standard Industrial Code
sp./spp.	Species.
T&E	Threatened & Endangered
TMA	Trimellitic Anhydride
UAA	Use Attainability Analysis
UDIP	Upper Dresden Island Pool (part of the lower Des Plaines River)
UIW	Upper Illinois Waterway
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
ZOP	Zone of Passage

LIST OF ABBREVIATED MEASUREMENTS

kg	Kilogram
g	Gram
mg	Milligram
µg	Microgram
ng	Nanogram
km	Kilometer
m	Meter
cm	Centimeter
mm	Millimeter
m^3	Cubic Meter
hr	Hour
min	Minute
sec	Second
µS	microSiemens
mi	Mile
mi^2	Square Mile
ft (‘)	Foot (Feet)
in (“)	Inch(es)
ac	Acre
L	Liter
cfs	Cubic Feet per Second
fps	Feet per Second
MGD	Million Gallons per Day
gpm	Gallons per Minute
cfu	Colony Forming Unit
°C	Degree Celsius
°F	Degree Fahrenheit
hr	Hour
min	Minute
sec	Second

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1. INTRODUCTION

1.1 OVERVIEW OF THE INEOS §316(a) DEMONSTRATION

The INEOS Joliet LLC (INEOS) facility is located on the lower Des Plaines River (LDPR) in the Upper Dresden Island Pool (UDIP) at River Mile 280.3. The applicable water quality standards, including water temperature limits for the UDIP, were recently reviewed and modified by the Illinois Pollution Control Board (IPCB or Board) (IPCB Docket No. 2008-09, Subdocket D). The new thermal standards, which were adopted by the IPCB on 16 June 2015 and codified on 10 July 2015, became applicable on 1 July 2018.[1]

A complete timeline of the regulatory proceedings that INEOS (or the facility's prior owner, Flint Hills Resources) has participated in with relation to the implementation of the UDIP thermal water quality standards is provided in the Detailed Study Plan (DSP) that was submitted to the Illinois Environmental Protection Agency (IEPA) for review on 28 January 2022 with subsequent approval on 13 March 2022 and will not be reiterated here in full. A copy of the approved DSP is included as Appendix 1 to this Demonstration document.

The driving factors that are now leading INEOS to submit this §316(a) Demonstration are as follows:

(1) the facility's inability to consistently meet the UDIP standards, in large part because of IEPA's inability to grant a mixing zone to INEOS due to the recently approved Midwest Generation (MG) Alternative Thermal Effluent Limitations (ATEL or AEL) for its two Joliet Generating Stations being in place in the receiving stream (per 35 Ill. Adm. Code 302.102(b)(9));

(2) the analyses that were performed at IEPA's request by MG as part of their overall §316(a) Demonstration (PCB 20-38/39), which show that the INEOS thermal discharge would not have any discernable impact on the temperature of the main body of the UDIP (MG Demonstration Appendix D, Exhibits D-2a and D-2b). INEOS was therefore found to be eligible for coverage under the proposed MG ATELs, which themselves have been shown to have no adverse impact on the Balanced Indigenous Community (BIC) of the UDIP in accordance with the requirements outlined in §316(a) criteria outlined in the United States Environmental Protection Agency (USEPA) (1977) technical guidance document, as well as the 35 Ill. Adm. Code Part 106, Subpart K rules (Subpart K)[2];

[1] Compliance with these water quality standards by INEOS has been stayed by operation of law. INEOS, then Flint Hills, timely filed a Petition for Variance on 21 July 2015 (PCB 2016-024; consolidated with PCB 2016-019). The Petition for Variance was automatically converted to a Petition for TLWQS in 2017 by operation of 415 ILCS 5/38.5(c). The Board found that the Petition for TLWQS was in "substantial compliance" and, therefore, under 415 ILCS 5/38.5(h)(4), the stay of the underlying water quality standard remains in place until the Board either adopts or denies the TLWQS. Order of the Board (July 25, 2019). The TLWQS proceedings, however, have been stayed pending the outcome of the Petition for ATEL that will be filed by INEOS and supported by this Demonstration.

[2] This Demonstration for INEOS is intended to apply only to that portion of the LDPR known as the UDIP, in accordance with the near-field ATELs established by MG. Since the INEOS thermal discharge does not provide any

(3) IEPA's Recommendation regarding the downstream dischargers (including INEOS) in the MG case (submitted into PCB 20-38/39 record on 29 April 2020, "IEPA Rec."), which proposed that "*each of these thermal dischargers be allowed to take advantage of the AELs adopted by the Board*." IEPA Rec. at 10. IEPA reported that USEPA considers it "*appropriate to include downstream dischargers in the relief requested as long as the dischargers were considered in the Demonstration Report.*" *Id*. at 11;

(4) The Board's ultimate approval of the MG ATELs (Board Opinion and Order dated 8 July 2021, p. 129), which cover the waterway into which INEOS discharges:

> *"Board Finding. Based on the record before it, the Board finds that the generally applicable thermal water quality standard is more stringent than necessary to assure the protection and propagation of the BIC in the receiving waters. The Board finds that MG's demonstration shows that the proposed thermal ATELs will protect the BIC in the UDIP/Near-Field and in the Five-Mile Stretch/Far-Field."*; and

(5) The Board's concurrent acknowledgement of MG's suggestion that INEOS (and/or other downstream dischargers) would be able to submit its own petition for coverage under the approved MG ATELs, relying upon the extensive MG case record as justification.[3]

Incorporation by Reference

Per the preceding MG case citations, it has already been established by both the Board and IEPA that the recently approved MG Demonstration for its two Joliet Generating Stations also provides the information and data necessary to support this INEOS request for coverage under the same set of ATELs granted to MG. As such, INEOS incorporates by reference the entirety of the MG case record as though fully set forth herein to serve as the technical basis for the Board to grant approval for the applicability of the MG ATELs to the INEOS thermal discharge in place of the existing UDIP thermal water quality standards**.** IEPA has acknowledged both the propriety and efficiency of this incorporation by reference in Early Screening discussions, and is reflected in its approval of the DSP.

To briefly summarize, the MG Demonstration was based on 24 years of monitoring and analyses of the fauna and ecosystems associated with the LDPR in the vicinity of the Joliet Stations in the UDIP and continuing downstream of the I-55 Bridge. These programs and analyses are discussed in detail in the documents that comprise the MG Demonstration document. The MG Demonstration presented both prospective (MG Appendix B) and retrospective (MG Appendix

significant contribution to downstream temperatures, INEOS does not request or require coverage under the MG far-field ATELs which are effective at the I-55 Bridge and continuing downstream to the confluence of the LDPR and Kankakee River.

[3] In the 8 July 2021 Board Order in PCB 20-38/39 at p. 55, the Board noted that MG "*expects that the three downstream dischargers could rely on its thermal demonstration with few modifications to receive ATELs for their own discharges.*"

C) analyses showing that the MG AELs would continue to assure the protection and propagation of a balanced, indigenous community (BIC) of shellfish, fish, and wildlife in and on the UDIP—where the INEOS thermal discharge is also located—as well as in downstream LDPR waters commonly referred to as the Five-Mile Stretch, thereby meeting the §316(a) criteria outlined in the USEPA (1977) technical guidance document, as well as the Subpart K rules.[4]

MG Appendix A describes the UDIP/LDPR in detail, while MG Appendix D details both the historical and current operations at the Joliet Stations and recent hydrothermal modeling analysis of the two station discharges, including thermal plume studies and the analysis of the contributions of three downstream dischargers, including INEOS. MG Appendix E reviews the various MG data collection programs which are referenced throughout the Demonstration. MG Appendices F, G, and H present the most recent annual fisheries monitoring reports covering the UDIP and Five-Mile Stretch from 2016, 2017, and 2018, respectively. These reports contain a comprehensive assessment of the LDPR fish community over time. MG Appendix I includes the prior thermal plume studies performed at the Joliet Stations in 2002 and 2012, along with related documentation. MG Appendix J provides a detailed summary of the fisheries data collected in the UDIP near the Joliet Stations in 2017 and 2018, post Joliet Stations 9 and 29 gas conversion. MG Appendix K presents the results of the habitat and submerged aquatic vegetation (SAV) surveys performed during the years 2016-2018. MG Appendix L contains the results of benthic macroinvertebrate surveys that were conducted in the UDIP in 2017 and 2018.

In addition, site-specific information regarding the INEOS thermal discharge has been included in Appendix 2 of this document. This data further demonstrates that there would be no adverse consequences of allowing INEOS to be covered by the approved MG near-field ATELs.

1.2 RESOURCE AGENCY INTERACTION

INEOS provided the required Early Screening information to the IEPA on 3 December 2021. This was followed by discussion with Agency personnel on 10 December 2021, during which time it was agreed that supporting information from the MG Demonstration could be incorporated by reference in the INEOS Demonstration, rather than having to duplicate or reiterate details that had already been thoroughly reviewed and approved by IEPA and the Board.

Development of a Detailed Study Plan (DSP) in support of the Demonstration was initiated by INEOS and submitted to the IEPA on 28 January 2022. Agency approval of the DSP was provided in written correspondence dated 13 March 2022.

The remaining sections of this document provide the information required by Subpart K for an ATEL demonstration, presented in the same order outlined in Section 106.1130.

[4] The MG Demonstration did not apply to the entirety of the LDPR. The portion of the LDPR upstream of the Brandon Road Lock and Dam (Brandon Pool) was not studied as part of this Demonstration. The LDPR extent for the MG Demonstration includes the UDIP (Brandon Road Lock and Dam to I-55 Bridge) and the Five-Mile Stretch (I-55 Bridge down to the confluence with the Kankakee River). **INEOS is only requesting coverage under the UDIP ("near-field") MG ATELs in this Demonstration document.**

2. SUBPART K REQUIREMENTS FOR AN ATEL PETITION

2.1 FACILITY DESCRIPTION

INEOS does not generate power. It is under Standard Industrial Code (SIC) 2865 and is classified as a manufacturer of cyclic organic crudes and intermediates, and organic dyes and pigments. A description of the facility, as well as site processes and products, is included below.

The INEOS Joliet facility is located on a 270-acre tract of land located in Channahon, Illinois. The site is approximately 41 miles Southwest of Chicago and approximately one-mile Southeast of the Route 6 and I-55 intersection (Latitude: 41.445541; Longitude: -88.174049). To the immediate East and Southeast of the facility is the LDPR (River Mile 280.3). The facility employs approximately 220 employees, who operate, maintain, and manage the facility, which operates 24 hours a day, 7 days a week.

The facility has three process units which manufacture isophthalic acid (IPA), maleic anhydride (MAN), and trimellitic anhydride (TMA). The facility is configured with separate and distinct production units. The facility also has one utilities unit and one wastewater treatment unit. These units supply process air and steam to the process units as well as treat any wastewater from the process units. The facility also has several maintenance shops, office buildings, and warehouses. Water for facility processes is withdrawn from on-site groundwater extraction wells. No water is withdrawn from the LDPR.

Site steam is produced from multiple sources – the CB706 boiler produces steam and the IPA unit and MAN units also export steam when the reactors are running. CB706 steam uses natural gas (supplied by Nicor) as well as biogas produced in the wastewater treatment unit. The IPA and MAN units do not use a natural gas fuel source – the steam is produced as a byproduct of the exothermic reactions.

INEOS does not plan to retire any process units at this time nor does it plan to add any additional process units. INEOS continually improves the facility by replacing or repairing major and minor equipment, as necessary. INEOS will continue its strategy of proactively shutting down units for maintenance and repair approximately once per year. Shuts downs generally last two to three weeks.

The wastewater discharges from the facility are governed by National Pollutant Discharge Elimination System (NPDES) permit No. IL0001643 (expiration date: 30 September 2025)—included as Appendix 3 to this document. According to the permit fact sheet, plant operation results in an average discharge of 1.22 million gallons per day (MGD) of treated process wastewater, analytical lab waste, fire field waste, impacted groundwater and stormwater, utilities waste, and alternate sanitary waste through Outfall 001; intermittent discharge of stormwater, non-process wastewater, and hydrostatic test wastewater from Outfalls 002, 003, and 005; and 0.25 MGD of treated sanitary waste from Outfall 004.

2.2 FACILITY'S METHOD OF HEAT DISSIPATION

The Facility's primary treatment methods for treating process wastewater consist of an anaerobic, aerobic, clarification, and air floatation process. The anaerobic reactor must be operated at 100°F, year-round. (The anaerobic reactor feed is controlled to 98-100°F using a steam heat exchanger during the winter months and a cooling water exchanger during the summer months). After the anaerobic reactor, natural heat loss to the atmosphere results in ambient cooling as the water passes in parallel through four aerobic treatment basins, and then in parallel through three clarifiers, and finally one air floatation channel before heading to Outfall 001. This process typically contributes 60-80% of the annual discharge flow volume to Outfall 001.

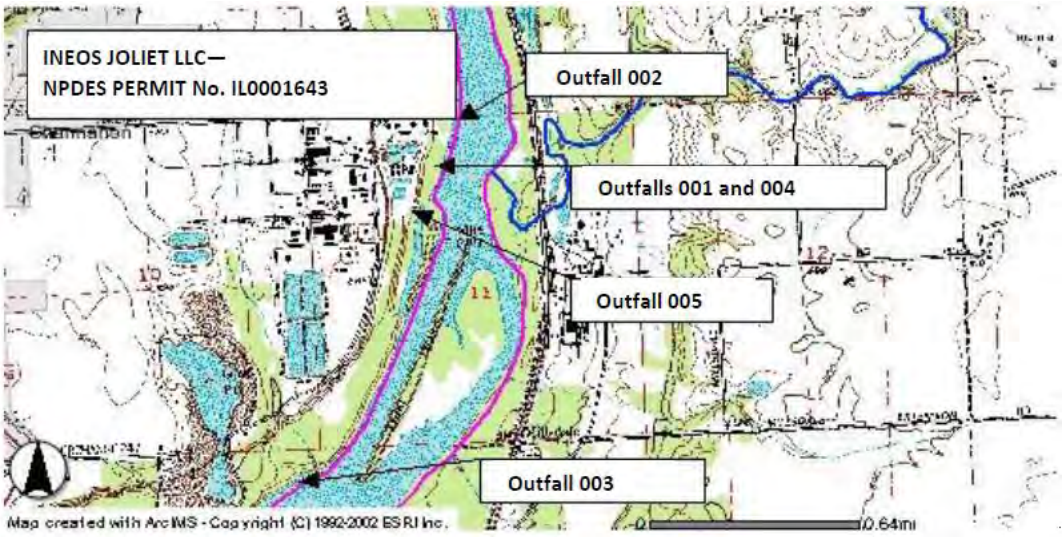
The second contributor to Outfall 001 is the discharge from the treatment of clean water utility streams from various facility processes. Clean water utility streams include cooling tower blow down, boiler blowdown, water filter backwash, and reject water from the reverse osmosis and filtration systems. This process consists of a storage tank and anthracite filters. The long-term average flow for the combined utilities water is 0.3 MGD (0.46 cfs).

The site has three cooling towers (CU401, CU402, and CU403). CU401 has a 12,000 gpm capacity and supplies cooling water to the utilities unit and IPA oxidation. CU402 has a 16,800 gpm design capacity and supplies cooling water to the utilities unit, IPA purification, MAN unit, and Air Products. CU403 has an 8,400 gpm capacity and supplies cooling water to the TMA unit. The cooling water is used to remove heat from process streams in heat exchangers. The cooling water from the basin of each tower is circulated by pumps to the distribution system that supplies the users at the plant. The warm cooling water is returned to the top of the cooling towers, where it is distributed evenly across each cell by spray nozzles and cascades down through the tower's packing. Blowdown occurs on an as-needed basis to maintain tower performance.

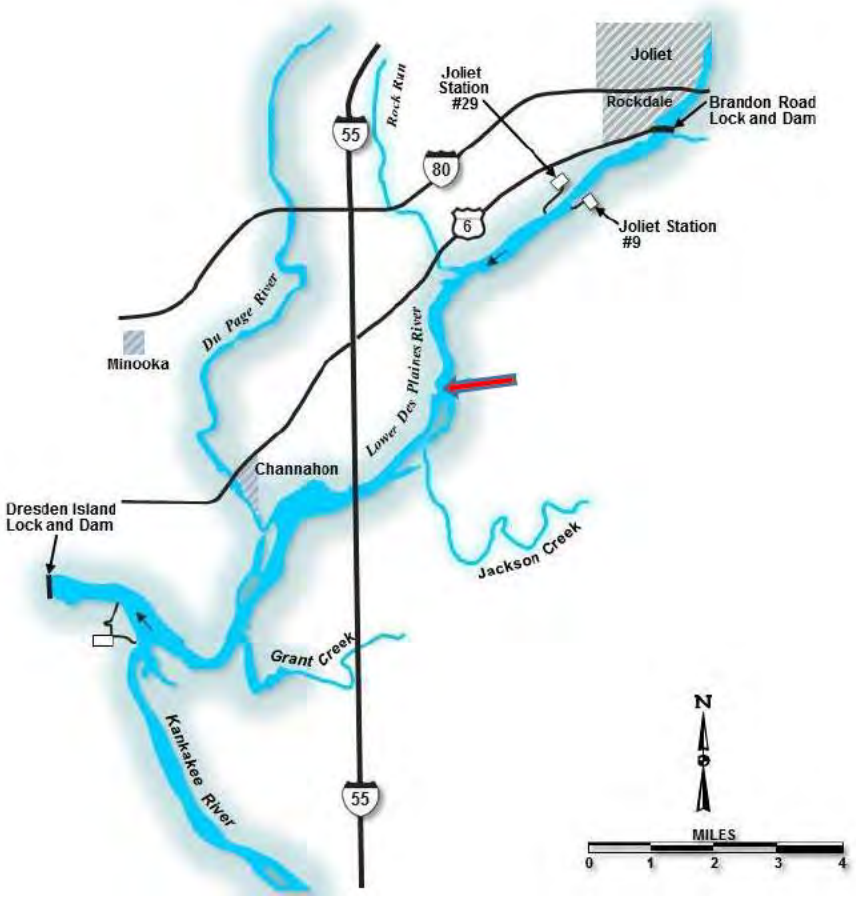
The thermal component of the INEOS discharge goes through Outfall 001. The Design Maximum Flow (DMF) through this outfall is 2.8 MGD (4.3 cfs), with a Design Average Flow (DAF) of 2.318 MGD (3.6 cfs) and a Long-Term Average (LTA) Flow of 1.22 MGD (1.9 cfs). The discharge flows underground in a 275-ft. linear 24" high-density polyethylene (HDPE) pipe to a concrete revetment-lined channel (i.e. discharge structure), which is located on the right descending bank of the LDPR at approximately River Mile 280. The temperature monitor for this discharge is located at the head of the pipe, prior to combining with the Outfall 004 flow.

INEOS' Outfall 004 is the effluent from the sanitary sewer system, which includes an aerobic and clarification process. This process contributes approximately 6 gpm of flow to the river.

Photos of the discharge point, along with a site location map, are included below for reference.



Location of INEOS Joliet Facility on the LDPR—River Mile 280.3



Aerial and Ground Level Views of INEOS Thermal Discharge

2.3 NARRATIVE SUMMARY OF INEOS DISCHARGE TEMPERATURES

INEOS had not been required to monitor for temperature in its prior NPDES permits, as it had no reasonable potential to exceed the former Secondary Contact thermal limits applicable to the LDPR prior to the implementation of the UDIP standards. Discharge Monitoring Report (DMR) temperature data has been submitted since October 2020 for Outfall 001. Since the UDIP standards have been stayed for INEOS due to the TLWQS variance filing, there have been no instances of non-compliance with the interim standards in place (i.e. Secondary Contact).

Temperature monitoring data collected by INEOS has been reviewed for the facility for the past six years (2016-2021) and is provided in Appendix 2, Table 1A of this document. The maximum daily average temperature for Outfall 001 during the past six years was 94.5°F, which occurred in May 2020, and July 2021. The corresponding hourly maximum temperature was 97.8°F, which occurred in August 2021 (Table 1B). The minimum daily average temperature during the same time period was 71.9 °F in November 2017. The minimum hourly measured temperature was 34.0°F in December 2018. The long-term annual average discharge temperature for the six-year period for Outfall 001 was 79.1 °F. The average temperature during the winter months (December through March) was 75.3 °F. The non-winter month (April-October) average temperature for the six-year period reviewed was 81 °F.[5]

Over this same six-year period (2016-2021), the average annual flow from Outfall 001 was 2.4 cfs, and remained relatively consistent on both a monthly and inter-annual basis (Appendix 2, Table 2). The monthly maximum flow average for the same time period was 3.1 cfs (Appendix 2, Table 3). Outfall 001 average flow for 2016-2021 was only 56% of the DMF of 2.8 MGD (4.3 cfs) and contributed only 0.07% of the corresponding long-term monthly average flow of the LDPR, as measured at the Brandon Road Lock and Dam (Appendix 2, Tables 4 and 5). The DMF flow is also less than 0.3% of the published 7-day, 10-year low flow for this portion of the LDPR (1,493 cfs).[6] Therefore, the overall thermal contribution from the INEOS discharge remains insignificant, as originally discussed in the MG Demonstration in Appendix D (MG Exhibits D-2a and D-2b).

2.4 THERMAL DISCHARGE INTERACTION WITH EXISTING WATERWAY IMPAIRMENTS

The stream segment of the UDIP directly adjacent to the INEOS thermal discharge (G-12) has been designated as impaired for fish consumption due to the presence of polychlorinated biphenyls (PCBs) and mercury. This has been documented in IEPA's Integrated Water Quality

[5] It should be noted that prior to October 2020, INEOS was not required to monitor or report outfall temperature as part of its NPDES permit. Therefore, the temperatures reviewed for this demonstration are reflective of daily average maximum values, which is what INEOS had been documenting for internal purposes. However, hourly maximum values were also available, so both sets of data are provided in Tables 1A (daily average maximums) and Table 1B (hourly maximums, respectively). For proposed ATEL compliance, INEOS intends to rely on hourly instantaneous measurements for permit-related monitoring and compliance purposes.

[6] https://www.ideals.illinois.edu/bitstream/handle/2142/100099/Map-2-Northeastern-Illinois-Streams-200302.pdf?sequence=2&isAllowed=y (ISWS 1993).

Report and included as a "medium" priority on the Section 303(d) List for many years, including the recently issued draft 2020/2022 list, as well as listings dating back to 2002 (period of record reviewed in MG Demonstration). Prior identified potential sources of this impairment include contaminated sediments and atmospheric deposition. The draft 2020/2022 report does not list potential sources for any identified contaminants.[7]

There is no evidence to suggest that past or expected future MG or INEOS thermal discharges had or will have any impact on the existing impairment levels in the UDIP. Temperature has never been identified as either a cause or source of impairment in any current or prior 303(d) listing for the UDIP, or downstream waterway segments.

2.5 HYDROLOGY

The navigational river system from Chicago to the Mississippi River is collectively known as the Illinois Waterway, while the portion from Chicago to the headwaters of the Illinois River is known as the Upper Illinois Waterway (UIW). The Lockport Controlling Works (LCW) is the single flow outlet control for the Chicago Area Waterway System (CAWS). All flow from the CAWS's approximately 738 square-mile watershed discharges from the Chicago Sanitary Ship Canal (CSSC) to the upper Des Plaines River north of the City of Joliet. The confluence with the CSSC is 1.1 miles downstream of the Lockport Lock and Dam, at which point it is referred to as the LDPR. The LDPR then extends downstream approximately 17 river miles to its confluence with the Kankakee River at River Mile 273, forming the headwaters of the Illinois River. From the headwaters to the confluence with the Mississippi River in Grafton, Illinois, the Illinois River drains 43% of the state of Illinois. INEOS is located within the UDIP of the UIW at River Mile 280.3, approximately 4.5 miles downstream from the MG Joliet Stations.

The Illinois Waterway flows 327 miles through eight navigational pools from Lake Michigan to the Mississippi River. The Brandon Road Lock and Dam is directly upstream of the MG Joliet Stations at RM 286 and controls both the flow and the navigational traffic entering the Dresden Island Pool of the LDPR. Since the upstream Brandon Pool is only five river miles long and accepts drainage from the much larger Lockport Pool (total length of 36.2 river miles), flows in the UDIP/Five-Mile Stretch are largely controlled and manipulated by operation of the LCW in order to prevent flooding and also to maintain navigational depth.

Flows in the UDIP/Five-Mile Stretch are derived principally from three sources: discharge from Chicago area storm drains and wastewater treatment plants, regulated flow diversion from Lake Michigan, and runoff from its 1,500 square mile drainage area. The drainage area of the Des Plaines River in Illinois is 1,320 square miles. Twelve major waterways contribute to the UDIP/Five-Mile Stretch. At 341 square miles, the drainage area of the CSSC is the largest of any of the tributaries.

[7] https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Pages/303d-list.aspx (Bottom of p.3--main report).

The CSSC base flow is dominated by the treated and partially treated effluents from several Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) wastewater reclamation plants and by many combined sewer overflow (CSO) points located throughout the metropolitan area that discharge into the CAWS and ultimately the UDIP/Five-Mile Stretch. Consequently, the environmental potential for the UDIP/Five-Mile Stretch has been historically limited. Improvements in wastewater treatment and stormwater containment have been made over the past several decades, including completion of portions of the MWRDGC's Tunnel and Reservoir Project (TARP), which has lessened the frequency and magnitude of CSO releases. However, there are still frequent precipitation-induced CSO events, as well as moderately heavy barge traffic and unnatural flow manipulations, which present ongoing challenges to the indigenous aquatic community of the UDIP/Five-Mile Stretch.

The UDIP near Joliet Stations 9 and 29 and INEOS has a normal flat pool level of approximately 505 feet above mean sea level (msl), but varies considerably, as the level reflects upstream manipulations of the CSSC that are frequently made to minimize flooding in the Chicago metropolitan area. Lowering upstream canal levels provides additional capacity to handle stormwater that flows into the canal system, either via run-off or from the large number of CSO inflow points located throughout the metropolitan Chicago area. Abrupt, pronounced, and frequent fluctuations on the order of three to five feet, or more, are most common in the CSSC during or immediately preceding rainfall events. The magnitude of these fluctuations attenuates as they flow into the UDIP/Five-Mile Stretch, but the disruption to the aquatic community is still measurable and, at times, significant (MG Appendix A).

Mean annual flow in the UDIP/LDPR for years 2016-2021, as measured by the U.S. Army Corps of Engineers (USACE) at the Brandon Road Lock and Dam (RM 286), was 3,959 cfs (Appendix 2, Table 4). The 7-day 10-year low flow for this portion of the LDPR is 1,493 cfs. This low flow is largely based on design flow of the three large publicly owned treatment works (POTW) that discharge into the upstream CAWS, and essentially dictate the base flow of the system, especially during the winter. There is some additional flow coming into the UDIP from Hickory Creek, immediately upstream of the Joliet Stations, which also conveys treated and at times untreated POTW effluent from the City of Joliet (MG Appendix A).

2.6 HYDROTHERMAL ANALYSIS

At the request of IEPA, an analysis was performed by MG as part of the hydrothermal modeling effort for the MG Demonstration to determine whether there would be any potential thermal influence from the operation of the Joliet Stations under the proposed AELs on the ability of INEOS (as well as two other identified downstream thermal dischargers) to comply with the UDIP thermal standards. Using available site-specific data and applying the results of the downstream modeling of temperature distribution under a range of modeled MG Joliet Stations operating scenarios, the analyses indicated that only under extreme circumstances, which are expected to occur only approximately once per decade, could INEOS experience compliance concerns due to upstream ambient temperatures influenced by the Joliet Stations' thermal plumes. One of the downstream dischargers would be unimpacted, due to their current end-of-pipe compliance requirements, as specified in their NPDES permit. Detailed results of this

analysis were provided in MG Appendix D and associated Exhibits. It is important to note that the MG analysis of the INEOS thermal discharge was premised on the assumption that a mixing zone would be allowed to meet the applicable thermal limits. However, upon the granting of the MG ATELs, IEPA indicated that it did not believe it could allow INEOS a mixing zone in which to meet the UDIP limits. As a result, end-of-pipe compliance could not be consistently assured, thereby leading to the need for INEOS to request coverage under the MG ATELs and request to be allowed a mixing zone as part of its relief under §316(a).

Additional flow-based compliance analyses to support the INEOS ATEL request are included in Appendix 4 of this document.

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3. COMPONENTS FOR A COMPLETE DEMONSTRATION TO SUPPORT APPLICATION FOR ALTERNATIVE THERMAL EFFLUENT LIMITS

In accordance with Section 106.1120(b) of the Illinois Subpart K thermal variance regulations, the petitioner (INEOS) has specified the nature and extent of the following types of information constituting the required DSP. Correspondingly, INEOS incorporates by reference the MG §316(a) Demonstration, as it includes all of the required studies and detailed information that allowed the MG ATELs to be approved by the Board. Specific topics outlined in Section 106.1120 (b) through (e) are referenced below to the pertinent sections of the MG Joliet Stations #9 and #29 §316(a) Demonstration submitted on 30 December 2019 in PCB 20-38/39.

3.1 BIOLOGICAL, HYDROGRAPHICAL, AND METEOROLOGICAL DATA (SECTION 106.1120(b)(1))

Biological Data

December 2019 Summary Document:
Section 5—Representative Important Species Rationale, and
Section 6—Biotic Category Rationale

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX B: Biothermal / Prospective Assessment
APPENDIX C: Retrospective Assessment
APPENDIX E: Data Collection Programs
APPENDIX F: 2016 Upper Illinois Waterway Fisheries Investigation
APPENDIX G: 2017 Upper Illinois Waterway Fisheries Investigation
APPENDIX H: 2018 Upper Illinois Waterway Fisheries Investigation
APPENDIX J: Summary of Upper Dresden Island Pool Fisheries Data Collected Following Operational Changes at Joliet Stations 9 and 29, 2017-2018
APPENDIX L: 2017-2018 Benthic Macroinvertebrate Assessment of the Des Plaines River

No new studies or information are being submitted by INEOS in order to obtain approval for coverage under the MG ATELs.

Hydrographical Data

December 2019 Summary Document:
Section 2—Engineering and Hydrological Summary

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX D: Station Operations and Hydrothermal Analysis
APPENDIX I: Previously Conducted Joliet Stations 9 and 29 Thermal Plume Surveys and Associated Documentation

No new studies or information are being submitted by INEOS in order to obtain approval for coverage under the MG ATELs.

Meteorological Data

December 2019 Summary Document:
Section 2—Engineering and Hydrological Summary

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX D: Station Operations and Hydrothermal Analysis

No new studies or information are being submitted by INEOS in order to obtain approval for coverage under the MG ATELs.

3.2 PHYSICAL MONITORING DATA (SECTION 106.1120(b)(2))

December 2019 Summary Document:
Section 2—Engineering and Hydrological Summary

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX D: Station Operations and Hydrothermal Analysis
APPENDIX E: Data Collection Programs
APPENDIX I: Previously Conducted Joliet Stations 9 and 29 Thermal Plume Surveys and Associated Documentation

In addition, a summary of the past six years of INEOS discharge temperature data has been provided for Outfall 001, along with associated outfall flows and corresponding flows in the LDPR. This data supports the original conclusion reached in the MG Demonstration that there is no significant contribution of heat from the INEOS discharge which would negatively impact the overall thermal regime of the waterway. (See Appendix 4 of this document).

INEOS has not collected any other temperature-related field measurements or performed additional thermal studies to support its request for coverage under the approved MG ATELs, other than the summary of thermal discharge and flow data discussed above and presented in Appendix 2 of this document. During the 10 December 2021 Early Screening discussion, IEPA indicated that it did not believe any further studies would be required. Agency approval of the INEOS DSP (13 March 2022 Letter—included in Appendix 1) confirms this understanding.

3.3 ENGINEERING OR DIFFUSION MODELS (SECTION 106.1120(b)(3))

Modeling in support of the MG §316(a) Demonstration is detailed in MG Appendix D and covered the entire UDIP. Additionally, the MG modeling exercise included consideration of the three downstream dischargers, including INEOS (MG Appendices D-2a and D-2b).

INEOS has employed the same mass-balance approach used in the MG Appendix D-2b analysis to determine compliance with the MG ATELs under varying flow and temperature conditions. As such, no complex modeling was necessary or required. The volume of flow that the INEOS thermal discharge contributes is extremely low in proportion to the flow of the LDPR, such that it has no appreciable impact on the ambient water temperature of the river. In Appendix 4, the application of a simple mass-balance model has been made to estimate the effect of mixing on the INEOS thermal discharge, which in turn demonstrates the need for a mixing zone to ensure continuing compliance with the MG ATELs. (This is the same modeling approach used in the MG Demonstration for the three downstream dischargers, as well as that currently used by the two MG Joliet Stations to document on-going compliance with the near-field ATELs).

3.4 LABORATORY STUDIES (SECTION 106.1120(b)(4))

No new laboratory studies were proposed or reviewed for the INEOS §316(a) Demonstration. Any prior referenced laboratory work in the MG Demonstration document, primarily related to RIS thermal endpoints and the determination that the MG ATELs remain protective, is hereby incorporated by reference (See MG Demonstration Summary Document – Section 4, and Appendix B).

3.5 REPRESENTATIVE IMPORTANT SPECIES (SECTION 106.1120(b)(5))

Given the number of species that compose the fish community in the UDIP, it is not feasible to fully evaluate every species that could be affected; therefore, consistent with the Interagency Guidance Manual, selected Representative Important Species (RIS) were used to characterize and assess the potential effects of the thermal discharges on important life history functions (e.g., migration, reproduction, growth, performance, and survival). The RIS were selected as representative of the BIC that currently exists in the vicinity of the MG Joliet Stations and INEOS, or could exist with other improvements in water quality that might result from the revised water quality standards implemented as result of the Use Attainability Analysis (UAA) for the LDPR.

The same representative important species (RIS) selected for the MG/Joliet Stations §316(a) Demonstration (see table below) are applicable to INEOS because INEOS discharges into the same waterbody that is covered by the approved MG ATEL. This is also in accordance with the request to rely on the PCB 20-38/39 record in its entirety to support coverage under the MG UDIP ATEL for INEOS.

Acknowledging that it is not possible, feasible, or necessary to evaluate every species in a receiving water body, the USEPA 1977 §316(a) document[8] provided guidance for selection of RIS to be used for evaluating the effects of thermal discharges on the balanced, indigenous community. The selected species should be representative of specific components of the aquatic community including:

[8] Draft Interagency §316(a) Technical Guidance Manual and Guide for Thermal Effects Sections of Nuclear Facilities Environmental Impact Statements. 1977 (Technical Guidance Manual)

- Target species of commercial or recreational fisheries
- Nuisance species
- State or federally listed threatened or endangered species
- Species important to the trophic structure/food chain
- Forage species
- Top level predatory species
- Thermally sensitive species.

This was the selection process used by MG for the RIS list that was approved by the Agency for consideration in the ATEL Demonstration process and, as such, remains entirely applicable for INEOS. In accordance with Section 106.1120 (c), the species mentioned in the Aquatic Life Use Standards for the Upper Dresden Island Pool (Largemouth Bass, Bluntnose Minnow, Channel Catfish, Orangespotted Sunfish, Smallmouth Bass, Shorthead Redhorse and Spottail Shiner)[9] are well-represented by the RIS selected by MG to represent the fish community of the UDIP for the ATEL analyses performed.

The only update to this RIS list is that since the MG case was originally filed in 2019, the Banded Killifish (*Fundulus diaphanus*) is now recognized as two sub-species by the IDNR: the Eastern Banded Killifish (*Fundulus diaphanus diaphanus*), which is not threatened or endangered, and the Western Banded Killifish (*Fundulus diaphanus menona*), which is state-threatened. [10] The Eastern (non-listed) form has been confirmed as the subspecies found in the UDIP and it should therefore be removed from consideration as an RIS under the INEOS §316(a) Demonstration. (This change does not in any way influence the overall outcome of any of the studies done to support approval of the MG ATELs).

[9] From 35 Ill. Adm. Code 303.230 Upper Dresden Island Pool Aquatic Life Use Waters, part (a); (Source: Added at 38 Ill. Reg. 5517, effective February 13, 2014)

[10] https://www2.illinois.gov/dnr/ESPB/Documents/ET%20List%20Review%20and%20Revision/IllinoisEndangeredandThreatenedSpecies.pdf

Representative Important Species (RIS) for the Upper Dresden Island Pool of the Lower Des Plaines River

Species	Abundant	Commercial[a]	Recreational[b]	Nuisance	Threatened and Endangered	Forage	Predator	Sensitive
Gizzard Shad	X					X		
Emerald Shiner	X					X		
~~Banded Killifish**~~					~~X~~			
Redhorse			X		X			X
White Sucker								X
Common Carp	X			X				
Channel Catfish			X					
Bluegill	X		X				X	
Largemouth Bass	X		X				X	
Freshwater Drum		X					X	

a. No commercial fishing currently takes place in this waterway.
b. Recreational fishing occurs; however, due to the presence of legacy contaminants, there is a long-standing fish consumption advisory.
**Eastern sub-species delisted by IDNR in May 2020

A detailed discussion on the RIS selection process for the UDIP is contained in the MG §316(a) Demonstration document in PCB 20-38/39, MG Appendix B, Section 2.4, pages B-7 through B-17.

3.6 OTHER RELEVANT INFORMATION (SECTION 106.1120(b)(6))

Section 106.1120 (d) states that *"(t)he petitioner shall provide any additional information or studies that the Agency subsequently determines necessary to support the alternative thermal effluent limitation demonstration, including such field or other studies as may be necessary to select representative important species."*

As discussed in prior sections, the Agency has already determined that no additional information or studies are necessary in order to support the INEOS alternative thermal effluent limitation demonstration.

Section 106.1120 (e) states that *"(i)n making the alternative thermal effluent limitation demonstration, the petitioner shall consider any information or guidance published by USEPA to assist in making such demonstrations."*

In cooperation with the Atomic Energy Commission (predecessor to the Nuclear Regulatory Commission), the USEPA developed the *Draft Interagency §316(a) Technical Guidance Manual and Guide for Thermal Effects Sections of Nuclear Facilities Environmental Impact Statements* (1977) ("Technical Guidance Manual"). Although the Technical Guidance Manual has not been finalized, it remains the primary guidance for preparation of §316(a) Demonstrations to support a request for a variance from thermal standards in NPDES permits for electric generating stations. The Technical Guidance Manual presents several approaches for developing a complete Demonstration: Retrospective, Predictive, and a "combined" approach.

Development of the MG §316(a) Demonstration relied upon the original 1977 USEPA guidance document, providing both Retrospective and Predictive analyses to show no appreciable harm to the BIC from the prior thermal water quality standards (i.e. Secondary Contact), as well as the proposed MG ATELs. Therefore, INEOS intends to rely on the Board's review and approval of the MG §316(a) Demonstration in this regard, as it would equally apply to a request for coverage under the granted MG ATELs for the UDIP.

3.7 MG ANALYSIS OF DOWNSTREAM DISCHARGERS

At the request of IEPA, an analysis was performed as part of the hydrothermal modeling effort for the MG Demonstration to determine whether there would be any potential thermal influence from the operation of the Joliet Stations under the proposed MG AELs on the ability of three identified downstream thermal dischargers to comply with the UDIP thermal standards. Using available site-specific data and applying the results of the downstream modeling of temperature distribution under a range of modeled MG Joliet Stations operating scenarios, the analyses indicated that only under extreme circumstances, which are expected to occur only approximately once per decade, two of the three downstream dischargers could experience compliance concerns due to upstream ambient temperatures influenced by the Stations' thermal plumes. One of the downstream dischargers would be unimpacted, due to their current end-of-pipe compliance requirements, as specified in their NPDES permit. Detailed results of this analysis are provided in MG Demonstration Appendix D and associated Exhibits.

The downstream discharger analysis for INEOS (then Flint Hills Resources) showed that the facility's thermal discharge would not be expected to have any appreciable impact on main river temperatures, due to its small overall volume in relation to river flow. The MG downstream discharger analysis assumed that INEOS would be granted a mixing zone in which to meet the applicable thermal standards. However, during the Early Screening discussion with IEPA in December 2021, INEOS learned that it would **not** be allowed a mixing zone in which to meet the applicable limits (either the UDIP or MG ATEL numerics), due to the approval of the MG ATEL for the UDIP (per Section 302.102(b)(9)). Since a mixing zone is allowed as part of the MG ATELs, INEOS is pursuing coverage for both the numeric and mixing zone provisions[11] of the MG ATEL in order to ensure on-going thermal compliance**.**

[11] Note that while INEOS is requesting a mixing zone in which to meet the MG ATELs, the volume of flow requested for the INEOS mixing zone is much reduced from that allowed for the two MG Joliet Stations. (See Section 5.3 and Appendix 4 of this document for more details).

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4. OVERVIEW OF BOARD FINDINGS FOR THE MG DEMONSTRATION

This Section summarizes the Board findings in support of the MG §316(a) Demonstration for thermal alternative effluent limitations (AELs) to take the place of the numerical and certain narrative provisions of 35 Ill. Adm. Code §302.408(c) through (f), (h) and (i), which became effective on July 1, 2018. The MG Demonstration was prepared in accordance with Subpart K, consistent with 40 CFR 125.70-125.73 and the Technical Guidance Manual (cited below by the Board as "USEPA 316(a) Manual").

Under §316(a), the proposed thermal AEL must, *"assure the protection and propagation of a balanced, indigenous community* (BIC) *of shellfish, fish, and wildlife in and on the body of water into which the discharge is made"* (USEPA and NRC 1977). 35 Ill. Admin. Code 106.1110 and 40 CFR Subpart H both identically define the BIC as the *"biotic community typically characterized by diversity, the capacity to sustain itself through cyclic seasonal changes, presence of necessary food chain species, and by a lack of domination by pollution tolerant species."*

All of these Board findings provide support for the application of the MG ATELs to the INEOS thermal discharge.

Biotic Category Identification

The Board findings on biotic category criteria that assure the protection and propagation of the UDIP BIC are provided below in the order in which they appear in the PCB 20-38/39 Order and Opinion issued on 8 July 2021, with appropriate page numbers. Six biotic categories were assessed in the MG Demonstration: habitat formers (aquatic vegetation), phytoplankton, zooplankton, macroinvertebrates and shellfish, fish, and other vertebrate wildlife.

Habitat Formers (p. 119): "*MG's demonstration shows that the proposed thermal discharges: (1) will not result in deterioration of habitat formers so as to cause appreciable harm to the balanced, indigenous community of fish or mussels; and (2) will not adversely impact threatened or endangered species due to impact on habitat formers. In light of these factors, the Board finds that MG's Section 316(a) Demonstration meets the decision criteria for habitat formers at sites that are not low potential impact areas*. *See* USEPA 316(a) Manual at 22."

Phytoplankton (p. 120): "*The Board finds that MG's 316(a) demonstration shows that the proposed thermal discharges are not likely to: (1) result in a shift toward nuisance species of phytoplankton; (2) alter the indigenous community from a detrital-based to phytoplankton-based system; and (3) cause appreciable harm to the balanced indigenous population resulting from phytoplankton community changes. Thus, the Board finds that MG's Section 316(a) demonstration meets the decision criteria for phytoplankton at sites that are not low potential impact areas. See USEPA 316(a) Manual at 18."*

Zooplankton (p. 120*): "The Board finds that MWG's 316(a) Demonstration shows that: (1) changes in zooplankton and meroplankton will not result in appreciable harm to the balanced, indigenous community of fish and shellfish; (2) the heated discharge is not likely to alter the standing crop or relative abundance of zooplankton; and (3) the thermal plume is not a lethal barrier to free movement (drift) of zooplankton. Thus, the Board finds that MG's Section 316(a) demonstration meets the decision criteria for zooplankton at sites that are not low potential impact areas. See USEPA 316(a) Manual at 21".*

Macroinvertebrates and Shellfish (p. 121): *"The demonstration shows that the lack of a diverse benthic macroinvertebrate and mussel community near the Joliet Stations is due to limitations related to habitat, and modified physical/hydrological characteristics of the waterway rather than the thermal discharges. Thus, the Board finds that MWG's Section 316(a) Demonstration shows that any measurable reduction of standing crop of shellfish and macroinvertebrates is not likely to: cause appreciable harm to balanced indigenous populations; or interfere with maintenance or critical, seasonal, life cycle of mussels or benthic macroinvertebrates. USEPA 316(a) Manual at 23-25."*

Fish (p. 121-122): *"…(T)he Board finds that MWG's requested alternative thermal effluent limitations will protect the balanced, indigenous fish communities in the UDIP and the Five-Mile Stretch. Accordingly, the Board finds that MWG's Section 316(a) Demonstration meets the criteria for a site that is not a low potential impact area for fish. MWG has demonstrated that (1) there will be no direct or indirect mortality from cold shock; (ii) there will be no direct or indirect mortality from excess heat; (iii) there will be no reduced reproductive success or growth due to the heated discharge; (iv) there will not be exclusion from unacceptably large areas; and (v) there will not be blockage of migration due to the thermal discharge."*

Other Vertebrate Wildlife (p. 122): *"The Board finds that the UDIP near the Joliet Stations' mixing zones is a low potential impact area for other vertebrate wildlife. Further, the Board finds that MG's demonstration meets the decision criteria for low potential impact areas by showing that the thermal plume does not harm any important, threatened, or endangered populations of vertebrate wildlife, including migratory birds."*

The Board findings on MG's Master Rationale (p.122) were as follows:

*"*The Board notes that the decision train in the USEPA 316(a) Manual provides steps to ensure that the demonstration is complete; required data has been submitted; the studies justify the conclusions for each of the biotic category criteria; the information shows the representative important species will not suffer appreciable harm; the engineering and hydrological data justify the conclusions for the Master Rationale; technical experts were consulted that include other government agencies; and the information is not negated by outside evidence. USEPA 316(a) Manual at 16–17, 70. Through its Type I Retrospective/Absence of Prior Appreciable Harm and Type II Predictive/Representative Important Species Demonstrations, MG has addressed each of the following biotic category criteria for a demonstration to be judged successful. App. C at C-43; see Pet. at 26; Exh. A at 4-11.*"*

To support the issuance of thermal AELs, the applicant may use predictive methods, or in the case of an existing facility, use studies to demonstrate the absence of prior appreciable harm. The MG Demonstration employed both methods. The retrospective evaluation based on many years of monitoring data demonstrating that the past and existing operations of Joliet Stations 9 and 29 have not caused prior appreciable harm to the BIC were presented in Appendix C of the MG Demonstration. Hydrothermal surveys and modeling of the Joliet Stations' thermal discharges in the UDIP were performed (MG Appendix D) to support a detailed assessment that predicted no adverse harm from the potential effects of the two thermal discharges on selected RIS (MG Appendix B).

In a §316(a) Demonstration, the standard used in the assessment of the thermal component of facility water discharges is whether a BIC of shellfish, fish, and wildlife has been and will be maintained in or on the receiving water body despite the thermal discharge. Consistent with the Technical Guidance Manual, the standard—protection of the BIC—is satisfied if the following are met:

1. There have been no substantial increases in abundance or distribution of any nuisance species or heat-tolerant community;

2. There have been no substantial decreases of formerly abundant indigenous species other than nuisance species;

3. There had been no elimination of an established potential economic or recreational use of the waters;

4. There have been no reductions in the successful completion of life cycles of indigenous species, including those of migratory species; a safe zone of passage is maintained;

5. There have been no substantial reductions of community heterogeneity or trophic structure;

6. There have been no adverse impacts on threatened or endangered species;

7. There has been no destruction of a unique or rare habitat; and

8. There have been no detrimental interactions with other pollutants, discharges (including biocides), or water-use activities.

The MG Demonstration successfully addressed each of the above criteria. The Board concurred with MG's findings and provided the following determination (p.125-126 of 8 July 2021 Board Order in PCB 20-38/39):

"…(T)he Board finds that MG's 316(a) Demonstration successfully addresses each of the elements of the Master Rationale outlined in the USEPA 316(a) Manual. See USEPA 316(a)

Manual at 70–71. Specifically, for the alternative thermal effluent limitations in the order below, the Board finds that MG's demonstration shows the following: (1) due consideration of the requisite steps in the USEPA 316(a) Manual's "decision train"; (2) there will be no appreciable harm to the balanced, indigenous community; (3) receiving water temperatures will not be in excess of the upper temperature limits for the life cycles of the representative important species; (4) the absence of the proposed thermal discharge would not result in excessive growth of nuisance organisms; (5) a zone of passage provides for the normal movement of representative important species; (6) there will be no adverse impact on threatened or endangered species; (7) there will be no destruction of unique or rare habitat, and (8) there will be no use of biocides and therefore biocides will not result in appreciable harm to the balanced, indigenous community."

5. PROPOSED INEOS COVERAGE UNDER MG ATELs

5.1 BACKGROUND

The UDIP of the LDPR, which is the receiving stream for the MG Joliet Station 9 and Joliet Station 29 thermal discharges, as well as the INEOS thermal discharge, had formerly been classified as a Secondary Contact and Indigenous Aquatic Life water under 35 Ill. Adm. Code 303.441. These Secondary Contact waters were regulated by a set of water quality limitations that were less stringent than the General Use limits that applied to most of the waters in the state, due to the inherent limitations of the system, as discussed in Appendices A and C.

The Secondary Contact and Indigenous Aquatic Life Standards applied to portions of the Chicago, Calumet, and LDPR drainages that were altered—in various stages during the mid-1800s into the mid-1900s—to promote commercial navigation and to stop untreated sewage from flowing into Lake Michigan. These waters remain impacted by hydrologic modification, alteration in flow, and stormwater and wastewater discharges from the urban development of the Chicago area. Since the adoption of the Secondary Contact and Indigenous Aquatic Life Standards in the 1970s, water quality has improved as the result of point-source discharge controls, as well as related wastewater control technology advances by publicly owned treatment works, which sparked consideration for revising the applicable uses and standards.

As the result of two use attainability analyses (UAAs) conducted by IEPA (one on the LDPR and one on the CAWS), as well as several public hearings, the Board approved and adopted new use designations and definitions for these waterways. In IPCB Docket No. R2008-09(A) Opinion and Order (August 18, 2011), the Board found that the CAWS and LDPR upstream of the I-55 Bridge cannot attain the Clean Water Act recreational use (swimmable) goal, and therefore evaluated the proposed designated uses for the CAWS and LDPR based on their identified existing uses. The UDIP near the Joliet Stations and INEOS was designated as an Incidental Contact Recreation water. 35 Ill. Adm. Code 303.225(h).

On February 6, 2014 (IPCB Docket No. R2008-09(C)) final water quality standards were adopted for the CAWS and Lower Des Plaines watersheds (IPCB Docket No. R2008-09(D)), which became effective 1 July 2015.[12]

As the result of the above proceedings, water quality standards applicable to the UDIP are defined in 35 Ill. Adm. Code 302 Subpart D: Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards. The aquatic life use designation assigned to the UDIP is provided below:

> "Lower Des Plaines River from the Brandon Road Lock and Dam to the Interstate 55 bridge is designated as the **Upper Dresden Island Pool Aquatic Life Use**.

[12] Revised temperature standards were given an effective date three years from the adoption date, with new limitations effective on 1 July 2018.

> These waters are capable of maintaining, and shall have quality sufficient to protect, aquatic-life populations consisting of individuals of tolerant, intermediately tolerant, and intolerant types that are adaptive to the unique flow conditions necessary to maintain navigational use and upstream flood control functions of the waterway system. Such aquatic life may include, but is not limited to, **largemouth bass, bluntnose minnow, channel catfish, orangespotted sunfish, smallmouth bass, shorthead redhorse, and spottail shiner**."
>
> 35 Ill. Adm. Code 303.230(a) (emphasis added).

The UDIP thermal water quality standards (35 Ill. Adm. Code 302.408), which became effective 1 July 2018, and would be applicable to the MG Joliet Stations 9 and 29 thermal discharges as well as the INEOS thermal discharge, are summarized below:

Section 302.408 Temperature

a) *[Applicable to the South Fork of the South Branch of the Chicago River only]*.

b) The temperature standards in subsections (c) through (i) will become applicable beginning July 1, 2018. Starting July 1, 2015, the waters designated at 35 Ill. Adm. Code 303 as Chicago Area Waterway System Aquatic Life Use A, Chicago Area Waterway System and Brandon Pool Aquatic Life Use B, and Upper Dresden Island Pool Aquatic Life Use will not exceed temperature (STORET number (ºF) 00011 and (ºC) 00010) of 34ºC (93ºF) more than 5% of the time, or 37.8ºC (100ºF) at any time.

c) There shall be no abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions.

d) The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

e) The maximum temperature rise above natural temperatures shall not exceed 5°F (2.8°C).

f) Water temperature at representative locations in the main river shall not exceed the maximum limits in the applicable table during more than one percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature exceed the maximum limits in the above table that follows by more than 3.0ºF (1.7º C).

g) [*Section applicable to Use A waters only*].

h) [*Section applicable to Chicago Area Waterway System and Brandon Pool Aquatic Life Use B waters only*].

i) Water temperature for the Upper Dresden Island Pool Aquatic Life Use waters, as defined in 35 Ill. Adm. Code 303.230, shall not exceed the limits in the following table in accordance with subsection (f):

Month	Daily Maximum (°F)
January	60
February	60
March	60
April	90
May	90
June	90
July	90
August	90
September	90
October	90
November	90
December	60

INEOS remains in full compliance with the currently applicable near-field thermal standards (302.408(b)), in accordance with the stay granted as part of the PCB 2016-019/024 proceeding.

The new standards summarized above and that went into effect on July 1, 2018, specifically Sections 302.408(c), (d), (e), (f), and (i), are those for which near-field thermal AELs were sought by MG and granted by the Board through the Subpart K Demonstration process, including applicable zone of passage (ZOP) provisions. <u>These are the AELs that INEOS is requesting coverage under for its thermal discharge to the UDIP</u>**.**

<u>INEOS is not requesting coverage under the granted far-field MG AELs effective below the I-55 Bridge in the LDPR as its overall volume of discharge is too small to effect any thermal impact on these downstream waters</u>**.**

5.2 BURDEN OF PROOF MET FOR ONGOING PROTECTION OF THE BIC

The MG Demonstration was conducted in order to determine if less stringent, site-specific thermal AELs for the Joliet Stations would continue to meet the required §316(a) criteria set forth in Subpart K. As was shown by the studies and analyses provided by MG, there was no evidence that operation of the Stations in accordance with the former Secondary Contact thermal limits, or the identical current interim thermal limits (35 Ill. Adm. Code 302.408(b)) which

became applicable July 1, 2015, have caused appreciable harm to the BIC in the UDIP, or the Five-Mile Stretch. This was true for the period prior to the conversion of both stations from base-loaded, coal fired units to gas-fired peaking units in mid-2016 and remains valid under current and expected future operations. Both the numeric near-field and far-field MG thermal AELs are more stringent than the prior Secondary Contact limits and would likewise not result in any such appreciable harm. In addition, the MG Demonstration provided support to show that the UDIP BIC will be adequately protected, during both the summer and non-summer months, if up to a 3ºF temperature increase above the proposed near-field thermal AELs is allowed for periods of limited duration (up to 5% of the time within a calendar year). Inclusion of the INEOS thermal discharge under the MG ATEL for the UDIP will result in no changes to the above conclusions**.**

5.3 NARRATIVE STANDARDS, ZONE OF PASSAGE, AND MIXING ZONE PROVISIONS

Historically, there has not been a 5°F "above natural temperature" limit (5°F delta T) applied to the UDIP, as is now provided in Section 302.408(e), effective July 1, 2018. These other narratives include Section 302.408(c), which provides that "[t]here shall be no abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions," and Section 302.408(d), which states that "[t]he normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained." 35 Ill. Adm. Code 302.408(c) and (d). Given the modifications to the natural habitat in these waters caused by channelization and locks/dams, even if the historic normal and seasonal temperature fluctuations before the addition of heat could be identified, their application here would not significantly change (or improve) the BIC. Data provided and summarized in the MG Demonstration clearly show that the UDIP/Five-Mile Stretch BIC can be adequately maintained without these narratives in place, as long as the seasonal numeric standards remain protective of the resident aquatic community. The MG ATEL numeric limits were found to meet these criteria for on-going protection of the BIC.

The intention of these narrative standards, ostensibly, is to prevent elevated water temperatures from negatively impacting fish movement and activity in a natural system. Certainly, the argument could be made that the UDIP/Five-Mile Stretch are anything but natural, as discussed above and elsewhere in the MG Demonstration. However, as indicated by the results of the MG hydrothermal modeling effort, as well as years of field studies, the MG Joliet Station 9 and 29 discharges do not create any type of thermal block that cannot be traversed by the indigenous aquatic community, during either summer or winter operations. Considering its small volume of flow in relation to the flow of the LDPR, this conclusion certainly also applies to the INEOS thermal discharge. As such, the BIC protections afforded by the approved MG ATELs (which do not contain the above narrative standards) remain fully adequate for application to the INEOS thermal discharge.

Based on review of historical operating and river flow data, it was determined that a 75% or greater ZOP under the proposed maximum thermal AELs would continue to be available in the UDIP near the MG Joliet Stations 9 and 29, even under the worst-case modeled conditions. This

equates to the allowed use of up to 25% of the available flow in the river for mixing for each facility. However, due to the frequency of erratic flow fluctuations, as well as low flow conditions where the dilution ratio may be less than 3:1, IEPA allows for a 50% ZOP. Therefore, based on the hydrothermal modeling results, both Joliet Stations 9 and 29 thermal discharges were found to be able to meet the existing zone of passage criteria in place[13] under the proposed near-field thermal AELs. At no time would there be an instance when the ZOP would be completely eliminated due to power plant operations (MG Demonstration, Appendix B).

While each of the MG Joliet Stations were granted a mixing zone using up to 25% of the available UDIP flow in which to meet the near-field ATELs (under the provisions of Ill. Adm. Code Section 302.102), the small volume of the INEOS discharge would require a much smaller volume of flow to achieve complete mixing. Therefore, INEOS is requesting that a mixing zone be granted which allows the use of 25% of the 7Q10 flow of the UDIP to maintain compliance with the MG ATELs. Use of a percentage of the 7Q10, instead of real-time flow, is extremely conservative, but still provides sufficient mixing to bring the INEOS discharge temperature down to near-ambient levels. (The scenarios provided in Appendix 4 show that the fully mixed INEOS thermal discharge temperatures are always less than 0.5°F higher than the corresponding upstream ambient temperature of the waterway). Therefore, by granting this mixing zone provision to INEOS, there is no reasonable potential for its thermal discharge to exceed the MG ATELs.

As demonstrated by analysis of the MG thermal discharges in the MG Demonstration, INEOS similarly meets all of the criteria for compliance with the best degree of treatment provisions discussed in 35 Ill. Adm. Code 304.102 (referenced in 302.102(a)). Cooling water from cooling towers is used to remove heat from process streams in heat exchangers. Natural heat loss occurs as the cooling tower blowdown and other clean utility streams pass through the storage tank and anthracite filters before heading to Outfall 001. Similarly, after process wastewater leaves the anaerobic reactor, natural heat loss to the atmosphere results in ambient cooling as the water passes in parallel through four aerobic treatment basins, and then in parallel through three clarifiers, and finally through one air floatation channel before heading to Outfall 001. As a consequence, the volume and temperature of the Outfall 001 discharge flow has been minimized to the extent feasible.

In addition, based on available information in both the MG Demonstration and discussed herein, the INEOS thermal discharge meets all of the other criteria listed in 35 Ill. Adm. Code 302.102 to allow a mixing zone to be granted. This includes the fact that there are no known mussel beds in the vicinity of the INEOS discharge structure that would be impacted by the thermal discharge (See Appendix 5).

[13] Ill. Adm. Code Title 35, Subtitle C, Chapter I, Section 302.102(b)(8).

5.4 SUMMARY OF REQUEST FOR INEOS THERMAL DISCHARGE TO BE COVERED BY APPROVED MG ATELS

Based on the entirely of the MG case record, as well as the site-specific information contained in Appendices 1 through 5 of this document, the following thermal AELs are proposed for application to the INEOS thermal discharge, in lieu of the following provisions contained in Title 35, Subtitle C, Chapter I:

- Proposed MG Near-Field Thermal AELs to replace the UDIP thermal standards in Section 302.408(c), (d), (e), (f), and (i).

- Acknowledgement that the Zone of Passage requirements in Section 302.102(b) are applicable to the INEOS thermal discharge, and that mixing is allowed to meet the applicable numeric MG Near-Field AELs.

Because there is no reasonable potential for the INEOS thermal discharge to raise the temperature of the main body of the LDPR more than 0.5°F over ambient upstream temperature conditions (assuming that the requested mixing zone using 25% of the 7Q10 flow of the LPDR is allowed) and as long as the INEOS Outfall 001 maximum discharge temperature remains at or below 100°F, compliance with the MG ATELs will be maintained for all months of the year. (See Appendix 4 for results of the reasonable potential analysis using worst-case conditions.)

5.5 MG AELS TO BE APPLIED TO THE INEOS THERMAL DISCHARGE

(1) Proposed Numeric Near-Field Thermal AELs for the INEOS Facility:

Month	**UDIP Thermal Standards (Effective 1 July 2018) ** Daily Maximum (°F)**	**Approved MG Near-Field Thermal AELs Daily Maximum (°F) Requested to be applied to INEOS Thermal Discharge**
January	60	65
February	60	65
March	60	70
April	90	80
May	90	85
June	90	93
July	90	93
August	90	93
September	90	93
October	90	90
November	90	85
December	60	70
Excursion Hours	Shall not exceed maximum limits during more than 1% of the hours in the 12-month period ending with any month; at no time shall water temperature exceed the maximum limits by more than 3.0°F	Daily maximum not to be exceeded by more than 5% of the time in a calendar year; at no time shall water temperature exceed the maximum limits by more than 3°F

**In addition to the numeric limits, UDIP Standards also have narrative requirements 304.408 (c), (d), and (e).

(c) There shall be no abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions.

(d) The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

(e) The maximum temperature rise above natural temperatures shall not exceed 5°F (2.8°C).

These proposed near-field thermal AELs are higher than the corresponding UDIP numeric thermal standards for eight months out of the year (January-March, June-September, and

December), equal to the UDIP standards for one month (October), and lower (i.e., more stringent) than the corresponding UDIP standards for three months (April, May, and November).

(2) Water temperature at representative locations in the UDIP shall not exceed the maximum limits listed above for more than 5% of the time in a calendar year. Moreover, at no time shall water temperature exceed the maximum limit by more than 3°F (1.7°C).

(3) Based on the applicable Numeric Near-Field AELs, the INEOS thermal discharge shall maintain a zone of passage pursuant to Section 302.102(b)(6) and shall comply with the required area and volume of a zone of passage in Section 301.102(b)(8).

5.6 INEOS THERMAL COMPLIANCE MONITORING AND REPORTING

The approved MG near-field thermal AEL limits, as applied to the INEOS thermal discharge, would be effective at the edge of the allowed mixing zone. As long as INEOS is provided with an allowed mixing zone using 25% of the 7Q10 flow of the LDPR and the end-of-pipe temperature does not exceed 100°F, the analysis provided in Appendix 4 demonstrates that there is no reasonable potential for the INEOS thermal discharge to exceed the MG ATELs at any time of the year. Therefore, INEOS requests that a 100°F maximum effluent limitation be placed in its new NPDES permit as the means for determining compliance with the MG ATELs in the main body of the LDPR. Adherence to this maximum effluent limit will assure continuing compliance and would not require the on-going use of a thermal model for compliance determination. The reported compliance temperature would be the maximum instantaneous temperature measured at INEOS Outfall 001 during any given month (based on hourly data).

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APPENDIX 1

INEOS Detailed Study Plan and IEPA Approval Letter

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January 28, 2022

VIA CERTIFIED MAIL
(Return Receipt Requested)

Mr. Scott Twait
Illinois Environmental Protection Agency
Bureau of Water #15
1021 North Grand Avenue East
Springfield, Illinois 62702

RE: INEOS Joliet, LLC
Channahon, Illinois
NPDES Permit No. IL0001643
Detailed Study Plan

Dear Mr. Twait:

Enclosed please find a Detailed Study Plan for a §316(a) Demonstration to Support Application of Alternative Thermal Effluent Limits for the INEOS Joliet LLC Facility. Should you have any questions or require additional information, please do not hesitate to contact me.

Respectfully,

Michael P. Murphy

Michael P. Murphy

Enclosure: Detailed Study Plan

cc via email with enclosure:

Scott Twait (Scott.Twait@Illinois.gov)
Sara Terranova (Sara.Terranova@Illinois.gov)

Detailed Study Plan for a §316(a) Demonstration to Support Application of Alternative Thermal Effluent Limits for the INEOS Joliet LLC Facility

(NPDES Permit No. IL0001643)

Prepared for

INEOS Joliet LLC
23425 Amoco Road
Channahon, IL 60410

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
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EA Project No. 16213.01
Version: FINAL
28 January 2022

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TABLE OF CONTENTS

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LIST OF ACRONYMS AND ABBREVIATIONS

ATEL / ATELs	Alternative Thermal Effluent Limit(s)
BIC	Balanced, Indigenous Community
DAF	Design Average Flow
DMF	Design Maximum Flow
DSP or Plan	Detailed Study Plan
EA	EA Engineering, Science, and Technology, Inc., PBC
IDNR	Illinois Department of Natural Resources
IEPA or Agency	Illinois Environmental Protection Agency
INEOS	INEOS Joliet LLC
IPCB or Board	Illinois Pollution Control Board
LDPR	Lower Des Plaines River
LLC	Limited Liability Company
MG	Midwest Generation, LLC
No. (#)	Number
NPDES	National Pollutant Discharge Elimination System
PBC	Public Benefit Corporation
RIS	Representative Important Species
RM	River Mile
TLWQS	Time-Limited Water Quality Standard
UDIP	Upper Dresden Island Pool
UIW	Upper Illinois Waterway
USEPA	United States Environmental Protection Agency

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1. INTRODUCTION

Pursuant to Section 106.1120 of the Illinois Subpart K thermal variance regulations, 35 Illinois Administrative Code §106.1100 et seq. (the "Subpart K Regulations"), this document presents the required Detailed Study Plan ("DSP" or "Plan") for the INEOS Joliet LLC Facility ("INEOS" or "the facility") that will be undertaken to support its alternative thermal effluent limitation ("ATEL") demonstration. The INEOS facility is located on the Lower Des Plaines River ("LDPR") in the Upper Dresden Island Pool ("UDIP") at River Mile 280.3. The applicable water quality standards, including water temperature limits for the UDIP, were recently reviewed and modified by the Illinois Pollution Control Board ("IPCB" or "Board") (IPCB Docket No. 2008-09, Subdocket D). The new thermal standards, which were adopted by the IPCB on 16 June 2015 and codified on 10 July 2015, became applicable on 1 July 2018.

The INEOS situation is somewhat unique, in that it is requesting coverage under a recently approved set of ATELs that were granted to Midwest Generation, LLC ("MG") on 8 July 2021 by the Board in PCB 20-38/39. Therefore, there are no additional "detailed studies" that will be proposed or submitted in support of this request, other than a review of site-specific thermal discharge data that will show that inclusion of the INEOS discharge under the approved MG ATELs will not result in any adverse environmental impact on the balanced indigenous community ("BIC") of the UDIP of the LDPR. All of the prior submitted information and studies that supported the MG §316(a) Demonstration will be incorporated by reference, as opposed to re-sending all the materials. IEPA agreed that this was acceptable and more efficient during discussion with INEOS on 10 December 2021. This will conserve both Agency and Board time and resources since the prior MG-submitted information has already been thoroughly reviewed and found to be fully supportive of the MG ATELs, which, in turn, should allow the INEOS proceeding to advance more quickly towards a final determination to allow its thermal discharge to be covered by these existing ATELs for the UDIP.

Facility Overview

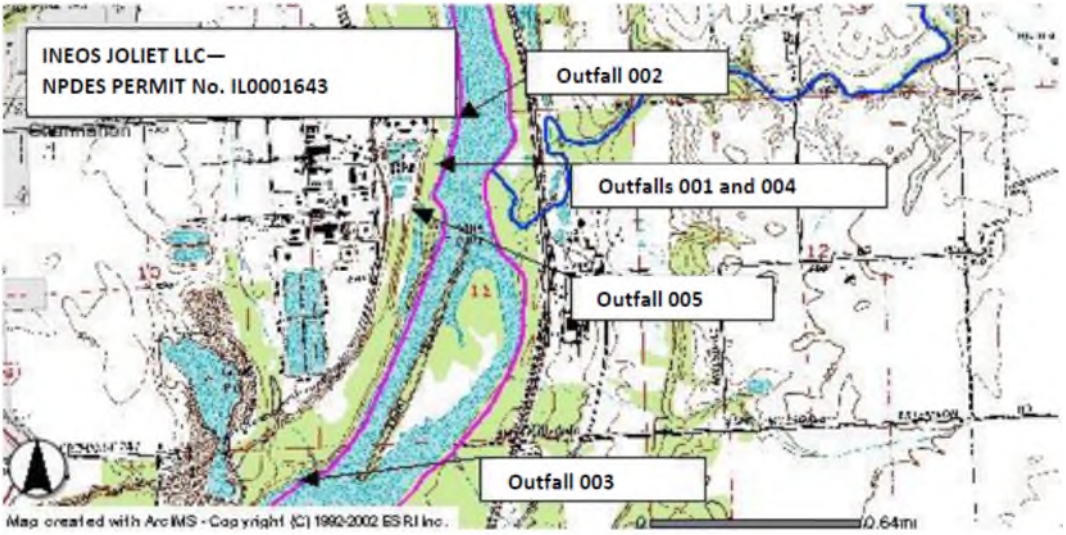
The INEOS Joliet facility is located on a 270-acre tract of land located in Channahon, Illinois. The site is approximately 41 miles Southwest of Chicago and approximately one-mile Southeast of the Route 6 and I-55 intersection. To the immediate East and Southeast of the facility is the LDPR (River Mile 280.3). The facility employs approximately 220 employees, who operate, maintain, and manage the facility, which operates 24 hours a day, 7 days a week.

The facility has three process units which manufacture isophthalic acid, maleic anhydride, and trimellitic anhydride. The facility is configured with separate and distinct production units. The facility also has one utilities unit and one wastewater treatment unit. These units supply process air and steam to the process units as well as treat any wastewater from the process units. The facility also has several maintenance shops, office buildings, and warehouses. Water for facility processes is withdrawn from on-site groundwater extraction wells.

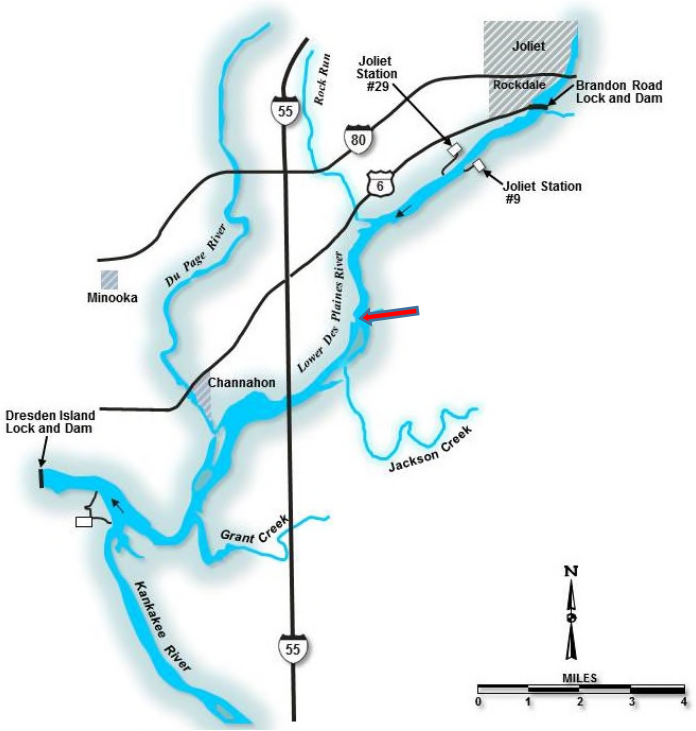
The wastewater discharges from the facility are governed by National Pollutant Discharge Elimination System ("NPDES") permit No. IL0001643 (expiration date: 30 September 2025). Plant operation results in an average discharge of 1.22 million gallons per day ("MGD") of

treated process wastewater, analytical lab waste, fire field waste, impacted groundwater and stormwater, utilities waste, and alternate sanitary waste through Outfall 001; intermittent discharge of stormwater, non-process wastewater, and hydrostatic test wastewater from Outfalls 002, 003, and 005; and 0.25 MGD of treated sanitary waste from Outfall 004.

The thermal component of the discharge goes through Outfall 001. The Design Maximum Flow ("DMF") through this outfall is 2.8 MGD (4.3 cfs), with a Design Average Flow ("DAF") of 2.318 MGD (3.6 cfs) and a Long-Term Average Flow of 1.22 MGD (1.9 cfs). [Photos of the discharge point, along with a site location map, are included below for reference].



Location of INEOS Joliet Facility on the LDPR—River Mile 280.3



Aerial and Ground Level Views of INEOS Thermal Discharge

2. REGULATORY BACKGROUND

A review of the preceding regulatory actions taken by INEOS since the UDIP standards were initially adopted is included below to provide additional context and lay the framework for the format of this DSP.

1. On July 21, 2015, INEOS (then Flint Hills Resources Joliet, LLC) filed a Petition for Variance pursuant to Section 35 of the Illinois Environmental Protection Act ("Act"), 415 ILCS 35(a). In the variance petition, INEOS requested a variance from the deadline for complying with the temperature standards at 35 Ill. Adm. Code 302.408(b), (c), (d), (e), (f), and (i) (i.e. the "UDIP temperature standards") for its Channahon Facility.

2. On February 24, 2017, the variance petition was automatically converted to a Petition for Time-Limited Water Quality Standard ("TLWQS") by operation of 415 ILCS 5/38.5(c), 40 C.F.R. § 131.14.

3. On July 26, 2018, INEOS filed an Amended Petition for a TLWQS. The TLWQS Petition sought coverage under a multiple discharger TLWQS from the UDIP temperature standards for its Channahon facility. The TLWQS Petition was supplemented by certain information provided in MG's Amended Petition for TLWQS in PCB 16-19, which provided information that was commonly applicable to dischargers that may be covered by the temperature multi-discharger TLWQS.

4. On July 25, 2019, the Board consolidated this proceeding with the MG thermal TLWQS proceeding at PCB 16-19 ("Consolidated TLWQS Proceeding").

5. On November 27, 2019, INEOS, MG, and the IEPA filed a joint motion to stay the Consolidated TLWQS Proceeding.

6. In the joint motion, the movants argued that MG planned on seeking ATEL relief for its Joliet Stations. If granted, MG's TLWQS petition would be mooted by the effect of the ATELs. Additionally, the joint motion stated that INEOS was assessing whether it would continue to pursue this TLWQS proceeding or whether it was feasible to seek ATEL relief.

7. On December 5, 2019, the Board granted the motion to stay proceedings. The Board Order stated that: *"The Board has reviewed the joint motion and agrees that it would now be more efficient to use the parties' and the Board's resources to review [Midwest Generation]'s expected petition for alternative thermal effluent limitations than to proceed with IEPA's recommendation on and the Board's consideration of the TLWQS petitions."*

8. The Board Order further stated that the stay would last until the Board *"reaches a final decision on [Midwest Generations]'s petition for alternative limitations for the Joliet Stations*."

9. On December 30, 2019, MG filed ATEL petitions for each of the Joliet Stations, which were docketed at PCB 20-38 and PCB 20-39 (consolidated on February 6, 2020).

10. In support of the ATELs requested in the petitions, MG filed a Thermal Demonstration report, which accounted for the fact that the UDIP receives additional thermal loading from three downstream dischargers, including INEOS (then Flint Hills Resources, LLC). The report found that, so long as INEOS continues discharging heat at historical levels, no adverse ecological impact would be created by granting alternative thermal effluent relief to the Joliet Stations. INEOS requested, and IEPA recommended, that the same relief requested by MG be granted to downstream dischargers such as INEOS.

11. On July 8, 2021, the Board granted ATEL relief for MG's Joliet Stations but did not extend that relief to the downstream dischargers, including INEOS, as requested by INEOS and suggested by the IEPA. The Board stated that while its rules do not preclude providing relief to dischargers who had not filed a petition, the MG case record lacked sufficient discharger-specific information for the Board to consider a request to include the three additional downstream dischargers in their final determination regarding the MG proceeding (8 July 2021 Board Order in PCB 20-38/39 at p. 55). The Board further noted that MG *"expects that the three downstream dischargers could rely on its thermal demonstration with few modifications to receive ATELs for their own discharges."* **This is the course of action that INEOS is now pursuing**.

12. On August 3, 2021, INEOS, MG, and the IEPA filed a second joint motion to stay the Consolidated TLWQS Proceeding. The movants requested a stay of the Consolidated TLWQS Proceeding to allow time for the approved ATELs to be incorporated into MG's respective NPDES permits.

13. The Hearing Officer granted the joint motion on August 17, 2021, and the Consolidated TLWQS Proceeding was stayed until January 1, 2022.

14. On December 6, 2021, INEOS filed a third motion to stay the TLWQS Proceeding to allow sufficient time for it to file its own §316(a) Demonstration, which will be based almost entirely on the MG case record, as well as that time necessary for the Board to review and make a determination on the INEOS request to extend the applicability of the MG ATELs to its own thermal discharge, including an allowable mixing zone provision.

15. This motion of stay was granted by the Hearing Officer on December 21, 2021; the stay of the TLWQS proceedings will remain in place until the Board reaches its decision on INEOS' ATEL petition or until the Board orders otherwise.

As specified in §106.1115(b) of the Subpart K Regulations, INEOS met with the IEPA via a Zoom call on 10 December 2021 to discuss the elements of the Early Screening information that had been submitted to IEPA on 2 December 2021. Much of this discussion centered around the fact that the IPCB record in the MG case (IPCB 20-38/39) clearly demonstrates that the ATELs that were proposed by MG and subsequently approved by the Board on 8 July 2021 are fully supportive of the BIC of fish and shellfish found in the UDIP of the LDPR. As the INEOS facility discharges within the same waterway segment (UDIP) covered by the MG §316(a) Demonstration, it should be permitted to comply with this same set of ATELs, including both the numeric limits as well as an allowed mixing zone in which to meet them.[1]

The MG §316(a) submittal to the Board on 30 December 2019 included volumes of retrospective, current, and in some cases predictive biological, physical, and physicochemical studies and data summaries which ultimately supported the Board's favorable 8 July 2021 ruling. IEPA expressed agreement during the 10 December 2021 Early Screening information discussion that no new or additional field studies would be required to be performed by INEOS to supplement the MG case/IPCB record to support the request for application of the MG ATELs to the INEOS thermal discharge. Additionally, it was agreed that the use of references, rather than complete reiteration of the information presented in support of the MG ATEL, would be appropriate for the INEOS §316(a) Demonstration. As such, this DSP, as well as the actual INEOS ATEL Demonstration, apart from the inclusion of site-specific INEOS data, will only provide brief summary information and pertinent references to the MG case record to meet the requirements specified in Section 106.1120 (b) through (e) and Section 106.1130(d) through (f) of the Subpart K Regulations.

[1] As a matter of clarification, INEOS is seeking coverage under the MG ATELs that apply to the UDIP of the LDPR (i.e. the "near-field" limits, as termed in the MG proceeding), and not those that cover the portion of the LDPR at and below the I-55 Bridge (the "far-field" limits).

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3. COMPONENTS FOR A COMPLETE DEMONSTRATION TO SUPPORT APPLICATION FOR ALTERNATIVE THERMAL EFFLUENT LIMITS

In accordance with Section 106.1120 (b) of the Illinois Subpart K thermal variance regulations, the petitioner (INEOS) shall specify the nature and extent of the following types of information to be included in the plan of study. To that end, INEOS incorporates by reference the MG §316(a) Demonstration, as it includes all of the required studies and detailed information that allowed it to be approved by the Board. Specific topics outlined in Section 106.1120 (b) through (e) are referenced below to the pertinent sections of the MG Joliet Stations #9 and #29 §316(a) Demonstration submitted on 30 December 2019 in PCB 20-38/39:

3.1 Biological, Hydrographical, and Meteorological Data (Section 106.1120 (b)(1))

Biological Data

December 2019 Summary Document:
Section 5—Representative Important Species Rationale, and
Section 6--Biotic Category Rationale

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX B: Biothermal / Prospective Assessment
APPENDIX C: Retrospective Assessment
APPENDIX E: Data Collection Programs
APPENDIX F: 2016 Upper Illinois Waterway Fisheries Investigation
APPENDIX G: 2017 Upper Illinois Waterway Fisheries Investigation
APPENDIX H: 2018 Upper Illinois Waterway Fisheries Investigation
APPENDIX J: Summary of Upper Dresden Island Pool Fisheries Data Collected Following Operational Changes at Joliet Stations 9 and 29, 2017-2018
APPENDIX L: 2017-2018 Benthic Macroinvertebrate Assessment of the Des Plaines River

No new studies or information are being proposed by INEOS in order to obtain approval for coverage under the MG ATELs.

Hydrographical Data

December 2019 Summary Document:
Section 2—Engineering and Hydrological Summary

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX D: Station Operations and Hydrothermal Analysis
APPENDIX I: Previously Conducted Joliet Stations 9 and 29 Thermal Plume Surveys and Associated Documentation

No new studies or information are being proposed by INEOS in order to obtain approval for coverage under the MG ATELs.

Meteorological Data

December 2019 Summary Document:
Section 2—Engineering and Hydrological Summary

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX D: Station Operations and Hydrothermal Analysis

No new studies or information are being proposed by INEOS in order to obtain approval for coverage under the MG ATELs.

3.2 Physical Monitoring Data (Section 106.1120 (b)(2))

December 2019 Summary Document:
Section 2—Engineering and Hydrological Summary

APPENDIX A: Description of the Lower Des Plaines River
APPENDIX D: Station Operations and Hydrothermal Analysis
APPENDIX E: Data Collection Programs
APPENDIX I: Previously Conducted Joliet Stations 9 and 29 Thermal Plume Surveys and Associated Documentation

INEOS also intends to provide a summary of the past 5 years of discharge temperature data for Outfall 001, along with associated outfall flows and corresponding flows in the LDPR, in order to demonstrate that there is no significant contribution to the overall thermal regime of the receiving water. This analysis will take the form of data summaries and associated discussion, as well as the application of a simple mass-balance model to establish how documentation of compliance with the proposed ATEL using allowed mixing would be accomplished.

INEOS does not intend to perform any further temperature-related field measurements or studies to support the INEOS request for coverage under the approved MG ATELs. During the 10 December 2021 discussion, IEPA indicated that it did not believe any further studies would be required.

3.3 Engineering or Diffusion Models (Section 106.1120 (b)(3))

Modeling in support of the MG §316(a) Demonstration is detailed in Appendix D and covered the entire UDIP. Additionally, the MG modeling exercise included consideration of the three downstream dischargers, including INEOS (Appendices D-2a and D-2b)

INEOS proposes to rely on the same mass-balance approach used in the MG Appendix D-2b analysis to determine compliance with the MG ATELs under varying flow and temperature conditions. As such, no complex modeling will be necessary or required. The volume of flow that the INEOS thermal discharge contributes is extremely low in proportion to the flow of the LDPR, such that it has no appreciable impact on the ambient water temperature of the river.

3.4 Laboratory Studies (Section 106.1120 (b)(4))

No laboratory studies are proposed for the INEOS §316(a) Demonstration. Any prior referenced laboratory work in the MG Demonstration document, primarily related to RIS thermal endpoints and the determination that the MG ATELs remain protective, is hereby incorporated by reference (See MG Demonstration Summary Document – Section 4, and Appendix B).

3.5 Representative Important Species (Section 106.1120 (b)(5))

The same representative important species (RIS) selected for the MG/Joliet Stations §316(a) Demonstration (see table below) would be applicable to INEOS, in accordance with the request to rely on the PCB 20-38/39 record in its entirety to support coverage under the MG UDIP ATEL for INEOS.

Acknowledging that it is not possible, feasible, or necessary to evaluate every species in a receiving water body, the USEPA 1977 §316(a) document[2] provided guidance for selection of RIS to be used for evaluating the effects of thermal discharges on the balanced, indigenous community. The selected species should be representative of specific components of the aquatic community including:

- Target species of commercial or recreational fisheries
- Nuisance species
- State or federally listed threatened or endangered species
- Species important to the trophic structure/food chain
- Forage species
- Top level predatory species
- Thermally sensitive species.

This was the selection process used by MG for the RIS list that was approved by the Agency for consideration in the ATEL Demonstration process, and as such, remains entirely applicable for INEOS. In accordance with Section 106.1120 (c), the species mentioned in the Aquatic Life Use Standards for the Upper Dresden Island Pool (Largemouth Bass, Bluntnose Minnow, Channel Catfish, Orangespotted Sunfish, Smallmouth Bass, Shorthead Redhorse and Spottail Shiner)[3] are well-represented by the RIS selected by MG to represent the fish community of the UDIP for the ATEL analyses performed.

The only update to this RIS list would be that since the MG case was originally filed in 2019, the Banded Killifish (*Fundulus diaphanus*) is now recognized as two sub-species by the Illinois Department of Natural Resources ("IDNR"): the Eastern Banded Killifish (*Fundulus diaphanus*

[2] Draft Interagency §316(a) Technical Guidance Manual and Guide for Thermal Effects Sections of Nuclear Facilities Environmental Impact Statements. 1977 (Technical Guidance Manual)
[3] From Section 303.230 Upper Dresden Island Pool Aquatic Life Use Waters, part (a); (Source: Added at 38 Ill. Reg. 5517, effective February 13, 2014)

diaphanus), which is not threatened or endangered, and the Western Banded Killifish (*Fundulus diaphanus menona*), which is state-threatened.[4] The Eastern (non-listed) form has been confirmed as the subspecies found in the UDIP and it should therefore be removed from consideration as an RIS under the INEOS §316(a) Demonstration. (This change will not in any way influence the overall outcome of any of the studies done to support approval of the MG ATELs).

Representative Important Species (RIS) for the Upper Dresden Island Pool of the Lower Des Plaines River

Species	Abundant	Commercial[a]	Recreational[b]	Nuisance	Threatened and Endangered	Forage	Predator	Sensitive
Gizzard Shad	X					X		
Emerald Shiner	X					X		
~~Banded Killifish~~**					~~X~~			
Redhorse			X		X			X
White Sucker								X
Common Carp	X			X				
Channel Catfish			X					
Bluegill	X		X				X	
Largemouth Bass	X		X				X	
Freshwater Drum		X					X	

a. No commercial fishing currently takes place in this waterway.
b. Recreational fishing occurs; however, due to the presence of legacy contaminants, there is a long-standing fish consumption advisory.
**Eastern sub-species delisted by IDNR in May 2020

A detailed discussion on the RIS selection process for the UDIP is contained in the MG §316(a) Demonstration document in PCB 20-38/39, Appendix B, Section 2.4, pages B-7 through B-17.

3.6 Other Relevant Information (Section 106.1120 (b)(6))

Section 106.1120 (d) states that *"(t)he petitioner shall provide any additional information or studies that the Agency subsequently determines necessary to support the alternative thermal effluent limitation demonstration, including such field or other studies as may be necessary to select representative important species."*

[4] https://www2.illinois.gov/dnr/ESPB/Documents/ET%20List%20Review%20and%20Revision/IllinoisEndangeredandThreatenedSpecies.pdf

As discussed in prior sections, the Agency has already determined that no additional information or studies are necessary in order to support the INEOS alternative thermal effluent limitation demonstration.

Section 106.1120 (e) states that *"(i)n making the alternative thermal effluent limitation demonstration, the petitioner shall consider any information or guidance published by USEPA to assist in making such demonstrations."*

In cooperation with the Atomic Energy Commission (predecessor to the Nuclear Regulatory Commission), the United States Environmental Protection Agency ("USEPA") developed the *Draft Interagency §316(a) Technical Guidance Manual and Guide for Thermal Effects Sections of Nuclear Facilities Environmental Impact Statements* (1977) ("Technical Guidance Manual"). Although the Technical Guidance Manual has not been finalized, it remains the primary guidance for preparation of §316(a) Demonstrations to support a request for a variance from thermal standards in NPDES permits for electric generating stations. The Technical Guidance Manual presents several approaches for developing a complete Demonstration: Retrospective, Predictive, and a "combined" approach.

Development of the MG §316(a) Demonstration relied upon the original 1977 USEPA guidance document, providing both Retrospective and Predictive analyses to show no appreciable harm to the BIC from the prior thermal water quality standards (i.e. Secondary Contact), as well as the proposed MG ATELs. Therefore, INEOS intends to rely on the Board's review and approval of the MG §316(a) Demonstration in this regard, as it would continue to apply to a request for coverage under the granted MG ATELs for the UDIP.

3.7 Review and Approval of Detailed Study Plan

According to Section 106.1120 (f), "(*w)ithin 90 days after petitioner's submittal of its detailed plan of study, the Agency shall respond in writing, either approving the detailed plan of study and representative important species or recommending necessary revisions."*

INEOS anticipates that the Agency will be able to provide their written response regarding approval of this Plan and RIS list on or before 1 May 2022. Given that the prior MG DSP for the Joliet Station #9 and #29 316(a) Demonstration was fully reviewed and approved by the Illinois Department of Natural Resources (IDNR), INEOS defers to IEPA's judgement on whether or not this DSP requires additional IDNR review.

Section 106.1120 (g) states that *"(a)fter receiving the Agency's response pursuant to subsection (f), or after 90 days have passed with no Agency response, the petitioner may proceed with the plan of study with or without making the Agency's recommended revisions. The petitioner shall complete the plan of study prior to filing the petition for an alternative thermal effluent limitation with the Board."*

Upon receiving written approval and/or authorization to proceed by IEPA, INEOS will commence the activities and actions necessary to develop the petition for coverage of its thermal discharge under the MG ATELs for the UDIP.

4. SCHEDULE FOR DEVELOPMENT AND SUBMITTAL OF INEOS §316(a) DEMONSTRATION

As discussed within the body of this document, INEOS is essentially applying for coverage under the approved MG ATELs, and therefore, there will be no additional "studies" performed. INEOS instead requests that IEPA and the Board agree that full support for this request lies within the case record in PCB 20-38/39 and that any conclusions drawn therein regarding approval of the studies and conclusions drawn from them that compliance with the MG ATELs, in place of the Use B thermal standard specified in 35 Ill. Adm. Code 302.408 for the UDIP, will not result in any adverse impacts to the BIC from the INEOS thermal discharge.

The only new information that INEOS proposes to submit as part of its §316(a) Demonstration is a summary of its thermal discharge temperatures and associated flows, along with a simple modeling analysis to show that the discharge will meet the MG ATELs after allowed mixing with the LDPR. This should provide the site-specific data necessary to allow INEOS to be covered under the MG ATELs.

Assuming that IEPA is in agreement with this approach, INEOS intends to request coverage under the MG ATELs through a simplified process which acknowledges the Board's prior review and approval of these ATELs in PBC 20-38/39. A review of the Board's Order, discussing important supporting information from the MG case that led to their decision, will be included in the INEOS Demonstration, to the extent necessary, along with an analysis of the INEOS thermal discharge characteristics. This will result in an abbreviated demonstration document. As such, it is anticipated that this document could be prepared and ready within 90 days of IEPA approval of this DSP. INEOS expects to share a draft of the demonstration document with IEPA for its review and comment, and it is expected that the Petition will be ready to file within 90 days after resolution of any Agency comments.

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- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Scott Twait
IEPA BOW #15
1021 North Grand Ave East
Springfield, IL 62702

9590 9402 6378 0303 0201 09

2. Article Number *(Transfer from service label)*

7017 3380 0000 9696 5460

PS Form 3811, July 2020 PSN 7530-02-000-9053

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☐ Agent
☐ Addressee

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Illinois Environmental Protection Agency
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

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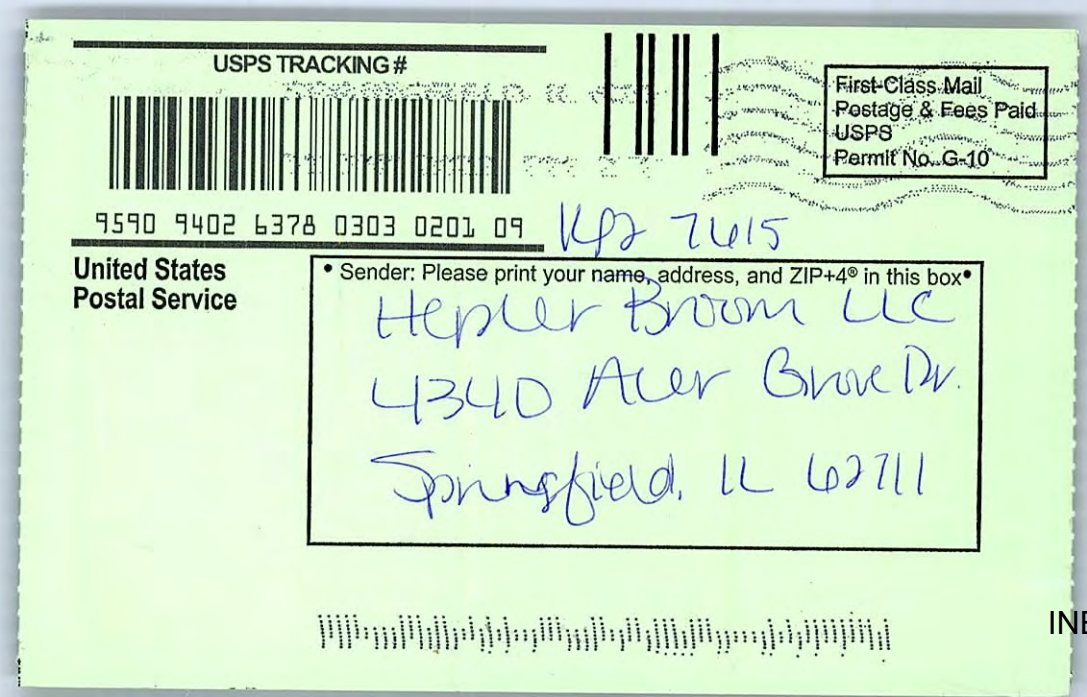
INEOS 67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9590 9402 6378 0303 0201 09
KP 7615
First-Class Mail
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• Sender: Please print your name, address, and ZIP+4® in this box•
Hepler Broom LLC
4340 Acer Grove Dr.
Springfield, IL 62711

Katie J. Johnson

From: Twait, Scott <Scott.Twait@Illinois.gov>
To: Michael P. Murphy
Sent: Friday, January 28, 2022 4:07 PM
Subject: Read:

Your message

To:
Subject: INEOS Joliet, LLC, NPDES Permit No. IL0001643, Detailed Plan of Study
Sent: Friday, January 28, 2022 4:06:51 PM (UTC-06:00) Central Time (US & Canada)

was read on Friday, January 28, 2022 4:06:46 PM (UTC-06:00) Central Time (US & Canada).

217/558-2012

MAR 13 2022

INEOS Joliet, LLC
c/o Mike Galvin, IH/Water CSO – Facility Security Officer
23425 Amoco Road
Channahon, Illinois 60410

RE: NPDES Nos. IL0001643
INEOS Joliet, LLC
316(a) Detailed Plan of Study Approval

Dear Mr. Galvin:

The Agency has reviewed the January 28, 2022 "Detailed Study Plan for a 316(a) Demonstration to Support Application of Alternative Thermal Effluent Limits for the INEOS Joliet LLC Facility". Based on the information provided, the Agency approves the "Detailed Study Plan for a 316(a) Demonstration to Support Application of Alternative Thermal Effluent Limits for the INEOS Joliet LLC Facility" thereby satisfying the requirements of 35 IAC 106.1120 (Detailed Plan of Study). The Agency reserves the option to provide further comments if new information becomes available.

If you have any questions or comments regarding this letter, please contact me at the above address and phone number. If you have questions regarding the permit, please call Permit Section at 217/782-0610.

Sincerely,

Scott Twait

Scott Twait, Manger
Water Quality Standards Unit
Bureau of Water

SAT:INEOS-316(a)planofstudy.docx

Cc: Michael Murphy, Hepler Broom

APPENDIX 2

INEOS Discharge Temperature and Flow Monitoring Summary

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Table 1A: INEOS Outfall 001 Discharge Temperature Summary for 2016-2021 (all values in ºF)*

	2016 Max	2016 Avg	2017 Max	2017 Avg	2018 Max	2018 Avg	2019 Max	2019 Avg	2020 Max	2020 Avg	2021 Max	2021 Avg
Jan	80.4	74.0	79.5	73.1	82.5	77.1	76.3	72.2	79.6	77.5	80.2	77.0
Feb	80.9	77.6	78.8	74.2	81.4	75.7	77.3	74.6	76.2	73.9	80.3	74.5
Mar	82.2	77.0	78.3	73.7	81.1	75.9	80.8	76.2	79.6	76.2	82.1	77.3
Apr	82.0	78.7	82.0	78.0	82.3	77.6	83.5	78.8	80.8	78.2	87.3	78.4
May	87.4	79.5	82.6	78.5	88.6	83.5	87.9	81.6	94.5	80.3	88.0	80.6
Jun	91.9	89.3	86.8	81.7	90.6	85.9	87.3	81.1	89.9	84.1	91.7	85.0
Jul	91.6	87.2	88.3	83.8	90.7	86.7	90.9	86.2	90.5	86.6	94.5	88.4
Aug	89.7	87.3	84.7	81.6	86,0	83.8	84.9	80.4	88.3	83.9	92.9	86.9
Sep	87.2	83.2	84.5	79.5	86.4	81.0	86.8	80.9	81.4	76.5	89.6	82.1
Oct	83.7	78.7	79.0	76.1	79.4	72.6	87.3	79.3	81.7	79.3	84.9	81.4
Nov	81.9	74.9	74.9	71.9	78.5	75.5	81.5	77.2	83.9	79.8	81.6	76.7
Dec	75.0	72.5	77.2	73.5	78.2	74.6	81.3	77.0	80.3	76.8	80.4	75.9

*Based on daily average values

Table 1B. INEOS Outfall 001 Discharge Temperature Summary for 2016-2021
(all values in ºF and are based on hourly measured data)

	2016 Max	2016 Avg	2017 Max	2017 Avg	2018 Max	2018 Avg	2019 Max	2019 Avg	2020 Max	2020 Avg	2021 Max	2021 Avg
Jan	83.3	74.0	82.0	73.1	86.9	77.1	78.8	72.2	83.9	77.5	85.2	77.0
Feb	83.7	77.6	80.8	74.2	83.4	75.7	79.9	74.6	80.5	73.9	85.7	74.5
Mar	85.0	77.0	87.0	73.7	83.8	75.9	82.8	76.2	83.5	76.2	84.5	77.3
Apr	83.7	78.7	85.2	78.0	85.5	77.6	85.3	78.8	85.3	78.2	91.2	78.4
May	88.5	79.5	86.2	78.5	91.8	83.5	90.4	81.6	89.5	80.3	92.7	80.6
Jun	90.0	84.3	89.2	81.7	93.5	85.9	90.9	81.1	93.0	84.1	95.4	85.0
Jul	93.9	87.2	90.6	83.8	93.0	86.7	94.2	86.2	92.9	86.6	97.2	88.4
Aug	92.1	87.3	87.2	81.6	87.7	83.8	88.7	80.4	92.7	83.9	97.8	86.9
Sep	89.5	83.2	86.8	79.5	88.0	81.0	89.8	80.9	86.5	76.5	92.1	82.1
Oct	86.6	78.7	82.0	76.1	80.8	72.6	88.9	79.3	85.1	79.3	90.3	81.4
Nov	84.0	74.9	77.5	71.9	80.4	75.5	83.5	77.2	86.1	79.8	83.6	76.7
Dec	76.5	72.5	78.4	73.5	80.5	74.6	83.8	77.0	83.2	76.8	82.6	75.9

Table 2. INEOS Outfall 001 Monthly Average Flow Data Summary for 2016-2021 (all values in cfs)

	2016 avg	2017 avg	2018 avg	2019 avg	2020 avg	2021 avg	Avg
Jan	2.0	2.0	1.7	2.3	3.2	3.1	2.4
Feb	2.1	1.8	2.0	2.8	3.4	2.9	2.5
Mar	1.8	1.9	2.2	2.6	3.4	2.8	2.5
Apr	1.7	1.9	2.0	3.0	3.1	2.7	2.4
May	1.4	1.7	2.4	3.1	3.5	2.7	2.5
Jun	1.8	2.0	2.0	2.5	3.2	2.6	2.4
Jul	1.9	2.1	2.2	2.9	3.0	3.0	2.5
Aug	2.4	2.0	1.9	2.0	2.9	3.0	2.4
Sep	2.3	2.1	2.0	2.4	2.3	2.7	2.3
Oct	2.0	2.2	1.3	3.1	2.3	3.0	2.3
Nov	1.4	1.5	2.5	3.1	3.0	3.0	2.4
Dec	1.7	1.7	2.2	2.8	2.9	3.4	2.5
Avg:	1.9	1.9	2.0	2.7	3.0	2.9	2.4

Table 3. INEOS Outfall 001 Monthly Maximum Flow Data Summary for 2016-2021 (all values in cfs)

	2016 max	2017 max	2018 max	2019 max	2020 max	2021 max	Avg
Jan	3.0	2.7	2.3	3.1	3.7	3.6	3.1
Feb	2.4	2.4	2.6	3.3	4.4	4.2	3.2
Mar	2.4	2.6	2.9	3.0	4.0	3.2	3.0
Apr	2.3	2.5	2.5	3.4	3.7	3.2	2.9
May	2.2	3.1	2.9	3.6	4.3	3.7	3.3
Jun	2.5	2.8	2.5	3.3	4.3	3.6	3.2
Jul	2.8	2.8	2.8	3.3	3.3	3.9	3.2
Aug	2.9	2.8	2.4	2.7	3.5	3.6	3.0
Sep	3.0	2.8	2.5	3.5	4.3	3.2	3.2
Oct	2.4	3.4	2.0	4.3	2.8	3.4	3.1
Nov	2.2	2.2	3.2	3.7	3.7	3.5	3.1
Dec	2.4	2.6	3.2	3.5	3.6	4.2	3.3
Avg:	2.5	2.7	2.7	3.4	3.8	3.6	3.1

Table 4: Monthly Average Lower Des Plaines River (LDPR) Flow (as reported by USACE for Brandon Road Lock and Dam)* (all values in cfs)

	2016	**2017**	**2018**	**2019**	**2020**	**2021**	AVG
Jan	4039	5273	2928	3925	5901	2332	4066
Feb	3340	3032	6157	7014	3893	2919	4393
Mar	3588	5255	3829	4750	3867	4363	4275
Apr	3360	6006	3141	4062	3931	2421	3820
May	5434	5157	5468	9408	10165	2662	6382
Jun	3140	2565	5547	5134	3773	4263	4070
Jul	3860	6112	3358	4172	3848	3859	4202
Aug	4110	2365	3203	3066	2320	2715	2963
Sep	2328	2069	3898	5917	2488	1964	3111
Oct	2860	5818	4127	5784	2272	3122	3997
Nov	2711	3443	3471	4998	2173	2470	3211
Dec	2870	1956	4691	3610	2634	2323	3014
AVG>>	3470	4088	4152	5153	3939	2951	3959

***Source:** https://rivergages.mvr.usace.army.mil/WaterControl/stationinfo2.cfm?sid=IL03&fid=JOLI2&dt=S

NOTE: Published 7Q10 Flow for LDPR in UDIP is 1493 cfs (ISWS 2003 Revision); use of a percentage of the 7Q10 flow provides a very conservative mixing zone allowance for INEOS.

Table 5. Percentage Contribution of INEOS Outfall 001 Monthly Average Flow to Corresponding LDPR Flow

	2016	2017	2018	2019	2020	2021	AVG
Jan	0.050%	0.038%	0.058%	0.059%	0.054%	0.133%	0.065%
Feb	0.063%	0.059%	0.032%	0.040%	0.087%	0.099%	0.064%
Mar	0.050%	0.036%	0.057%	0.055%	0.088%	0.064%	0.058%
Apr	0.051%	0.032%	0.064%	0.074%	0.079%	0.112%	0.068%
May	0.026%	0.033%	0.044%	0.033%	0.034%	0.101%	0.045%
Jun	0.057%	0.078%	0.036%	0.049%	0.085%	0.061%	0.061%
Jul	0.049%	0.034%	0.066%	0.070%	0.078%	0.078%	0.062%
Aug	0.058%	0.085%	0.059%	0.065%	0.125%	0.110%	0.084%
Sep	0.099%	0.101%	0.051%	0.041%	0.092%	0.137%	0.087%
Oct	0.070%	0.038%	0.031%	0.054%	0.101%	0.096%	0.065%
Nov	0.052%	0.044%	0.072%	0.062%	0.138%	0.121%	0.081%
Dec	0.059%	0.087%	0.047%	0.078%	0.110%	0.146%	0.088%
							0.069%

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APPENDIX 3

INEOS NPDES Permit (IL0001643)

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397
JB PRITZKER, GOVERNOR JOHN J. KIM, DIRECTOR

217/782-0610

September 23, 2020

INEOS Joliet, LLC
P.O. Box 941
Joliet, Illinois 60434

Re: INEOS Joliet, LLC – Joliet Plant
NPDES Permit No. IL0001643
Bureau ID: W1978000009
Final Permit

Gentlemen:

Attached is the final NPDES Permit for your discharge. The Permit as issued covers discharge limitations, monitoring, and reporting requirements. Failure to meet any portion of the Permit could result in civil and/or criminal penalties. The Illinois Environmental Protection Agency is ready and willing to assist you in interpreting any of the conditions of the Permit as they relate specifically to your discharge. Regarding your July 23, 2020 comments, the Agency offers the following response:

1. While the wastewater streams listed in your comment are listed in the ILR00 General Permit, listing them in an individual NPDES permit would not serve a purpose. In an individual permit, all wastewater streams, tributary to one of the outfalls, must be listed in the main body of the permit.

2. Stormwater held in the GF101 tank may be treated in the utility treatment system rather than the main process wastewater treatment system provided that the ultimate discharge from outfall 001 meets permit limits.

3. Total Suspended Solids, BOD_5, and Manganese have been added to the list of parameters not subject to Special Condition 15.

4. The Permittee is approved to utilize a side stream of raw wastewater around the anaerobic reactor directly to the aeration basins in order to provide a sufficient food source as well as acclimate the biomass to raw wastewater in an effort to facilitate management of upset conditions.

5. The Water Quality Analysis showed that there was potential to exceed the Water Quality Limit for Xylene and recommended a Xylene limit. The Xylene concentration and load limits are pursuant to 35 Ill. Adm. Code 302.208.

6. For outfalls 002, 003, and 005, the permittee shall sample for the parameters listed on page 5 at all times. If hydrostatic test water is discharged through outfalls 002, 003, or 005, the permittee shall sample for the additional parameters listed on page 6 of the permit.

Pursuant to the Final NPDES Electronic Reporting Rule, all permittees must report DMRs electronically unless a waiver has been granted by the Agency. The Agency utilizes NetDMR, a web based application, which allows the submittal of electronic Discharge Monitoring Reports instead of paper Discharge Monitoring Reports (DMRs). More information regarding NetDMR can be found on the Agency website, https://www2.illinois.gov/epa/topics/water-quality/surface-water/netdmr/Pages/quick-answer-guide.aspx. If your facility has received a waiver from the NetDMR program, a supply of preprinted paper DMR Forms will be sent to your facility during the interim period prior to your registration in the NetDMR program. Additional information and instructions will accompany the preprinted DMRs. Please see the attachment regarding the electronic reporting rule.

The attached Permit is effective as of the date indicated on the first page of the Permit. Until the effective date of any re-issued Permit, the limitations and conditions of the previously-issued Permit remain in full effect. You have the right to appeal any condition of the Permit to the Illinois Pollution Control Board within a 35 day period following the issuance date.

Should you have questions concerning the Permit, please contact Mark E. Liska at 217/782-0610.

Sincerely,

Amy L. Dragovich, P.E.
Manager, Permit Section
Division of Water Pollution Control

ALD:DEL:MEL:19121801.docx

Attachment: Final Permit

cc: Records
Compliance Assurance Section
Des Plaines Region
USEPA
CMAP
Billing
DRSCW/The Conservation Foundation

NPDES Permit No. IL0001643

Illinois Environmental Protection Agency

Division of Water Pollution Control

1021 North Grand Avenue East

Post Office Box 19276

Springfield, Illinois 62794-9276

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Reissued (NPDES) Permit

Expiration Date: September 30, 2025

Issue Date: September 23, 2020
Effective Date: October 1, 2020

Name and Address of Permittee:

INEOS Joliet, LLC
P.O. Box 941
Joliet, Illinois 60434

Facility Name and Address:

INEOS Joliet, LLC
23425 Amoco Road
Channahon, Illinois 60410
(Will County)

Discharge Number and Name:	Receiving Waters:
001: Treated Process Water, Lab Wastewater, Fire Field Wastewater, Impacted Groundwater, Utility Water and Alternate Route for Sanitary Waste, Treated Stormwater	Des Plaines River
002, 003, and 005: Stormwater, Non-Process Wastewater, and Hydrostatic Test Wastewater	Des Plaines River
004: Treated Sanitary Wastewater	Des Plaines River

In compliance with the provisions of the Illinois Environmental Protection Act, Title 35 of Ill. Adm. Code, Subtitle C and/or Subtitle D, Chapter 1, and the Clean Water Act (CWA), the above named permittee is hereby authorized to discharge at the above location to the above-named receiving stream in accordance with the standard conditions and attachments herein.

Permittee is not authorized to discharge after the above expiration date. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit the proper application as required by the Illinois Environmental Protection Agency (IEPA) not later than 180 days prior to the expiration date.

Amy L. Dragovich, P.E.
Manager, Permit Section
Division of Water Pollution Control

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NPDES Permit No. IL0001643

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE
1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:						
Outfall(s): 001* - Treated Process Water, Lab Wastewater, Fire Field Wastewater, Impacted Groundwater, Utility Water and Alternate Route for Sanitary Waste, Treated Stormwater						
Design Average Flow = 2.318 MGD (Long Term Average Flow = 1.22 MGD)						
Flow (MGD)	See Special Condition 4				Daily	Continuous
TOC			****	****	1/Day	Composite
pH	See Special Condition 2.				1/Day	Grab
Temperature	See Special Condition 22.				Continuous	Meter
BOD_5	186	432	20	40	3/Week	Composite
Total Suspended Solids	312	864	25	50	1/Day	Composite**
Manganese	9.3	22	1	2	1/Week	Composite
Acenaphthene	0.124	0.334	0.022	0.059	***	Grab
Acrylonitrile	0.543	1.368	0.096	0.242	***	Grab
Benzene	0.209	0.769	0.037	0.136	***	Grab
Carbon Tetrachloride	0.102	0.215	0.018	0.038	***	Grab
Chlorobenzene	0.085	0.158	0.015	0.028	***	Grab
1,2,4-Trichlorobenzene	0.385	0.792	0.068	0.14	***	Grab
Hexachlorobenzene	0.085	0.158	0.015	0.028	***	Grab
1,2-Dichloroethane	0.385	1.193	0.068	0.211	***	Grab
1,1,1-Trichloroethane	0.119	0.305	0.021	0.054	***	Grab
Hexachloroethane	0.119	0.305	0.021	0.054	***	Grab
1,1-Dichloroethane	0.124	0.334	0.022	0.059	***	Grab
1,1,2-Trichloroethane	0.119	0.305	0.021	0.054	***	Grab
Chloroethane	0.588	1.515	0.104	0.268	***	Grab
2-Chlorophenol	0.175	0.554	0.031	0.098	***	Grab
1,2-Dichlorobenzene	0.435	0.922	0.077	0.163	***	Grab
1,3-Dichlorobenzene	0.175	0.249	0.031	0.044	***	Grab
1,4 Dichlorobenzene	0.085	0.158	0.015	0.028	***	Grab
1,1-Dichloroethylene	0.090	0.140	0.016	0.025	***	Grab

NPDES Permit No. IL0001643

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE
1,2-Trans-dichloroethylene	0.119	0.305	0.021	0.054	***	Grab
2,4-Dichlorophenol	0.221	0.633	0.039	0.112	***	Grab
1,2-Dichloropropane	0.865	1.301	0.153	0.23	***	Grab
1,3-Dichloropropylene	0.164	0.249	0.029	0.044	***	Grab
4,6-Dinitro-o-cresol	0.441	1.566	0.078	0.277	***	Grab
Phenol	0.085	0.147	0.015	0.026	***	Grab
Bis (2-ethylhexyl)phthalate	0.582	1.578	0.103	0.279	***	Grab
Di-n-butyl phthalate	0.153	0.322	0.027	0.057	***	Grab
Diethyl phthalate	0.458	1.148	0.081	0.203	***	Grab
Dimethyl phthalate	0.107	0.266	0.019	0.047	***	Grab
Benzo (a)anthracene	0.124	0.334	0.022	0.059	***	Grab
Benzo (a)pyrene	0.130	0.345	0.023	0.061	***	Grab
3,4 Benzofluoranthene	0.130	0.345	0.023	0.061	***	Grab
Benzo (k)fluoranthene	0.124	0.334	0.022	0.059	***	Grab
Chrysene	0.124	0.334	0.022	0.059	***	Grab
Acenaphthylene	0.124	0.334	0.022	0.059	***	Grab
Anthracene	0.124	0.334	0.022	0.059	***	Grab
2,4-Dimethylphenol	0.102	0.204	0.018	0.036	***	Grab
2,6-Dinitrotoluene	1.442	3.625	0.255	0.641	***	Grab
2,4-Dinitrotoluene	0.639	1.612	0.113	0.285	***	Grab
Ethylbenzene	0.181	0.611	0.032	0.108	***	Grab
Fluoranthene	0.141	0.385	0.025	0.068	***	Grab
Methylene Chloride	0.226	0.503	0.04	0.089	***	Grab
Methyl Chloride	0.486	1.074	0.086	0.19	***	Grab
Hexachlorobutadiene	0.113	0.277	0.02	0.049	***	Grab
Naphthalene	0.124	0.334	0.022	0.059	***	Grab

NPDES Permit No. IL0001643

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE
Nitrobenzene	0.153	0.385	0.027	0.068	***	Grab
2-Nitrophenol	0.232	0.390	0.041	0.069	***	Grab
4-Nitrophenol	0.407	0.701	0.072	0.124	***	Grab
2,4-Dinitrophenol	0.401	0.696	0.071	0.123	***	Grab
Fluorene	0.124	0.334	0.022	0.059	***	Grab
Chloroform	0.119	0.260	0.021	0.046	***	Grab
Phenanthrene	0.124	0.334	0.022	0.059	***	Grab
Pyrene	0.141	0.379	0.025	0.067	***	Grab
Tetrachloroethylene	0.124	0.317	0.022	0.056	***	Grab
Toluene	0.147	0.452	0.026	0.08	***	Grab
Trichloroethylene	0.119	0.305	0.021	0.054	***	Grab
Vinyl Chloride	0.588	1.515	0.104	0.268	***	Grab
Chromium (total)	6.3	16	1	2	***	Composite
Copper	4.7	11	0.5	1.0	***	Composite
Cyanide (total)	0.93	2.1	0.1	0.2	***	Composite
Lead	1.8	3.9	0.2	0.4	***	Composite
Nickel	9.3	22	1	2	***	Composite
Zinc	5.9	14	1	2	***	Composite
Xylene(s)	3.3	10	0.36	0.92	1/Quarter*****	Grab

*See Special Condition 15.
**See Special Condition 21.
***See Special Condition 16.
****Report Concentration (mg/l) – See Special Condition 11.
*****See Special Condition 17.

NPDES Permit No. IL0001643

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE
Outfall: 004* DAF = 0.025 MGD – Treated Sanitary Wastewater - DAF: 0.025 MGD						
Flow	See Special Condition 4.				Daily	Continuous
pH	See Special Condition 1.				1/Week	Grab
$CBOD_5$	5.2	10	25	50	1/Week	Composite
Total Suspended Solids	6.3	13	30	60	1/Week	Composite

*See Special Condition 7.

Outfalls: 002*, 003* and 005* - Stormwater, Non-Process Wastewater, and Hydrostatic Test Wastewater – Intermittent Discharge			
Flow	Monitor Only	1/Month	Measurement
pH	Monitor Only	1/Month	Grab**
Total Suspended Solids	Monitor Only	1/Month	Grab**
Oil and Grease	Monitor Only	1/Month	Grab**
TOC***	Monitor Only	1/Month	Grab**

*See Special Condition 14.
**See Special Condition 13.
***Report Concentration (mg/l) – See Special Condition 11.

NPDES Permit No. IL0001643

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE
Outfalls: 002*, 003*, and 005* - Hydrostatic Test Water Discharge Requirements from Outfalls 002, 003, and 005 (Intermittent Discharge)						
Flow	See Special Condition 4				Daily When Discharging	Measurement
pH	See Special Condition 1				Daily When Discharging	Grab
Total Suspended Solids			15	30	Daily When Discharging	Grab
Iron (Total)			2	4	Daily When Discharging	Grab
Oil and Grease			15	30	Daily When Discharging	Grab
Total Residual Chlorine**				0.05	Daily When Discharging	Grab

*See Special Condition 19 for allowable hydrostatic test water and other discharges allowed to stormwater outfalls.

**See Special Condition 20 for addition requirements for Hydrostatic Test Water Discharges from Outfalls 002, 003, and 005.

Special Conditions

SPECIAL CONDITION 1. (Outfall 004) The pH shall be in the range 6.0 to 9.0. The monthly minimum and monthly maximum values shall be reported on the DMR form.

SPECIAL CONDITION 2. (Outfall 001) The pH shall be in the range of 6.0 to 10.0. The monthly minimum and monthly maximum values shall be reported on the DMR form.

SPECIAL CONDITION 3. The Permittee shall record monitoring results on Discharge Monitoring Report (DMR) electronic forms using one such form for each outfall each month.

In the event that an outfall does not discharge during a monthly reporting period, the DMR Form shall be submitted with no discharge indicated.

The Permittee is required to submit electronic DMRs (NetDMRs) instead of mailing paper DMRs to the IEPA unless a waiver has been granted by the Agency. More information, including registration information for the NetDMR program, can be obtained on the IEPA website, https://www2.illinois.gov/epa/topics/water-quality/surface-water/netdmr/Pages/quick-answer-guide.aspx.

The completed Discharge Monitoring Report forms shall be submitted to IEPA no later than the 25th day of the following month, unless otherwise specified by the permitting authority.

Permittees that have been granted a waiver shall mail Discharge Monitoring Reports with an original signature to the IEPA at the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attention: Compliance Assurance Section, Mail Code # 19
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

SPECIAL CONDITION 4. Flow shall be reported in units of Million Gallons per Day (MGD) as a monthly average and daily maximum value.

SPECIAL CONDITION 5. The provisions contained in 40 CFR 122.41 (m) and (n) are applicable to this permit.

SPECIAL CONDITION 6. The use or operation of this facility shall be by or under the supervision of a Certified Class K operator.

SPECIAL CONDITION 7. If an applicable effluent standard or limitation is promulgated under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act and that effluent standard or limitation is more stringent than any effluent limitation in the permit or controls a pollutant not limited in the NPDES Permit, the Agency shall revise or modify the permit in accordance with the more stringent standard or prohibition and shall so notify the permittee.

SPECIAL CONDITION 8. Samples taken in compliance with the effluent monitoring requirements shall be taken at a point representative of the discharge, but prior to entry into the receiving stream.

SPECIAL CONDITION 9. For the purpose of this permit, the discharge from outfall 004 is limited to treated sanitary wastewater, free from process and other wastewater discharges.

SPECIAL CONDITION 10. For the purpose of this permit, the discharge from Outfall 001 shall be limited to process water, fire field waste water (water from firefighting activities and firefighting system maintenance including but not limited to, fire water, fire truck testing , hydrant flushing, fire water piping repairs and fire training), impacted groundwater, lab wastewater, utility water and alternate route for sanitary waste. In the event that the permittee shall require a change in use of water treatment additives reviewed as part of the renewal application, the permittee must request a change in this permit in accordance with the Standard Conditions -- Attachment H.

SPECIAL CONDITION 11. Testing for toxic organic pollutants at outfalls 001, 002, 003, and 005 shall be performed utilizing analytical test methods approved under 40 CFR 136 or other approved procedures. Laboratory results shall be reported on the DMR's in units of mg/L down to analytical detection limits which shall be comparable with the method detection limits in 40 CFR 136.

SPECIAL CONDITION 12. The permittee shall conduct biomonitoring of the effluent from outfall 001 in May of each year.

Biomonitoring

1. Acute Toxicity - Standard definitive acute toxicity tests shall be run on at least two trophic levels of aquatic species (fish, invertebrate) representative of the aquatic community of the receiving stream. Testing must be consistent with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fifth Ed.) EPA/821-R-02-012. Unless substitute

tests are pre-approved; the following tests are required:

a. Fish - 96 hour static LC_{50} Bioassay using fathead minnows (Pimephales promelas).

b. Invertebrate 48-hour static LC_{50} Bioassay using Daphnia magna.

2. Test Samples - The above tests shall be conducted using 24-hour composite samples unless otherwise authorized by the IEPA.

3. Reporting - Results shall be reported according to EPA/821-R-02-012, Section 12, Report Preparation, and shall be submitted to IEPA, Bureau of Water, Compliance Assurance Section within one week of receipt from the laboratory.

4. Toxicity Reduction Evaluation - Should the results of the biomonitoring program identify toxicity, the IEPA may require that the Permittee prepare a plan for toxicity reduction evaluation and identification. This plan shall be developed in accordance with Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, EPA/833B-99/002, and shall include an evaluation to determine which chemicals have a potential for being discharged in the plant wastewater, a monitoring program to determine their presence or absence and to identify other compounds which are not being removed by treatment, and other measures as appropriate. The Permittee shall submit to the IEPA its plan for toxicity reduction evaluation within ninety (90) days following notification by the IEPA. The Permittee shall implement the plan within ninety (90) days or other such date as contained in a notification letter received from the IEPA.

   The IEPA may modify this Permit during its term to incorporate additional requirements or limitations based on the results of the biomonitoring. In addition, after review of the monitoring results, the IEPA may modify this Permit to include numerical limitations for specific toxic pollutants. Modifications under this condition shall follow public notice and opportunity for hearing.

SPECIAL CONDITON 13. Stormwater Sampling Procedures:

All samples shall be collected from the discharge resulting from a storm event greater than 0.1 inches and at least 72 hours from previously measurable (greater than 0.1 inch rainfall) storm event. Where feasible, the variance in the duration of the event and the total rainfall of the event should not exceed 50 percent from the average or median rainfall event in that area.

A grab sample shall be taken during the first 30 minutes of the discharge (or as soon thereafter as practicable), and composite shall be taken for the entire event with first sample taken during first 30 minutes of discharge (or as soon thereafter as practicable).

If no measurable rainfall event takes place in a reporting month, then sampling shall be conducted on the dry weather flow conditions of outfalls, 002, 003, and 005. In these instances, an 8 h-hour composite sample will be collected with two aliquots drawn during the first collection, one of which will be grab sample.

Grab and composite samples are defined as follows:

Grab Sample: An individual sample of at least 100 milliliters collected during the first 30 minutes (or as soon thereafter as practicable) of the discharge. This sample is to be analyzed separately from the composite sample. If sampling on dry weather base flow, the grab sample shall be collected at the same time as the first aliquot collected for an 8-hour composite sample.

Composite Sample: A composite shall consist of a combination of a minimum of one sample aliquots taken in each hour of discharge for the entire event, with each aliquot being at least 100 milliliters and collected with a minimum period of fifteen minutes between aliquot collections. The first aliquot shall be collected during the first 30 minutes of discharge when sampling during a rain event. If sampling on dry weather base flow, the composite shall consist of at least three aliquots collected over an 8-hour period. Aliquots shall be collected at times such that they are representative of the 8-hour period, and each aliquot shall be at least 100 milliliters in volume. Aliquots may be collected manually or automatically.

SPECIAL CONDITION 14.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

A. A storm water pollution prevention plan shall be maintained by the permittee for the storm water associated with industrial activity at this facility. The plan shall identify potential sources of pollution which may be expected to affect the quality of storm water discharges associated with the industrial activity at the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. The permittee shall modify the plan if substantive changes are made or occur affecting compliance with this condition.

   1. Waters not classified as impaired pursuant to Section 303(d) of the Clean Water Act.

      Unless otherwise specified by federal regulation, the storm water pollution prevention plan shall be designed for a storm event

equal to or greater than a 25-year 24-hour rainfall event.

2. Waters classified as impaired pursuant to Section 303(d) of the Clean Water Act

   For any site which discharges directly to an impaired water identified in the Agency's 303(d) listing, and if any parameter in the subject discharge has been identified as the cause of impairment, the storm water pollution prevention plan shall be designed for a storm event equal to or greater than a 25-year 24-hour rainfall event. If required by federal regulations, the storm water pollution prevention plan shall adhere to a more restrictive design criteria.

B. The operator or owner of the facility shall make a copy of the plan available to the Agency at any reasonable time upon request.

   Facilities which discharge to a municipal separate storm sewer system shall also make a copy available to the operator of the municipal system at any reasonable time upon request.

C. The permittee may be notified by the Agency at any time that the plan does not meet the requirements of this condition. After such notification, the permittee shall make changes to the plan and shall submit a written certification that the requested changes have been made. Unless otherwise provided, the permittee shall have 30 days after such notification to make the changes.

D. The discharger shall amend the plan whenever there is a change in construction, operation, or maintenance which may affect the discharge of significant quantities of pollutants to the waters of the State or if a facility inspection required by paragraph H of this condition indicates that an amendment is needed. The plan should also be amended if the discharger is in violation of any conditions of this permit, or has not achieved the general objective of controlling pollutants in storm water discharges. Amendments to the plan shall be made within 30 days of any proposed construction or operational changes at the facility, and shall be provided to the Agency for review upon request.

E. The plan shall provide a description of potential sources which may be expected to add significant quantities of pollutants to storm water discharges, or which may result in non-storm water discharges from storm water outfalls at the facility. The plan shall include, at a minimum, the following items:

   1. A topographic map extending one-quarter mile beyond the property boundaries of the facility, showing: the facility, surface water bodies, wells (including injection wells), seepage pits, infiltration ponds, and the discharge points where the facility's storm water discharges to a municipal storm drain system or other water body. The requirements of this paragraph may be included on the site map if appropriate. Any map or portion of map may be withheld for security reasons.

   2. A site map showing:

      i. The storm water conveyance and discharge structures;
      ii. An outline of the storm water drainage areas for each storm water discharge point;

      iii. Paved areas and buildings;

      iv. Areas used for outdoor manufacturing, storage, or disposal of significant materials, including activities that generate significant quantities of dust or particulates.

      v. Location of existing storm water structural control measures (dikes, coverings, detention facilities, etc.);

      vi. Surface water locations and/or municipal storm drain locations

      vii. Areas of existing and potential soil erosion;

      viii. Vehicle service areas;

      ix. Material loading, unloading, and access areas.

      x. Areas under items iv and ix above may be withheld from the site for security reasons.

   3. A narrative description of the following:

      i. The nature of the industrial activities conducted at the site, including a description of significant materials that are treated, stored or disposed of in a manner to allow exposure to storm water;

      ii. Materials, equipment, and vehicle management practices employed to minimize contact of significant materials with storm water discharges;

iii. Existing structural and non-structural control measures to reduce pollutants in storm water discharges;

iv. Industrial storm water discharge treatment facilities;

v. Methods of onsite storage and disposal of significant materials.

4. A list of the types of pollutants that have a reasonable potential to be present in storm water discharges in significant quantities. Also provide a list of any pollutant that is listed as impaired in the most recent 303(d) report.

5. An estimate of the size of the facility in acres or square feet, and the percent of the facility that has impervious areas such as pavement or buildings.

6. A summary of existing sampling data describing pollutants in storm water discharges.

F. The plan shall describe the storm water management controls which will be implemented by the facility. The appropriate controls shall reflect identified existing and potential sources of pollutants at the facility. The description of the storm water management controls shall include:

1. Storm Water Pollution Prevention Personnel - Identification by job titles of the individuals who are responsible for developing, implementing, and revising the plan.

2. Preventive Maintenance - Procedures for inspection and maintenance of storm water conveyance system devices such as oil/water separators, catch basins, etc., and inspection and testing of plant equipment and systems that could fail and result in discharges of pollutants to storm water.

3. Good Housekeeping - Good housekeeping requires the maintenance of clean, orderly facility areas that discharge storm water. Material handling areas shall be inspected and cleaned to reduce the potential for pollutants to enter the storm water conveyance system.

4. Spill Prevention and Response - Identification of areas where significant materials can spill into or otherwise enter the storm water conveyance systems and their accompanying drainage points. Specific material handling procedures, storage requirements, spill cleanup equipment and procedures should be identified, as appropriate. Internal notification procedures for spills of significant materials should be established.

5. Storm Water Management Practices - Storm water management practices are practices other than those which control the source of pollutants. They include measures such as installing oil and grit separators, diverting storm water into retention basins, etc. Based on assessment of the potential of various sources to contribute pollutants, measures to remove pollutants from storm water discharge shall be implemented. In developing the plan, the following management practices shall be considered:

i. Containment - Storage within berms or other secondary containment devices to prevent leaks and spills from entering storm water runoff. To the maximum extent practicable storm water discharged from any area where material handling equipment or activities, raw material, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water should not enter vegetated areas or surface waters or infiltrate into the soil unless adequate treatment is provided.

ii. Oil & Grease Separation - Oil/water separators, booms, skimmers or other methods to minimize oil contaminated storm water discharges.

iii. Debris & Sediment Control - Screens, booms, sediment ponds or other methods to reduce debris and sediment in storm water discharges.

iv. Waste Chemical Disposal - Waste chemicals such as antifreeze, degreasers and used oils shall be recycled or disposed of in an approved manner and in a way which prevents them from entering storm water discharges.

v. Storm Water Diversion - Storm water diversion away from materials manufacturing, storage and other areas of potential storm water contamination. Minimize the quantity of storm water entering areas where material handling equipment of activities, raw material, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water using green infrastructure techniques where practicable in the areas outside the exposure area, and otherwise divert storm water away from exposure area.

vi. Covered Storage or Manufacturing Areas - Covered fueling operations, materials manufacturing and storage areas to prevent contact with storm water.

vii. Storm Water Reduction - Install vegetation on roofs of buildings within adjacent to the exposure area to detain and evapotranspirate runoff where precipitation falling on the roof is not exposed to contaminants, to minimize storm water runoff; capture storm water in devices that minimize the amount of storm water runoff and use this water as appropriate based on quality.

6. Sediment and Erosion Prevention - The plan shall identify areas which due to topography, activities, or other factors, have a high potential for significant soil erosion. The plan shall describe measures to limit erosion.

7. Employee Training - Employee training programs shall inform personnel at all levels of responsibility of the components and goals of the storm water pollution control plan. Training should address topics such as spill response, good housekeeping and material management practices. The plan shall identify periodic dates for such training.

8. Inspection Procedures - Qualified plant personnel shall be identified to inspect designated equipment and plant areas. A tracking or follow-up procedure shall be used to ensure appropriate response has been taken in response to an inspection. Inspections and maintenance activities shall be documented and recorded.

G. Non-Storm Water Discharge - The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharge. The certification shall include a description of any test for the presence of non-storm water discharges, the methods used, the dates of the testing, and any onsite drainage points that were observed during the testing. Any facility that is unable to provide this certification must describe the procedure of any test conducted for the presence of non-storm water discharges, the test results, potential sources of non-storm water discharges to the storm sewer, and why adequate tests for such storm sewers were not feasible.

H. Quarterly Visual Observation of Discharges - The requirements and procedures for quarterly visual observations are applicable to all outfalls covered by this condition.

1. You must perform and document a quarterly visual observation of a storm water discharge associated with industrial activity from each outfall. The visual observation must be made during daylight hours. If no storm event resulted in runoff during daylight hours from the facility during a monitoring quarter, you are excused from the visual observations requirement for that quarter, provided you document in your records that no runoff occurred. You must sign and certify the document.

2. Your visual observation must be made on samples collected as soon as practical, but not to exceed 1 hour or when the runoff or snow melt begins discharging from your facility. All samples must be collected from a storm event discharge that is greater than 0.1 inch in magnitude and that occurs at least 72 hours from the previously measureable (greater than 0.1 inch rainfall) storm event. The observation must document: color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. If visual observations indicate any unnatural color, odor, turbidity, floatable material, oil sheen or other indicators of storm water pollution, the permittee shall obtain a sample and monitor for the parameter or the list of pollutants in Part E.4.

3. You must maintain your visual observation reports onsite with the SWPPP. The report must include the observation date and time, inspection personnel, nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge (including observations of color, odor, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution), and probable sources of any observed storm water contamination.

4. You may exercise a waiver of the visual observation requirement at a facility that is inactive or unstaffed, as long as there are no industrial materials or activities exposed to storm water. If you exercise this waiver, you must maintain a certification with your SWPPP stating that the site is inactive and unstaffed, and that there are no industrial materials or activities exposed to storm water.

5. Representative Outfalls - If your facility has two or more outfalls that you believe discharge substantially identical effluents, based on similarities of the industrial activities, significant materials, size of drainage areas, and storm water management practices occurring within the drainage areas of the outfalls, you may conduct visual observations of the discharge at just one of the outfalls and report that the results also apply to the substantially identical outfall(s).

6. The visual observation documentation shall be made available to the Agency and general public upon written request.

I. The permittee shall conduct an annual facility inspection to verify that all elements of the plan, including the site map, potential pollutant sources, and structural and non-structural controls to reduce pollutants in industrial storm water discharges are accurate. Observations that require a response and the appropriate response to the observation shall be retained as part of the plan. Records documenting significant observations made during the site inspection shall be submitted to the Agency in accordance with the reporting requirements of this permit.

Special Conditions

J. This plan should briefly describe the appropriate elements of other program requirements, including Spill Prevention Control and Countermeasures (SPCC) plans required under Section 311 of the CWA and the regulations promulgated there under, and Best Management Programs under 40 CFR 125.100.

K. The plan is considered a report that shall be available to the public at any reasonable time upon request.

L. The plan shall include the signature and title of the person responsible for preparation of the plan and include the date of initial preparation and each amendment thereto.

M. Facilities which discharge storm water associated with industrial activity to municipal separate storm sewers may also be subject to additional requirement imposed by the operator of the municipal system

Construction Authorization

Authorization is hereby granted to construct treatment works and related equipment that may be required by the Storm Water Pollution Prevention Plan developed pursuant to this permit.

This Authorization is issued subject to the following condition(s).

N. If any statement or representation is found to be incorrect, this authorization may be revoked and the permittee there upon waives all rights there under.

O. The issuance of this authorization (a) does not release the permittee from any liability for damage to persons or property caused by or resulting from the installation, maintenance or operation of the proposed facilities; (b) does not take into consideration the structural stability of any units or part of this project; and (c) does not release the permittee from compliance with other applicable statutes of the State of Illinois, or other applicable local law, regulations or ordinances.

P. Plans and specifications of all treatment equipment being included as part of the stormwater management practice shall be included in the SWPPP.

Q. Construction activities which result from treatment equipment installation, including clearing, grading and excavation activities which result in the disturbance of one acre or more of land area, are not covered by this authorization. The permittee shall contact the IEPA regarding the required permit(s).

REPORTING

R. The facility shall submit an electronic copy of the annual inspection report to the Illinois Environmental Protection Agency. The report shall include results of the annual facility inspection which is required by Part I of this condition. The report shall also include documentation of any event (spill, treatment unit malfunction, etc.) which would require an inspection, results of the inspection, and any subsequent corrective maintenance activity. The report shall be completed and signed by the authorized facility employee(s) who conducted the inspection(s). The annual inspection report is considered a public document that shall be available at any reasonable time upon request.

S. The first report shall contain information gathered during the one year time period beginning with the effective date of coverage under this permit and shall be submitted no later than 60 days after this one year period has expired. Each subsequent report shall contain the previous year's information and shall be submitted no later than one year after the previous year's report was due.

T. If the facility performs inspections more frequently than required by this permit, the results shall be included as additional information in the annual report.

U. The permittee shall retain the annual inspection report on file at least 3 years. This period may be extended by request of the Illinois Environmental Protection Agency at any time.

Annual inspection reports shall be submitted electronically at epa.npdes.inspection@illinois.gov or mailed to the following address:

Illinois Environmental Protection Agency
Bureau of Water
Compliance Assurance Section
Annual Inspection Report
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

Special Conditions

V. The permittee shall notify any regulated small municipal separate storm sewer owner (MS4 Community) that they maintain coverage under an individual NPDES permit. The permittee shall submit any SWPPP or any annual inspection to the MS4 community upon request by the MS4 community.

SPECIAL CONDITION 15. The facility will be required to calculate the reportable concentration values at Outfall 001 if the sampling point is located after the wastewater treatment plant effluent and the Utility wastewaters have mixed.

Utility wastewater consists of boiler blow down, non-contact cooling water blow down, and utilities reverse osmosis wastewater.

Reportable Concentration Value = Measured Concentration Value times (Total Waste Stream (Utility Wastewater plus Waste Water Treatment Plant flow) divided by Waste Water Treatment flow)

Flows shall be determined by flow meters, calculation, or best professional estimate depending on the wastewater flows occurring during monitoring.

The calculated actual concentration shall be reported on the DMR with an example of the calculation attached to the submitted DMR with flows utilized per test date.

pH, Total Suspended Solids, BOD_5, and Manganese are not subject to this condition.

SPECIAL CONDITION 16. The facility has been granted a waiver of monitoring for some of the OCPSF regulated pollutants found in 40 CFR 414 Subpart I pursuant to 40 CFR 122.44 (a)(2).

The compounds that will have continued monitoring are 2,4-dimethyl phenol, benzene, bis(2-ethylhexyl)phthalate, ethylbenzene, methyl chloride, methylene chloride, naphthalene, toluene, phenol, chromium, copper, lead, nickel and zinc. Monitoring for these compounds will be required 2/Year. See Special Condition 17 for monitoring and reporting schedule.

All other OCPSF regulated pollutants under 40 CFR 414 Subpart I will not be required to be monitored. This waiver is good for the term of the permit but may be revoked, with notice and opportunity for hearing, upon notification that the facility's processes or raw materials have changed or other evidence is provided that would indicate the introduction of a waived pollutant parameter into the waste stream. Certification of no process change or raw material change is required to continue the monitoring waiver and shall be submitted with the renewal application for this permit.

The permittee shall provide the Illinois Environmental Protection Agency with information on any new chemical that contains a known amount of any of the waived OCPSF chemicals which the facility proposes to utilize in the process of development, production, and wastewater treatment. The information to be submitted to the Agency may include the following:

1. Brand name
2. Function of the chemical
3. Material Safety Data Sheet
4. Manufacturer Technical Specifications Data, if available
5. Proposed use at the facility including frequency, duration, and rate of use
6. An evaluation of the potential routes of entry into the waste water system

The Agency will conduct a timely evaluation of the information to determine the chemical's impact, if any, on the monitoring waiver described in this Condition. Agency approval of the new chemical must be received by the permittee prior to the new chemical's use at the facility. Upon review of the submitted information, the Agency shall advise the permittee if the monitoring waiver is to be revoked for any of the OCPSF regulated pollutants upon use of the new chemical.

Please refer to Special Condition 18 for addition procedures required for the monitoring waiver.

SPECIAL CONDITION 17. The analytical results or reports shall be submitted according to the following schedule.

Frequency:	Reporting Date:
1/Month or Less	Following Month DMR
1/Quarter*	Following Month DMR after Quarter
2/Year**	Reported on the July, and January DMRs
1/Year	Reported in the Following Year on the January DMR

Special Conditions

*Quarters are January-March, April-June, July-September, and October-December
**Samples taken during January-June reported in July, and during July-December reported in January.

SPECIAL CONDITION 18. The facility will be required to monitor all OCPSF regulated pollutants found in 40 CFR 414 Subpart I pursuant to 40 CFR 414 Subpart O in the influent waste stream prior to the wastewater treatment system within six months of permit renewal submission.

The required testing shall be submitted with the renewal submittal package.

The influent monitoring shall be at a point that monitors the process waste stream prior to mixing with any other dilutional waste streams or impacted stormwater/groundwater.

The Agency may use this information to remove constituents from the monitoring waiver request granted.

SPECIAL CONDITION 19. Hydrostatic Test Water and Other Discharges allowed to Outfall 002, 003, and 005.

For the purpose of this Permit, discharges from Outfalls 002, 003, and 005 shall be limited to storm water, free from process and other wastewater discharges except that the following non-stormwater discharges are authorized from Outfalls 002, 003, and 005: discharges from fire fighting activities; fire hydrant flushings and test waters; waters used to wash vehicles without the use of detergents only if performed in unconnected areas to the stormwater system; waters used to control uncontaminated dust; irrigation drainage from; lawn watering; routine external building washdown that does not include detergents; pavement wash waters outside process area where spills or leaks of toxic or hazardous material have not occurred (unless all spilled material has been removed) and where detergents are not used; air condenser condensate; condensate from refrigerants; foundation drains not contaminated or adjacent to process areas; and hydrostatic test waters as long as they are used in new piping and equipment so that the water does not come into contact with process chemicals and materials.

Hydrostatic test water must comply with requirements established on page 6 of this permit and Special Condition 20.

The permittee may discharge additional hydrostatic waste water from other sources not listed above if the field office verifies that the system being tested is free of all process wastewater and chemical materials. See Special Condition 20(d) for contact information.

All discharges allowed above shall adhere to Special Conditions 21(a), 21(b), and 21(c).

SPECIAL CONDITION 20. Hydrostatic Test Water Requirements from Outfalls 002, 003, and 005.

a. In addition to other requirements of this permit, no effluent shall contain settleable solids, floating debris, visible oil, grease, scum, or sludge solids. Color (including color resulting from dyes or tracers in the hydrostatic test water) odor and turbidity shall be reduced to below obvious levels.

b. Appropriate measures shall be taken to prevent water quality impacts resulting from soil erosion due to the discharge. The discharge flow rate shall be controlled so as not to cause scouring or other damage to stream beds or banks.

c. Solid wastes such as straw used for filtering or erosion control shall be disposed of in accordance with state and federal law.

d. The permittee shall provide telephone notification to the IEPA Des Plaines Regional Office at, 815/987-7760, at least 1 week prior to any hydrostatic pipeline testing which may result in a discharge.

e. When test water is discharged to the same waterbody from which it was withdrawn, compliance with the numerical effluent standards is not required when effluent concentrations in excess of the standards result entirely from influent contamination, evaporation, and/or the incidental addition of traces of materials not utilized or produced in the hydrostatic test activity that is the source of the waste.

f. When the wastewater contains or could contain total residual chlorine (TRC), the permittee will be required to test for TRC as described on page 6 of this permit.

All samples for total residual chlorine (TRC) shall be analyzed by an applicable method contained in 40 CFR 136, equivalent in accuracy to low-level amperometric titration. Any analytical variability of the method used shall be considered when determining the accuracy and precision of the results obtained.

g. Except for the situation described in (A) below, the permittee shall only discharge hydrostatic test water to the origin from which the source water was drawn. For all treatment programs, including chlorination, written notification to the Illinois EPA shall be submitted and shall include a complete description of the proposed treatment process as well as information explaining the basis of design. Only those treatment programs approved by the Illinois EPA may be implemented. The permit may be modified to include additional limits and conditions following public notice and opportunity for hearing.

Special Conditions

(A)The permittee may discharge hydrostatic test water from any municipal source to any of the watersheds identified above provided the water will not cause any violation of water quality standards. If the source water is chlorinated then the water must meet the limit for total residual chlorine listed on page two of this permit prior to discharge. The permittee shall provide written notification to the Illinois EPA in the event that treatment processes other than chlorination are to be utilized for biological treatment. The notification shall include a description of the proposed treatment process along with basis of design information. Only those treatment programs approved by the Illinois EPA may be implemented. The permit may be modified to include additional limits and conditions based on the alternative treatment proposed. Any modification of the permit will follow public notice and opportunity for a public hearing.

SPECIAL CONDITION 21. Total Suspended Solids Sampling Procedure

The permittee may collect 8 individual grab samples for total suspended solids for Outfall 001 and report the results as a mathematical composite on the DMR's, provided that the 8 individual grab samples will be collected as periodic intervals during the operating hours of the facility over a 24-hr period, and the mathematical composite will be representative of the discharge from Outfall 001.

SPECIAL CONDITION 22. INEOS Joliet, LLC timely filed a Time-Limited Water Quality Standard (TLWQS) for temperature (Case # PCB 2016-024). Since they timely filed, the thermal water quality standard at 35 Ill. Adm. Code 302.408 is stayed. The permittee must comply with the Board Order resulting from the TLWQS (Case # PCB 2016-024).

SPECIAL CONDITION 23. The permittee shall test for Benzo(a)anthracene, Benzo(a)pyrene, and 3,4 benzofluoranthene once per month for 10 consecutive months at outfall 001 on a non-limited basis. This Permit may be modified with public notice to establish effluent limitations if appropriate, based on information obtained through sampling

SPECIAL CONDITION 24. The permittee shall test for mercury once per month for 10 consecutive months at outfall 004 on a non-limited basis. The detection limit shall be 1.0 ng/L. This Permit may be modified with public notice to establish effluent limitations if appropriate, based on information obtained through sampling.

The permittee shall utilize USEPA Method 1631E and the digestion procedure described in Section 11.1.1.2 of 1631E.

Attachment H

Standard Conditions

Definitions

Act means the Illinois Environmental Protection Act, 415 ILCS 5 as Amended.

Agency means the Illinois Environmental Protection Agency.

Board means the Illinois Pollution Control Board.

Clean Water Act (formerly referred to as the Federal Water Pollution Control Act) means Pub. L 92-500, as amended. 33 U.S.C. 1251 et seq.

NPDES (National Pollutant Discharge Elimination System) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318 and 405 of the Clean Water Act.

USEPA means the United States Environmental Protection Agency.

Daily Discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Maximum Daily Discharge Limitation (daily maximum) means the highest allowable daily discharge.

Average Monthly Discharge Limitation (30 day average) means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Discharge Limitation (7 day average) means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Aliquot means a sample of specified volume used to make up a total composite sample.

Grab Sample means an individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.

24-Hour Composite Sample means a combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24-hour period.

8-Hour Composite Sample means a combination of at least 3 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over an 8-hour period.

Flow Proportional Composite Sample means a combination of sample aliquots of at least 100 milliliters collected at periodic intervals such that either the time interval between each aliquot or the volume of each aliquot is proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot.

(1) **Duty to comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.

(2) **Duty to reapply.** If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. If the permittee submits a proper application as required by the Agency no later than 180 days prior to the expiration date, this permit shall continue in full force and effect until the final Agency decision on the application has been made.

(3) **Need to halt or reduce activity not a defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

(4) **Duty to mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

(5) **Proper operation and maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up, or auxiliary facilities, or similar systems only when necessary to achieve compliance with the conditions of the permit.

(6) **Permit actions.** This permit may be modified, revoked and reissued, or terminated for cause by the Agency pursuant to 40 CFR 122.62 and 40 CFR 122.63. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

(7) **Property rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.

(8) **Duty to provide information.** The permittee shall furnish to the Agency within a reasonable time, any information which the Agency may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also furnish to the Agency upon request, copies of records required to be kept by this permit.

(9) **Inspection and entry.** The permittee shall allow an authorized representative of the Agency or USEPA (including an authorized contractor acting as a representative of the Agency or USEPA), upon the presentation of credentials and other documents as may be required by law, to:

(a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

(c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(d) Sample or monitor at reasonable times, for the purpose of assuring permit compliance, or as otherwise authorized by the Act, any substances or parameters at any location.

(10) **Monitoring and records.**

(a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of this permit, measurement, report or application. Records related to the permittee's sewage sludge use and disposal activities shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503). This period may be extended by request of the Agency or USEPA at any time.

(c) Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;

(2) The individual(s) who performed the sampling or measurements;

(3) The date(s) analyses were performed;

(4) The individual(s) who performed the analyses;

(5) The analytical techniques or methods used; and

(6) The results of such analyses.

(d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. Where no test procedure under 40 CFR Part 136 has been approved, the permittee must submit to the Agency a test method for approval. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to ensure accuracy of measurements.

(11) **Signatory requirement.** All applications, reports or information submitted to the Agency shall be signed and certified.

(a) **Application.** All permit applications shall be signed as follows:

(1) For a corporation: by a principal executive officer of at least the level of vice president or a person or position having overall responsibility for environmental matters for the corporation:

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

(b) **Reports.** All reports required by permits, or other information requested by the Agency shall be signed by a person described in paragraph (a) or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described in paragraph (a); and

(2) The authorization specifies either an individual or a position responsible for the overall operation of the facility, from which the discharge originates, such as a plant manager, superintendent or person of equivalent responsibility; and

(3) The written authorization is submitted to the Agency.

(c) **Changes of Authorization.** If an authorization under (b) is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of (b) must be submitted to the Agency prior to or together with any reports, information, or applications to be signed by an authorized representative.

(d) **Certification.** Any person signing a document under paragraph (a) or (b) of this section shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

(12) **Reporting requirements.**

(a) **Planned changes.** The permittee shall give notice to the Agency as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source pursuant to 40 CFR 122.29 (b); or

(2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements pursuant to 40 CFR 122.42 (a)(1).

(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

(b) **Anticipated noncompliance.** The permittee shall give advance notice to the Agency of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(c) **Transfers.** This permit is not transferable to any person except after notice to the Agency.

(d) **Compliance schedules.** Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

(e) **Monitoring reports.** Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR).

(2) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

(3) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Agency in the permit.

(f) **Twenty-four hour reporting.** The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24-hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time; and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The following shall be included as information which must be reported within 24-hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit.

(2) Any upset which exceeds any effluent limitation in the permit.

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Agency in the permit or any pollutant which may endanger health or the environment.

The Agency may waive the written report on a case-by-case basis if the oral report has been received within 24-hours.

(g) **Other noncompliance.** The permittee shall report all instances of noncompliance not reported under paragraphs (12) (d), (e), or (f), at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (12) (f).

(h) **Other information.** Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application, or in any report to the Agency, it shall promptly submit such facts or information.

(13) **Bypass.**

(a) Definitions.

(1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

(2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

(b) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (13)(c) and (13)(d).

(c) Notice.

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph (12)(f) (24-hour notice).

(d) Prohibition of bypass.

(1) Bypass is prohibited, and the Agency may take enforcement action against a permittee for bypass, unless:

(i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(iii) The permittee submitted notices as required under paragraph (13)(c).

(2) The Agency may approve an anticipated bypass, after considering its adverse effects, if the Agency determines that it will meet the three conditions listed above in paragraph (13)(d)(1).

(14) **Upset.**

(a) Definition. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

(b) Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph (14)(c) are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

(c) Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required in paragraph (12)(f)(2) (24-hour notice).

(4) The permittee complied with any remedial measures required under paragraph (4).

(d) Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

(15) **Transfer of permits.** Permits may be transferred by modification or automatic transfer as described below:

(a) Transfers by modification. Except as provided in paragraph (b), a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued pursuant to 40 CFR 122.62 (b) (2), or a minor modification made pursuant to 40 CFR 122.63 (d), to identify the new permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

(b) Automatic transfers. As an alternative to transfers under paragraph (a), any NPDES permit may be automatically

transferred to a new permittee if:

(1) The current permittee notifies the Agency at least 30 days in advance of the proposed transfer date;

(2) The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage and liability between the existing and new permittees; and

(3) The Agency does not notify the existing permittee and the proposed new permittee of its intent to modify or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement.

(16) All manufacturing, commercial, mining, and silvicultural dischargers must notify the Agency as soon as they know or have reason to believe:

(a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant identified under Section 307 of the Clean Water Act which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

(1) One hundred micrograms per liter (100 ug/l);

(2) Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6 dinitrophenol; and one milligram per liter (1 mg/l) for antimony.

(3) Five (5) times the maximum concentration value reported for that pollutant in the NPDES permit application; or

(4) The level established by the Agency in this permit.

(b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the NPDES permit application.

(17) All Publicly Owned Treatment Works (POTWs) must provide adequate notice to the Agency of the following:

(a) Any new introduction of pollutants into that POTW from an indirect discharge which would be subject to Sections 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; and

(b) Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

(c) For purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

(18) If the permit is issued to a publicly owned or publicly regulated treatment works, the permittee shall require any industrial user of such treatment works to comply with federal requirements concerning:

(a) User charges pursuant to Section 204 (b) of the Clean Water Act, and applicable regulations appearing in 40 CFR 35;

(b) Toxic pollutant effluent standards and pretreatment standards pursuant to Section 307 of the Clean Water Act; and

(c) Inspection, monitoring and entry pursuant to Section 308 of the Clean Water Act.

(Rev. 7-9-2010 bah)

(19) If an applicable standard or limitation is promulgated under Section 301(b)(2)(C) and (D), 304(b)(2), or 307(a)(2) and that effluent standard or limitation is more stringent than any effluent limitation in the permit, or controls a pollutant not limited in the permit, the permit shall be promptly modified or revoked, and reissued to conform to that effluent standard or limitation.

(20) Any authorization to construct issued to the permittee pursuant to 35 Ill. Adm. Code 309.154 is hereby incorporated by reference as a condition of this permit.

(21) The permittee shall not make any false statement, representation or certification in any application, record, report, plan or other document submitted to the Agency or the USEPA, or required to be maintained under this permit.

(22) The Clean Water Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed $25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318 or 405 of the Clean Water Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both. Additional penalties for violating these sections of the Clean Water Act are identified in 40 CFR 122.41 (a)(2) and (3).

(23) The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

(24) The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

(25) Collected screening, slurries, sludges, and other solids shall be disposed of in such a manner as to prevent entry of those wastes (or runoff from the wastes) into waters of the State. The proper authorization for such disposal shall be obtained from the Agency and is incorporated as part hereof by reference.

(26) In case of conflict between these standard conditions and any other condition(s) included in this permit, the other condition(s) shall govern.

(27) The permittee shall comply with, in addition to the requirements of the permit, all applicable provisions of 35 Ill. Adm. Code, Subtitle C, Subtitle D, Subtitle E, and all applicable orders of the Board or any court with jurisdiction.

(28) The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit is held invalid, the remaining provisions of this permit shall continue in full force and effect.

APPENDIX 4

INEOS Reasonable Potential Analysis for Temperature

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INEOS Thermal Compliance --Reasonable Potential Analysis

INEOS Joliet LLC, NPDES Permit No. 0001643

Intake Source Water: On-Site Well

Receiving Stream: Lower Des Plaines River (LDPR) in Upper Dresden Island Pool ((UDIP)

7-day 10-year Low Flow (7Q10) of Stream Segment: 1,493 cfs

Average River Flow (2016-2021 period of record): 3,959 cfs

Outfall 001:

Design Maximum Flow (DAF):	2.8 MGD (4.3 cfs)—0.3% of 7Q10 river flow
Design Average Flow (DAF):	2.318 MGD (3.6 cfs)—0.24% of 7Q10 river flow
Long-Term Average Flow (LTA):	1.22 MGD (1.9 cfs)—0.13% of 7Q10 river flow
2016-2021 Average Flow:	1.41 MGD (2.2 cfs)—0.15% of 7Q10 river flow

Discharge Location: RM 280.3

Maximum Summer Discharge Temperature (2016-2021 period of record): 97.8 ºF

Average Summer Discharge Temperature (2016-2021 period of record): 80.9 ºF

Maximum Winter Discharge Temperature (2016-2021 period of record): 87.0 ºF

Average Winter Discharge Temperature (2016-2021 period of record): 75.3 ºF

(See Table 1B--data represents hourly maximums).

As shown in **Figure 1**, the INEOS discharge temperature is consistently higher than the corresponding UDIP limit during the winter and transitional months due to the nature of its operations. Summer temperatures are generally at or below the UDIP limit, but intermittent temperatures in excess of 90 ºF have occurred in five of the six past years analyzed, on a daily average end-of-pipe temperature basis. (Hourly fluctuations result in a greater percentage of exceedances, as shown in **Figure 2**).

With the consistently small volume of discharge from INEOS, even at low river flow, there is sufficient heat dissipation available to meet the UDIP Use numeric limitations with an allowed mixing zone, even when the ambient water temperatures are close to the maximum applicable limit. However, due to the approval and implementation of the MG Near-Field ATELs that apply to the waterway segment into which INEOS discharges, the facility is not allowed a mixing zone under , and therefore cannot maintain consistent compliance with the UDIP thermal standards on an end-of-pipe basis. Further, since the MG Joliet Stations have the potential to heat the waterway to temperatures above the UDIP limits and still remain in compliance with the approved ATELs, this could further affect the ability of INEOS to comply with the UDIP standards as currently applied.

Therefore, the logical solution is for the same MG ATELs to apply to the INEOS thermal discharge, including the allowance for a mixing zone in which to meet the ATELs within the main body of the receiving stream. **With allowed mixing with 25% of the 7Q10 flow (i.e. 373 cfs), there is no potential for the INEOS thermal discharge to increase the temperature of the river beyond whatever the ambient upstream temperature is at any given time even under worst case conditions with a maximum end-of-pipe temperature of 100 ºF** (See analysis presented below in **Tables 1 and 2.**)

INEOS Thermal Compliance--Reasonable Potential Analysis

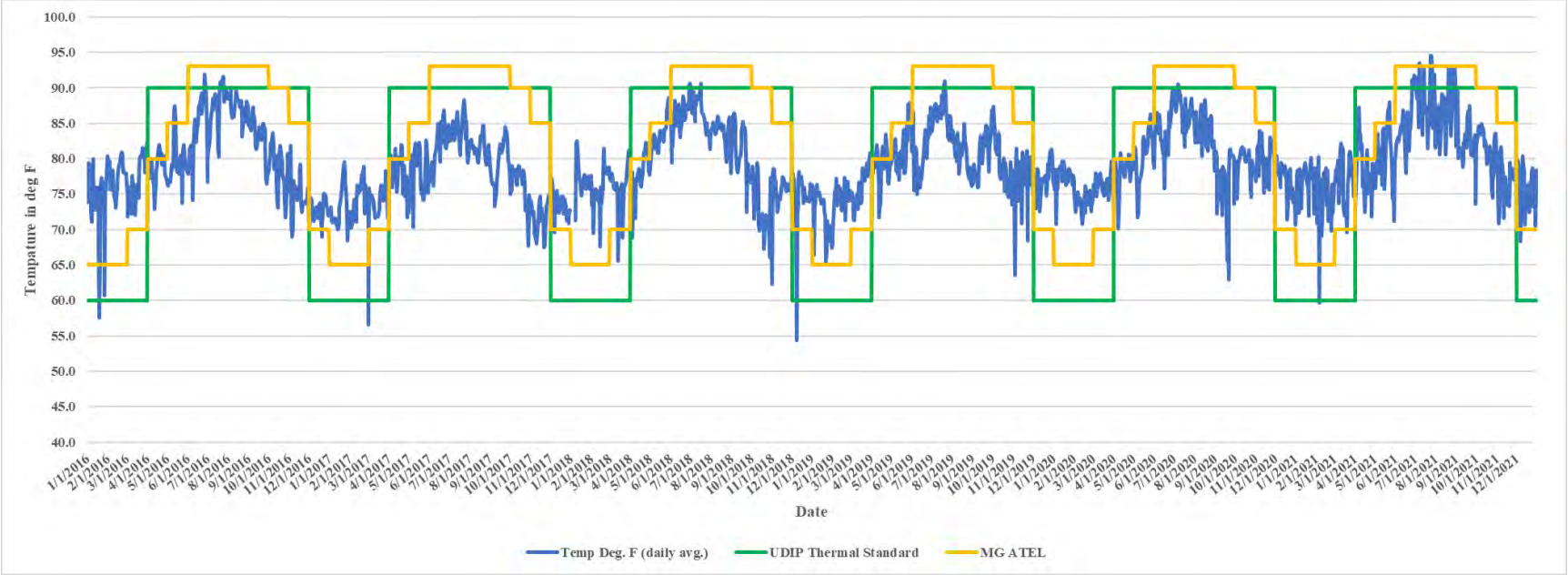

Figure 1. **INEOS Daily Average End-of-Pipe Discharge Temperature Compared to Thermal Standards**

INEOS Thermal Compliance--Reasonable Potential Analysis

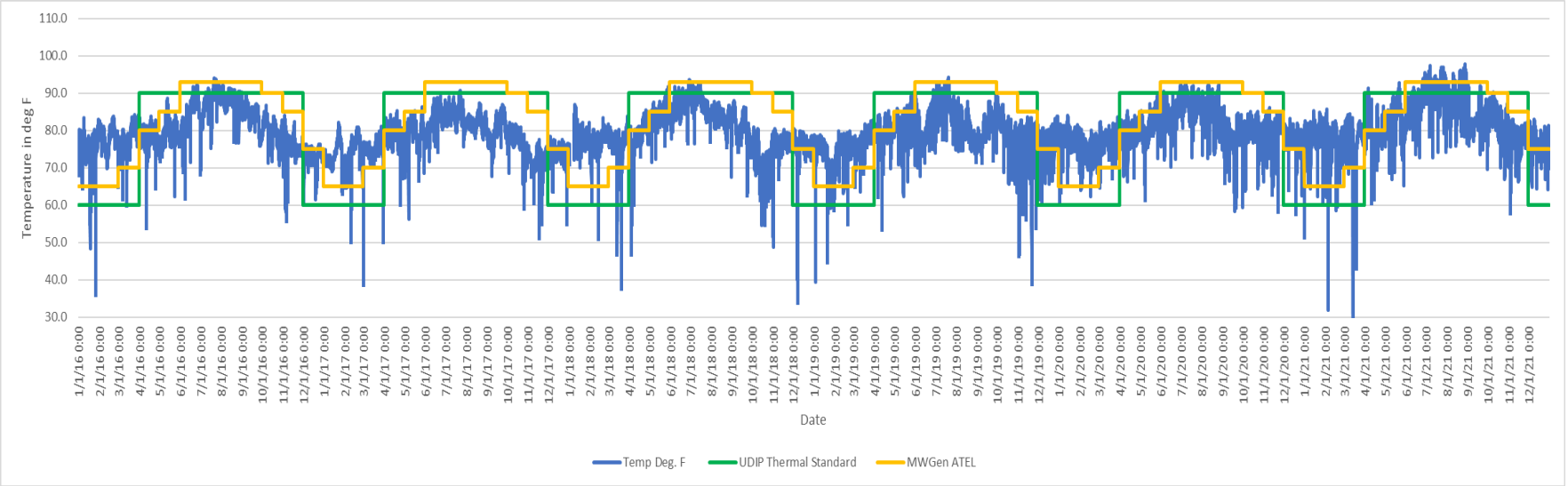

Figure 2. INEOS Hourly Maximum End-of-Pipe Discharge Temperatures Compared to Standards

Table 1: Worst Case Analysis for INEOS Thermal Compliance with Allowed Mixing Under MG ATELs

Date	Worst-Case Max Upstream Temperature (deg F)--equal to MG ATELs	Max INEOS Discharge (deg F)--Worst Case	MAX Discharge flow (cfs)	7Q10 UDIP Flow (cfs)	25% of 7Q10 flow** (cfs)	Resultant Edge of Mixing Zone Compliance Temp (deg F)
January	65	100.0	4.30	1493	373	65.4
February	65	100.0	4.30	1493	373	65.4
March	70	100.0	4.30	1493	373	70.3
April	80	100.0	4.30	1493	373	80.2
May	85	100.0	4.30	1493	373	85.2
June	93	100.0	4.30	1493	373	93.1
July	93	100.0	4.30	1493	373	93.1
August	93	100.0	4.30	1493	373	93.1
September	93	100.0	4.30	1493	373	93.1
October	90	100.0	4.30	1493	373	90.1
November	85	100.0	4.30	1493	373	85.2
December	70	100.0	4.30	1493	373	70.3

**Use of 25% of the 7Q10 Flow, along with elevated ambient temperatures in this example, provides a worst-case approximation of compliance temperature; Actual temperatures in the main body of the river would be much lower based on the river flow data records provided in Appendix 2.

Table 2: INEOS Thermal Compliance Analysis Using Measured Hourly Maximum Discharge Temperatures (2016-2021)

Date	Worst-Case Max Upstream Temperature (deg F)--equal to MG ATELs	Max INEOS Discharge (deg F)--based on hourly values	MAX Discharge flow (cfs)	7Q10 UDIP Flow (cfs)	25% of 7Q10 flow (cfs)	Resultant Edge of Mixing Zone Compliance Temp (deg F)
January	65	86.9	4.30	1493	373	65.2
February	65	85.7	4.30	1493	373	65.2
March	70	87.0	4.30	1493	373	70.2
April	80	91.2	4.30	1493	373	80.1
May	85	92.7	4.30	1493	373	85.1
June	93	95.4	4.30	1493	373	93.0
July	93	97.2	4.30	1493	373	93.0
August	93	97.8	4.30	1493	373	93.1
September	93	92.1	4.30	1493	373	93.0
October	90	90.3	4.30	1493	373	90.0
November	85	86.1	4.30	1493	373	85.0
December	70	83.8	4.30	1493	373	70.2

INEOS Thermal Compliance Analysis Mass-Balance Model

Compliance Model Used for Reasonable Potential Analysis:

Introduction

This model calculates a "fully-mixed" receiving water temperature immediately downstream of the INEOS Outfall 001 discharge. Compliance with the applicable near-field temperature standards is determined based on the output of this model.

The model determines the fully-mixed receiving water temperature by calculating a weighted average temperature of the receiving stream, after mixing with the INEOS thermal discharge, based on the temperature and flow of the Outfall 001 discharge and the temperature and flow of the receiving stream. This approach is patterned after the general mass balance procedure for conservative substances outlined in IEPA's Illinois Strategy for Point Source Wasteload Allocation, January 17, 1991.

This model has been reviewed and approved for use by IEPA at other NPDES permitted facilities, including the MG Joliet Stations.

INEOS Thermal Compliance Mass-Balance Model

Thermal Balance Procedure for Determination of Fully-Mixed Receiving Water Temperature

Fully mixed receiving water temperatures are determined using a thermal balance model that considers INEOS thermal discharge temperature and flow, upstream river flow, and upstream river temperature.

The basic thermal balance equation for determination of the fully-mixed receiving water temperature is:

$$T_{FM} = \frac{T_D Q_{CW} + T_{US}(0.25 * Q_{AV})}{Q_{CW} + (0.25 * Q_{AV})}$$

Term	Description
T_{FM}	Calculated fully-mixed receiving water temperature in degrees F.
T_D	Actual discharge temperature in deg F from the continuous temperature monitor
Q_{CW}	Discharge water flow in cubic feet per second.
Q_{AV}	Available receiving stream dilution flow in cfs. Model assumes that only 25% of the 7Q10 flow can be used at any time. Since INEOS does not withdraw water from the river, 25% of the full 7Q10 flow is available for dilution. (Use of this extremely conservative amount of river flow will ensure continuing compliance with temperature limits in the main body of the river under expected conditions).
T_{US}	Upstream river temperature in degrees F.

INEOS Thermal Compliance -- Reasonable Potential Analysis

The INEOS compliance temperature will always reflect the upstream ambient water temperature, as long as the upstream river temperature remains at or below the approved MG ATELs. Compliance will be attained, no matter what the INEOS end-of-pipe temperature is, due to the extremely small flow contribution. This is illustrated by the scenarios provided in Tables 1 and 2.

Assumptions:

1. Ambient upstream water temperature is equal to the MG ATEL value (WORST CASE)
2. 7Q10 river flow (1,493 cfs) assumed, with use of worst-case DMF flow (4.3 cfs)
3. Only 25% of the 7Q10 river flow is allowed for mixing

Results are provided for scenarios using the above values, with a range of upstream ambient water temperatures either at or approaching the applicable seasonally-based MG ATEL values. Even at DMF flow with the maximum measured seasonal discharge temperature, the compliance temperature (representative of what would be found in the main body of the LDPR) is essentially the same as the ambient upstream temperature in every case. Use of this model provides a conservative estimate of the fully mixed temperature of the discharge and conclusively demonstrates the insignificant impact of the INEOS thermal discharge on the BIC, as well as the overall thermal regime of the receiving stream.

Upon request, INEOS will provide a real-time demonstration of the calculational model that can be used to run any variety of scenarios to demonstrate compliance under a variety of conditions.

Based on this analysis, a year-round effluent limit of 100°F for Outfall 001 will ensure continuing compliance with the MG ATELs.

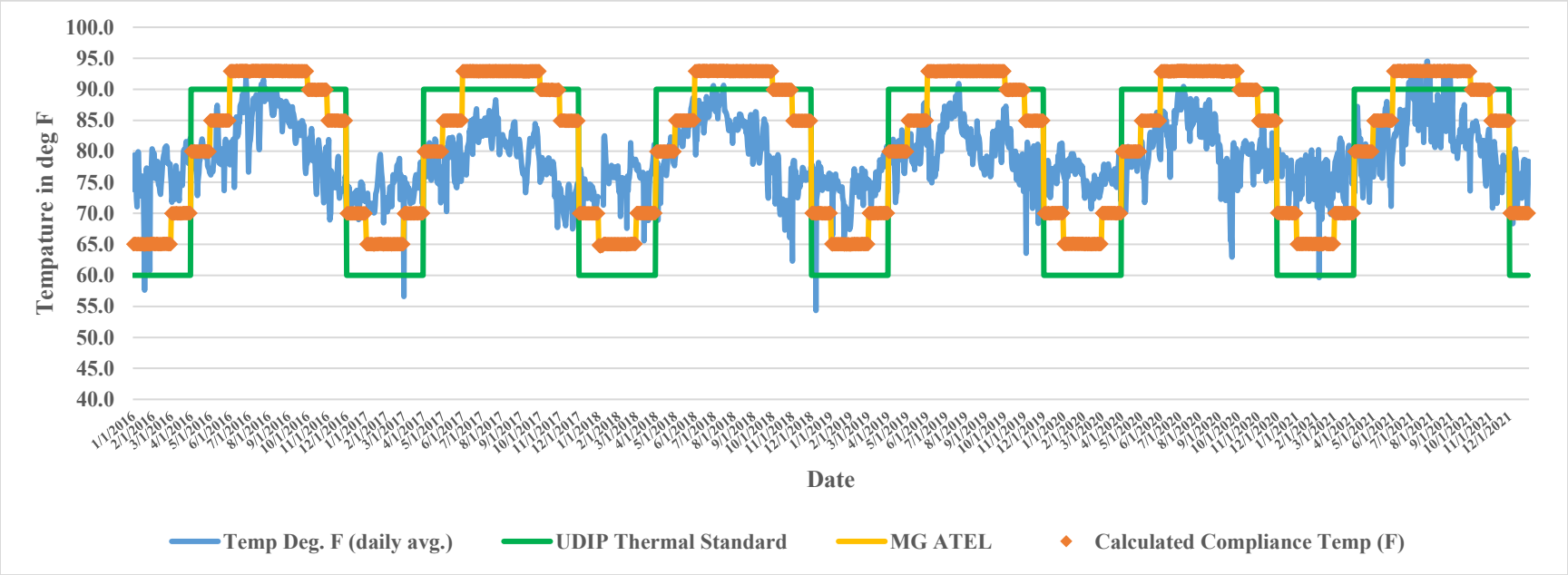

Figure 3. INEOS Worst-Case Compliance Temperature Compared to Thermal Standards

In the above example, actual INEOS discharge temperatures and flows were used in the mass-balance model for the entire six-year period from 2016-2021. Upstream water temperature was assumed to be equivalent to the MG ATEL value for illustrative purposes, and 25% of the published 7Q10 river flow was applied. The final compliance values are essentially the same as the assumed upstream temperatures.

In reality, ambient upstream water temperatures at or close to the MG ATEL maximums are not expected to occur with any frequency; therefore, the INEOS compliance temperatures will remain considerably lower than those shown in the worst-case figure above.

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APPENDIX 5

Review of LDPR Mussel Information to Support INEOS Mixing Zone Requirements

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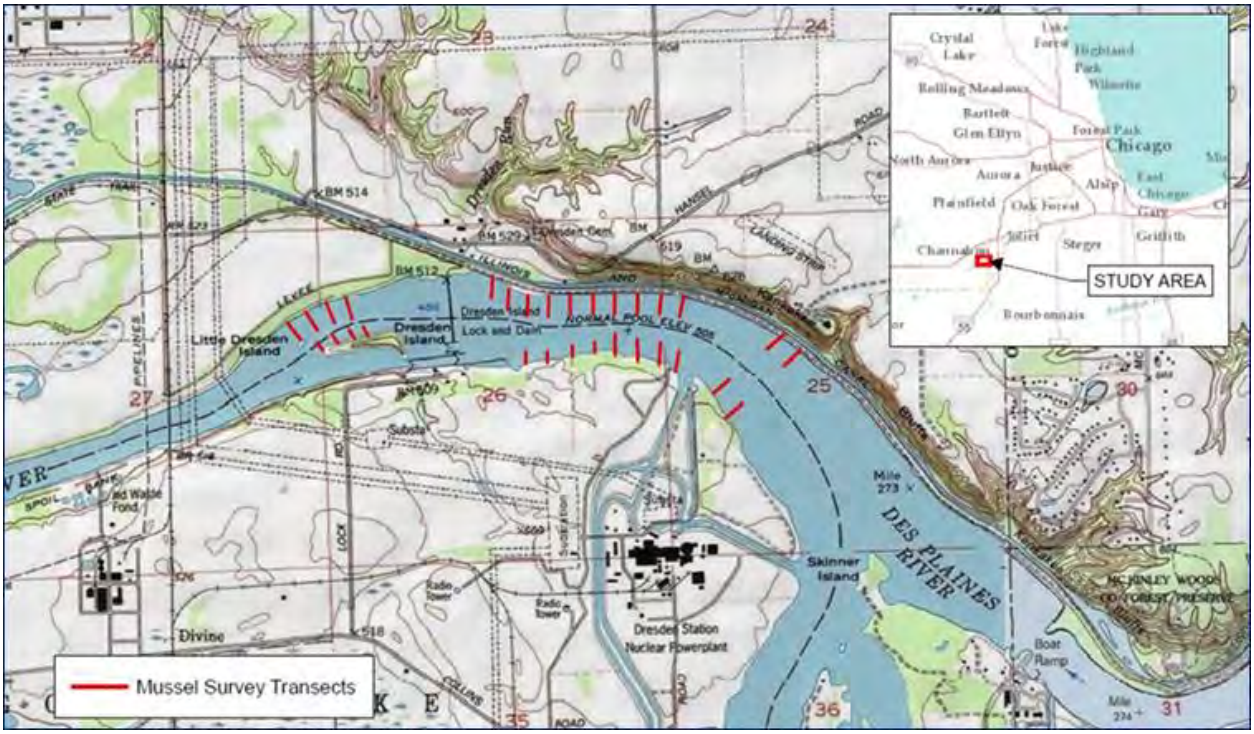
MUSSEL SURVEY INFORMATION FOR THE LOWER DES PLAINES RIVER

The most recent study in the vicinity of the INEOS thermal discharge was for the Houbolt Bridge project, conducted in **September 2017** (EnviroScience 2017). Study Location: ~River Mile 282, which is approximately 2 River Miles Upstream of the INEOS discharge. Several transects both upstream and downstream of the proposed bridge site were surveyed using approved methods. A total of 275 freshwater mussels, representing eight species, were collected during the survey. None of the mussel species collected during the survey were designated as state or federally protected species. Of the species collected, Threeridge (*Amblema plicata*) was the most abundantly collected species (232 mussels) and accounted for approximately 85% of the total catch. Mapleleaf (*Quadrula quadrula*) was the second most abundantly collected species (30 mussels) and accounted for 11% of all mussels collected. Zebra mussels were infrequently observed attached to live mussels that were brought to the surface for identification. Live mussels were generally sparse within 50m of each bank. These sections of the examined transects were covered in submerged aquatic vegetation and dense clumps of long filamentous algae. Sampled transects ranged in depth from 0.3m (1ft) to 4.8m (16ft). Depths remained generally shallow along each bank until reaching the river's navigational channel. At this transition point, depths typically dropped 1.5m (5ft) to 2m (6.5ft) in depth over a short distance. Substrates along both banks were dominated by mud and silt. These areas were covered in submerged aquatic vegetation and filamentous algae. Substrates transitioned to a hard clay when approaching the navigational channel, where aquatic vegetation and filamentous algae were no longer present. Zebra mussels were generally absent on substrates along each transect due to the lack of larger, hard substrates within the examined area.

SOURCE: EnviroScience, Inc. 2017. Freshwater Mussel Survey for the Houboult Road Bridge Over the Des Plaines River. Joliet, IL. Prepared for Geosyntec Consultants.

In **September 2014**, a mussel survey was conducted in the Illinois River just downstream of the confluence of the Lower Des Plaines and Kankakee Rivers as part of the Exelon Dresden Nuclear Station 316(a) Demonstration studies (EA 2014). The study extended from River Mile 271 to River Mile 272.5 (7.5 to 9 River Miles downstream of INEOS). A total of 3,349 individuals representing 25 species were collected within the survey area from the semi-quantitative and qualitative sampling efforts; 928 individuals representing 20 species downstream and 2,421 individuals representing 24 species upstream of the Dresden lock and dam. The most abundant species encountered during the survey was the Threeridge (*Amblema plicata*) which represented 57.7 percent of the total followed by Mucket (*Actinonaias ligamentina*) with 8.2 percent of the total and Pink heelsplitter (*Potamilus alatus*) with 7.8 percent of the total. Each of the other 22 species comprised less than seven percent and collectively comprised 26.3 percent of the total abundance. The same three species were most abundant upstream of the lock and dam representing, 66.1 percent, 4.3 percent, and 7.5 percent of the total, respectively. Those three species were also the most abundant species encountered downstream of the lock and dam, representing 35.8 percent, 18.1 percent, and 8.7 percent, respectively. The highest densities of mussels occurred in areas with a diverse substrate mix of silt, gravel, and sand. The largest concentration and highest densities of mussels occurred along the right descending bank opposite and downstream of the Dresden discharge. Two state threatened species were encountered: Purple Wartyback (*Cyclonaias tuberculata*) and Black Sandshell (*Ligumia recta*).

SOURCE: EA Engineering, Science, and Technology, Inc., PBC. 2014. Freshwater Mussel Survey in the Illinois River near the Dresden Generating Station (RM 271-272.5). Prepared for Exelon Generation Company LLC.



The Illinois Natural History Survey performed mussel surveys in the tributaries to the Lower Des Plaines River in **2009 and 2011** (Price, et al 2012). The three locations closest to the INEOS discharge were (#13 and #14) in Jackson Creek (River Mile 278.2, approximately two miles downstream of the INEOS discharge), and (#18) the DuPage River delta area (~River Mile 277; three miles downstream of the INEOS discharge). Jackson Creek yielded four common species, with two represented by only dead organisms. Six species were identified in the DuPage River, with only one living specimen being found. No state or federally listed threatened or endangered species were encountered for these locations. These data support the position that mussels, particularly native species, reside primarily in locations with more favorable habitat, which is not likely to be found in areas upstream of the confluence of the LDPR and Kankakee River.

SOURCE: Price, A.L., D.K. Shasteen, and S.A. Bales. 2012. Freshwater mussels of the Des Plaines River and Lake Michigan tributaries in Illinois. Illinois Natural History Survey Technical Report 2012 (10). Champaign, IL. 16 pp.

In survey conducted in **2008** for the Brandon Road Hydroelectric development, no live unionids were found in the Brandon Road Dam survey area (~River Mile 285; approximately 5 River Miles upstream of the INEOS discharge) (ESI 2008). Only weathered shells of three common

species were identified: Fat Mucket (Lampsilis siliquoidea), Giant Floater (Pyganodan grandis), and Paper Pondshell (Utterbackia imbecillis).

SOURCE: Ecological Specialists, Inc. (ESI). 2008. Final Report: Characterization of Unionid Communities Downstream of Two Lock and Dams on the Illinois River.

SUMMARY: There is available mussel data for the waterway, although nothing in very close proximity to the INEOS discharge. None of the upstream studies found any federal or state threatened or endangered species. The physical habitat of the Lower Des Plaines (soft silt, clay, and legacy contaminants) is not conducive to colonization by more sensitive/intolerant mussel species. In particular, the shoreline area near the INEOS thermal discharge is characterized by shallow silted areas. Habitat improves downstream, especially downstream of the confluence with the Kankakee (as shown by the study performed near the Dresden Lock and Dam—see above). Therefore, it is unlikely that there are any mussel beds in the immediate vicinity or directly downstream from the INEOS thermal discharge. The small volume of the thermal discharge mixes rapidly with the main body of the river, resulting in no discernable changes in overall ambient temperature of the LDPR, nor any subsurface/bottom sediment impacts.

CERTIFICATE OF SERVICE

I, the undersigned, on oath state the following:

That I have served the attached the **PETITION TO APPROVE ALTERNATIVE THERMAL EFLUENT LIMITATIONS FOR INEOS JOLIET, LLC** via electronic mail upon:

Don Brown
Clerk of the Board
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601
Don.Brown@illinois.gov

Division of Legal Counsel
Illinois Environmental Protection Agency
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That my email address is: Michael.Murphy@heplerbroom.com

That the number of pages in the email transmission is 159 pages.

That the email transmission took place before 5:00 p.m. on the date of June 29, 2023.

/s/ Michael P. Murphy
One of Its Attorneys

Date: June 29, 2023